

Examining Nursing Bronchiolitis Education to Improve Discharge Times for RSV Bronchiolitis

Patients: A Quality Improvement

Taylor Tran BSN, RN

Oregon Health & Science University School of Nursing

Submitted to: Sandra Banta-Wright PhD, RN, NNP-BC

This paper is submitted in partial fulfillment of the requirements for the Doctor of Nursing

Practice degree.

Abstract

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Background & Significance: Respiratory Syncytial Virus (RSV) circulates annually from fall to spring, peaking in the winter season, targeting small airways of infants leading to acute inflammation of the lower respiratory tract (Piedimonte & Perez, 2014). During this time, pediatric patient volumes exceed hospital service limits.

Problem: Nursing care management of bronchiolitis involves competent clinical assessments and decision-making skills to offer supportive care interventions, escalate clinical concerns, and determine discharge readiness. Lack of nursing skills to assess respiratory status can lead to poor clinical outcomes and unnecessary interventions, resulting in prolonged hospital stays.

Aims & Objectives: The purpose of this quality improvement (QI) project was to examine the nursing bronchiolitis knowledge of clinical assessment and decision-making skills. The following interventions were performed 1) pre-assessment of nursing knowledge of clinical assessment and decision-making practice specific to bronchiolitis and 2) re-evaluation one-month post intervention education session. Focusing on nursing bronchiolitis education can lead to positive hospital downstream effects with acuity levels and timely discharges.

Methods & Strategy: Data were collected through pre-and post-educational surveys through an online survey tool, Qualtrics®. Once the surveys were closed in February 2024, data were downloaded into Microsoft Excel, with discrepancies resolved accordingly and analyzed. Sample demographics were summarized using means and standard deviations for continuous variables, and frequency counts and percentages for nominal variables. Pre- versus post-intervention data collected from surveys were compared using t-tests.

Outcome: Participation of nursing staff and measurement of nursing knowledge in clinical assessment and decision-making skills were the primary outcome measures from the pre- and post-intervention.

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Problem Description

Bronchiolitis is a common viral lower respiratory tract infection affecting infants less than 2 years of age, with a peak age of three to six months (Tian et al., 2023). Two to three out of every 100 infants with respiratory syncytial virus (RSV) infection required hospitalization for oxygen and fluid support (CDC, 2023). This self-limiting disease was the most frequent cause of hospitalization in infants and young children with approximately 130,000 annual admissions in the United States (Hasegawa et al., 2013). RSV is the common pathogen with peak hospitalizations in the winter season from December to February (Tian et al., 2023). Although, mortality rate is low and prognosis is favorable in children without underlying disease, the burden of disease is relatively high (Tian et al., 2023). Healthcare costs attributable to bronchiolitis are five-times and two-times higher within the initial and subsequent six months, respectively, compared to no bronchiolitis, with most expenses occurring in the initial 10 days of illness relating to hospitalization (Sander et al., 2021). Healthy infants with bronchiolitis generally improve with supportive care and are discharged within a few days (CDC, 2023). Culturally, pediatric healthcare providers have resorted to use of high flow nasal cannula (HFNC) for infants with moderate to severe bronchiolitis to avoid escalation of care. Yet, recent literature revealed HFNC did not mitigate the disease process and instead may have contributed to prolonged hospitalization (Durand et al., 2020; Wiser et al., 2021). HFNC length of therapy for bronchiolitis ranged from 43 to 72 hours (Kepreotes et al., 2017). Delays in discharges were attributed to overtreatment with HFNC and other therapies not supported by

evidence-based literature (Lipshaw et al., 2021; Kepreotes et al., 2021; Franklin et al., 2019).

This revealed a lack of standardization in initiating, weaning, and discontinuing HFNC.

Additionally, the patient's clinical picture was always changing with evaluations based on subjective data and cultural differences in providers deciding when to escalate to HFNC respiratory support. Finally, there were multiple roles and team members when caring for infants with bronchiolitis leading to inconsistent communication among the care team.

Ultimately, late discharges had downstream effects on bed availability for transfers and admissions to later times, forcing children in the community to not receive the care they needed. There were various contributing factors prolonging hospital stay for infants with bronchiolitis as illustrated in the fishbone diagram (Appendix A). This QI project focused on nursing clinical skills when caring for infants with bronchiolitis to reduce LOS.

Available Knowledge

According to the clinical practice guidelines for bronchiolitis from the American Academy of Pediatrics (AAP) (2014), standard treatment is supportive care, including suctioning, maintaining hydration, and providing low oxygen supplementation for hypoxemia as the primary therapy for bronchiolitis (AAP, 2014). Other pharmacotherapies such as albuterol and hypertonic saline are strongly discouraged as they do not improve patient outcomes. Despite AAP (2014) recommendations, use of HFNC continued to be utilized in managing patients with bronchiolitis.

Overuse of HFNC was associated with increased LOS along with increased costs and poor nutrition (Shadman et al., 2019; Schoet et al., 2017). Other adverse effects include prolonged discomfort and pneumothoraxes as evidenced by randomized controlled studies

(Franklin et al., 2019; Durand et al., 2020). Additionally, Lipshaw et al. (2021) and Kepreotes et al., (2021) concluded there were no meaningful clinical outcomes with HFNC use due to no difference in oxygen therapy, LOS or change in rates in hospital admission and intensive care unit transfers. Moreover, Franklin et al. (2019) reported similar findings in a randomized controlled trial including 1,472 patients, echoing Lipshaw et al. (2021) and Kepreotes et al., (2021) findings, which demonstrated no beneficial outcome effect in hospitals adopting wide use of HFNC. As a result, there have been significant efforts to reduce overuse of HFNC to reduce LOS.

Charvat et al. (2020) reported a reduced LOS from 84.3 hours to 60.9 hours with decreased length of therapy time on HFNC from 48.2 to 31.2 hours. In addition, shorter therapy treatment time of HFNC was associated with shorter LOS as highlighted by Noelck et al. (2021). This QI initiative focused on reducing unnecessary use of HFNC with a standard daily trial off HFNC respiratory treatment. In a single center QI initiative, Hoefert et al. (2022) reported a standardized process for weaning and discontinuing HFNC and found reduced length of therapy on HFNC which reduced LOS from 60.7 to 46.7 hours for infants hospitalized with bronchiolitis. In summary, evidence-based literature revealed HFNC use was not medically indicated for patients with mild to moderate RSV respiratory symptoms as decreased LOS was reported shorter with minimal to no HFNC therapy treatment time for patients hospitalized with bronchiolitis.

Rationale

Care for infants with bronchiolitis utilizes the full scope of nursing practice. Nursing staff need the necessary tools to assist with their clinical decision-making as they have a pivotal role

in mitigating care of the multidisciplinary team, educating families, and understanding the patient's entire clinical picture (Jackson et al., 2022). For this reason, nursing staff can improve discharge times by using their full scope and standards of nursing practice to meet pediatric health care demands. Current nursing protocols rely on nursing assessment and clinical judgment. First, the Simple Cannula/Room Air Trial for Children [SCRATCH] protocol was designed for inpatient pediatric patients 0 to 24 months with the diagnosis of bronchiolitis and receiving HFNC. The purpose of the protocol was to reduce the excess use of HFNC by determining the patient's readiness to discontinue HFNC therapy and transition to either simple nasal cannula support or room air. Next, the clinical pathway decision making process and feeding algorithms for bronchiolitis utilized the Pediatric Bronchiolitis Scoring Tool (PBST) (Appendix B) to assess respiratory distress severity from 0 = mild to 14 = severe based on five categories: Respiratory rate, accessory muscle use, breath sounds, alertness, and dyspnea. Each score deemed by the nurse determined the next step in management. As highlighted with the SCRATCH protocol, the centerpiece of PBST scoring required nurses to be proficient in nursing assessment skills. Failure to be adept in nursing clinical skills resulted in poor decision-making process and outcomes.

Specific Aims

The aim of this QI project was to measure the pediatric nursing knowledge specific to bronchiolitis. The specific aim was to empower nurses to be skilled in their assessment and clinical decision-making skills to prevent unnecessary use of interventions which would prolong LOS. By focusing on nursing knowledge, the aim was to alleviate acuity levels in the pediatric hospital during peak respiratory seasons.

Methods

Context

The QI project was at Doernbecher Children's Hospital (DCH), a level one trauma center, nonprofit, teaching institution with 151 inpatient beds serving the Portland metropolitan area. The specific unit was 9N, an acute care pediatric unit. The unit consists of 23 private beds. Generally, previously healthy infants presenting with bronchiolitis were admitted to 9N for general pediatric care. The population of focus included all infants from 0 to 24 months admitted with bronchiolitis without any underlying cardiac disease requiring baseline medications, anatomic airway defects, neuromuscular disease, immunodeficiency, or chronic lung disease.

The current nurse driven protocol when caring for infants with bronchiolitis was referred to as the Clinical Pathway Decision Making Process: Bronchiolitis (Appendix C). The protocol required nursing staff to score patient's degree of respiratory status using the Pediatric Bronchiolitis Scoring Tool (PBST) (Appendix B) as each score provided next steps in the decision-making process. The hallmark of PBST scoring was the tool was dependent on the scope of clinical nursing skills.

Ethical Considerations

A request for determination from the OHSU IRB was submitted. The QI project was deemed not human research (Appendix D). The project posed a small risk for staff burden, but by making the survey short, the burden was minimal. No identifiable data was collected from the participants as the surveys were anonymous. Autonomy of providers was reserved through

the right to participate or to not participate. Data from surveys were secured on a password protected device. Written clinical site agreement was received from 9N prior to starting the project (Appendix E).

Interventions

This QI project was guided by the Institute for Health Improvement (IHI) Model for Improvement (MFI) which is a framework to guide improvement work based on testing changes in the healthcare organization by setting measurable goals and testing changes with a series of Plan-Do-Study-Act (PDSA) Cycle to implement effective change. The following interventions were implemented in this QI project: 1) gathered baseline nursing knowledge to identify gaps specific to bronchiolitis with a pre-implementation nursing survey, 2) provided a virtual education session via Webex, 3) provided two in-person service micro-learning hands-on education sessions, and 4) assessed nursing knowledge of clinical assessment and decision-making skills specific to bronchiolitis with post-implementation nursing survey. To aid the nursing staff, a Caring for Infants with Bronchiolitis poster was created and placed in various areas in the unit during October 2023 (Appendix F). For the hands-on learning session, clinical assessment cards (Appendix G) were used to provide nurses with the ability to role play.

Study of Interventions

There were a series of 4 clinical assessment and decision-making topics integrated into the pre- and post-interventions for caring for infants with bronchiolitis – general respiratory assessments, identifying clinical deterioration, assessing discharge readiness, and feeding readiness (Appendix H). The focus of the pre-implementation survey was to obtain nursing staff baseline knowledge of caring for infants with bronchiolitis to allow for identification of gaps that should be included in the virtual education session. The virtual education session took

place during October 2023 via Webex. Evidence-based recommendations from the AAP (2014) were heavily discussed to promote supportive care when caring for infants with bronchiolitis. The PBST scoring was also reviewed which required nursing staff to use their clinical assessment skills to score infants on the degree of respiratory distress to dictate next steps in care. Finally, indicators to prevent overtreatment or unnecessary use of HFNC were highlighted. Optimal feeding practices were addressed to maximize feeding for infants prescribed HFNC. The next intervention consisted of hands-on learning with nursing staff. The goal was to provide quick hands-on learning when staff nurses were working on the floor. There were opportunities for nurses working on day and night shifts to participate. The hands-on learning consisted of case scenarios called “conversation starters” where a staff nurse picked a card to role plan a clinical case (Appendix F). These tools and strategies helped with general bronchiolitis supportive care, respiratory PBST assessment scoring, and feeding strategies. The post-implementation survey took place during January 2024 after the hands-on learning.

Analysis

All data were collected using Qualtrics®, an online survey tool. Once the survey was closed, data was downloaded into Microsoft Excel, compared to the hardcopy of each participant’s data with discrepancies resolved accordingly. Sample demographics were summarized using means and standard deviations for continuous variables, and frequency counts and percentages for nominal variables. Pre- versus post-implementation data collected from the survey were compared using unpaired t-tests.

Results

Demographics

Overwhelmingly, the participants were White, females with the majority having six to ten years of nursing experience (Table 1).

Table 1

Demographic Characteristics of Nursing Staff

Pre-Intervention n=15 n(%)		Post-Intervention n=5 n(%)	
Female	15 (100%)	Female	5 (100%)
White	15 (100%)	White	4 (80%)
Experience		Experience	
2-5 years	4 (27%)	2-5 years	1 (20%)
6-10 years	2 (13%)	6-10 years	2 (40%)
11-20 years	4 (27%)	11-20 years	1 (20%)
> 20 years	3 (20%)	> 20 years	1 (20%)

Survey Results

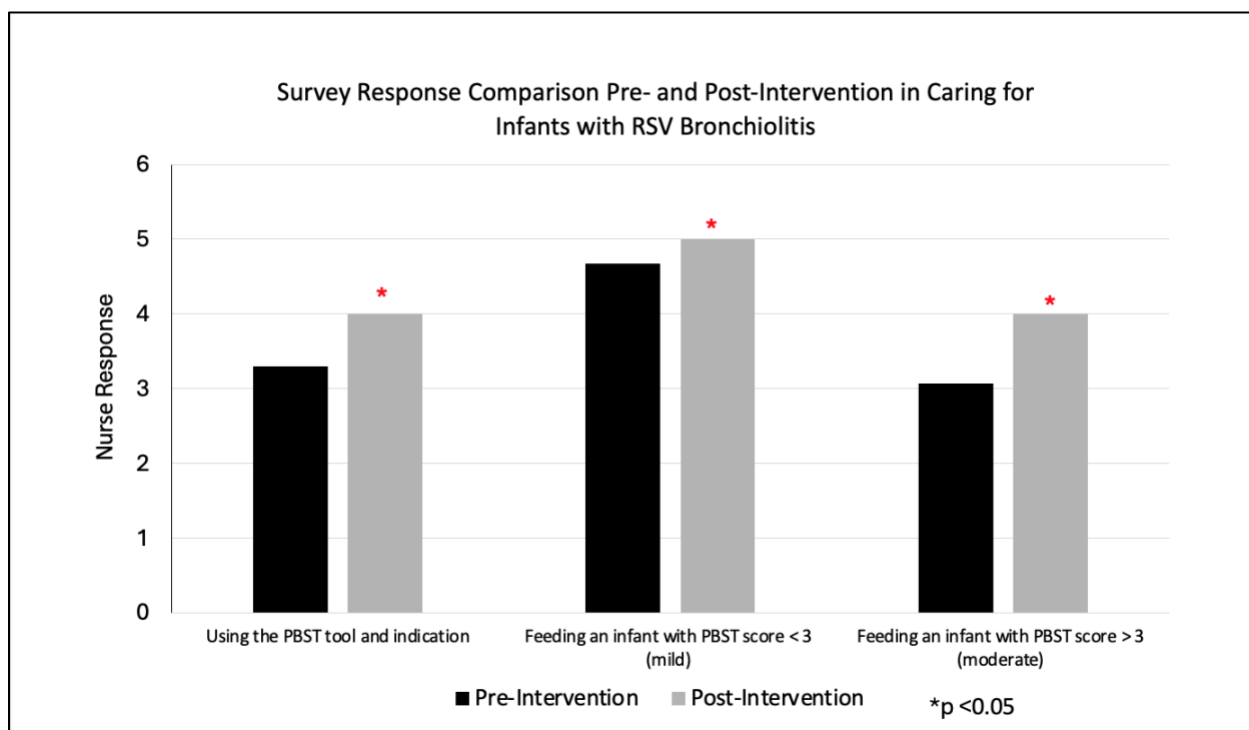
The survey responses were compared between pre- and post-interventions in caring for infants with RSV. The post-intervention responses revealed an increase in knowledge of respiratory assessment skills with PBST scoring (Figure 1). Nursing staff reported feeling more knowledgeable in their nursing assessment skills when assessing respiratory status of infants with RSV bronchiolitis.

In infants with a mild respiratory score, staff nurses reported feeling more motivated to feed infants with mild respiratory symptoms after the interventions. Finally, there were also

similar findings with infants with moderate respiratory symptoms. There was no change in assessment skills in early detection of clinical deterioration or discharge readiness.

Figure 1

Comparison of Pre- and Post-Intervention in Caring for Infants with RSV Bronchiolitis



Three categories revealed statistical significant p -values ≤ 0.05 . The three categories were increased knowledge in respiratory assessments with PBST scoring and feeding with both mild and moderate respiratory symptoms on HFNC. In the first category, using the Likert scale of 1 = no knowledge, 2= limited knowledge, 3 = basic knowledge, 4 = very knowledgeable, had a mean response of 3.33 pre-intervention and post-intervention a mean of 4.0 with a p -value of 0.003. The final category was associated with feeding on 2L/kg of HFNC in two areas: mild and moderate RSV respiratory symptoms. The pre-intervention mean was 4.67 for feeding infants with mild respiratory symptoms on HFNC and a mean of 5 post-intervention with a p -value of

0.05. In terms of feeding on HFNC with moderate respiratory symptoms, there was a mean of 3.07 pre-intervention and 4 post-interventions with a p-value of 0.003. In summary, this QI project demonstrated an increase in understanding of respiratory clinical assessments with PBST scoring and increased level of knowledge when feeding infants with mild to moderate respiratory symptoms on HFNC (Table 2).

Table 2

Statistical Significance in 3 Categories

Question	Pre-Intervention mean [95% CI]	Post-Intervention mean [95% CI]	Difference mean [95% CI]	p-value*
The pediatric bronchiolitis scoring tool (PBST) and the scoring indication.	3.33 (0.72)	4 (0)	0.67 (0.68)	0.003
I feel comfortable feeding an infant with PBST score <3 (mild)	4.67 (0.62)	5 (0)	0.33 (0.55)	0.05
I feel comfortable feeding an infant with PBST score >3 (mild)	3.07 (1.03)	4 (0)	0.93 (0.98)	0.003

*Calculated with Welches t-test, unequal variance

Discussion

Accurate respiratory assessments by the nursing staff allowed for proper standardization of weaning and discontinuation of HFNC when unnecessary. As nursing staff gained increased knowledge in respiratory assessments, less use of escalation of respiratory support of HFNC occurred as reported by Charvat and colleagues (2021). Additionally, nurses were more self-assured in feeding infants with mild to moderate respiratory symptoms on HFNC than previously when feedings were withheld on HFNC, which has been associated with poorer patient outcomes (Sochet et al., 2017). By increasing nursing knowledge to safely feed infants on HFNC, this resulted in similar positive outcomes as evidenced by Shadman et al.

(2019), as infants treated with HFNC and exclusively fed had shorter time to discharge compared to infants not fed. Though, the extent of intervention impact was limited as the QI project was notable for a very small sample size in post-survey responses. Overall, the interventions had a positive impact on scope of nursing practice when caring for infants with RSV bronchiolitis as nursing knowledge in feeding and assessing respiratory status increased with statistical significance.

Limitations

The limitations of the study include the small sample size in post-survey responses. Better communication with the unit nurse educator would have resulted in a larger sample size post-intervention. The study occurred during an unexpected mild RSV bronchiolitis season compared to previous years. Lastly multiple QI projects were occurring simultaneously on the unit, which resulted in nurses' frustration with the never-ending QI projects from undergraduate and graduate nursing students. This led to nursing fatigue of surveys to complete.

Conclusions

Though there was a small sample size in the post-intervention nursing survey, the previous gaps that had been identified in nursing skills and knowledge revealed an increase in nursing knowledge to use the PBST more accurately and consequently to feed infants with RSV bronchiolitis on HFNC. This facilitated the discharge of infants with bronchiolitis in a timelier fashion. However, feedings continued to be impacted negatively in the setting of a respiratory illness. As a result, future efforts should focus on interventions such as trending HFNC flow rates when feeding and reviewing the literature on adverse feeding outcomes while feeding on

HFNC respiratory support. In addition, it would be important to continue to increase nursing knowledge to further empower nursing staff to safely feed infants with mild to moderate respiratory status on HFNC. There is significant evidence supporting the continued feeding of otherwise healthy infants with RSV bronchiolitis while on HFNC (Sochet et al., 2017). A future QI project should measure nursing confidence in managing HFNC and feeding infants on HFNC.

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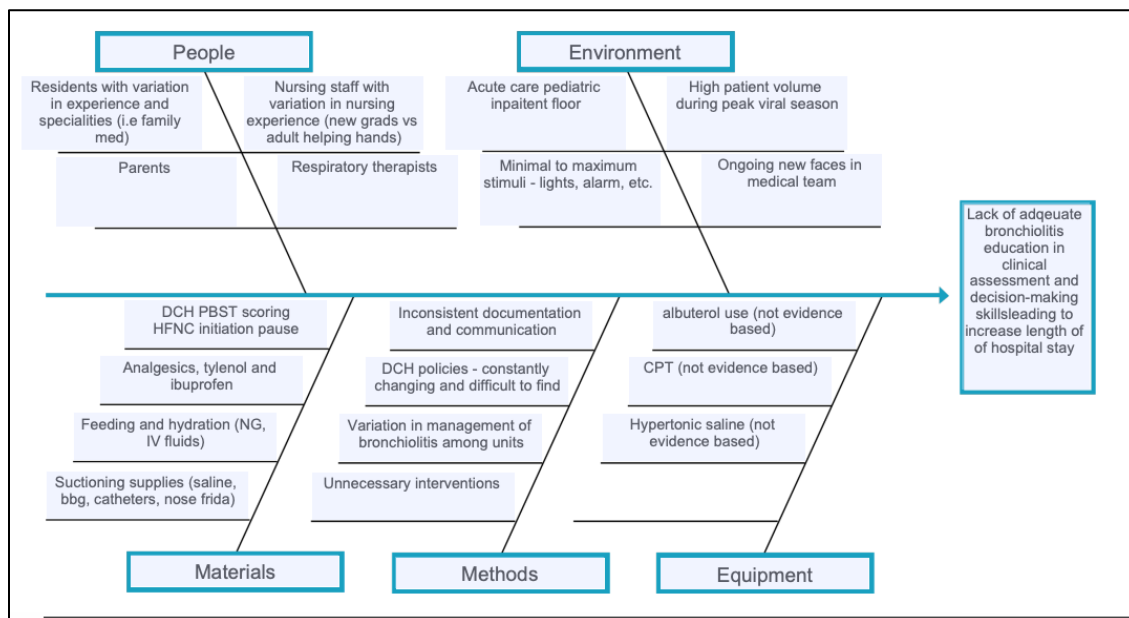
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Appendix A

Fishbone Cause and Effect Diagram



Appendix B

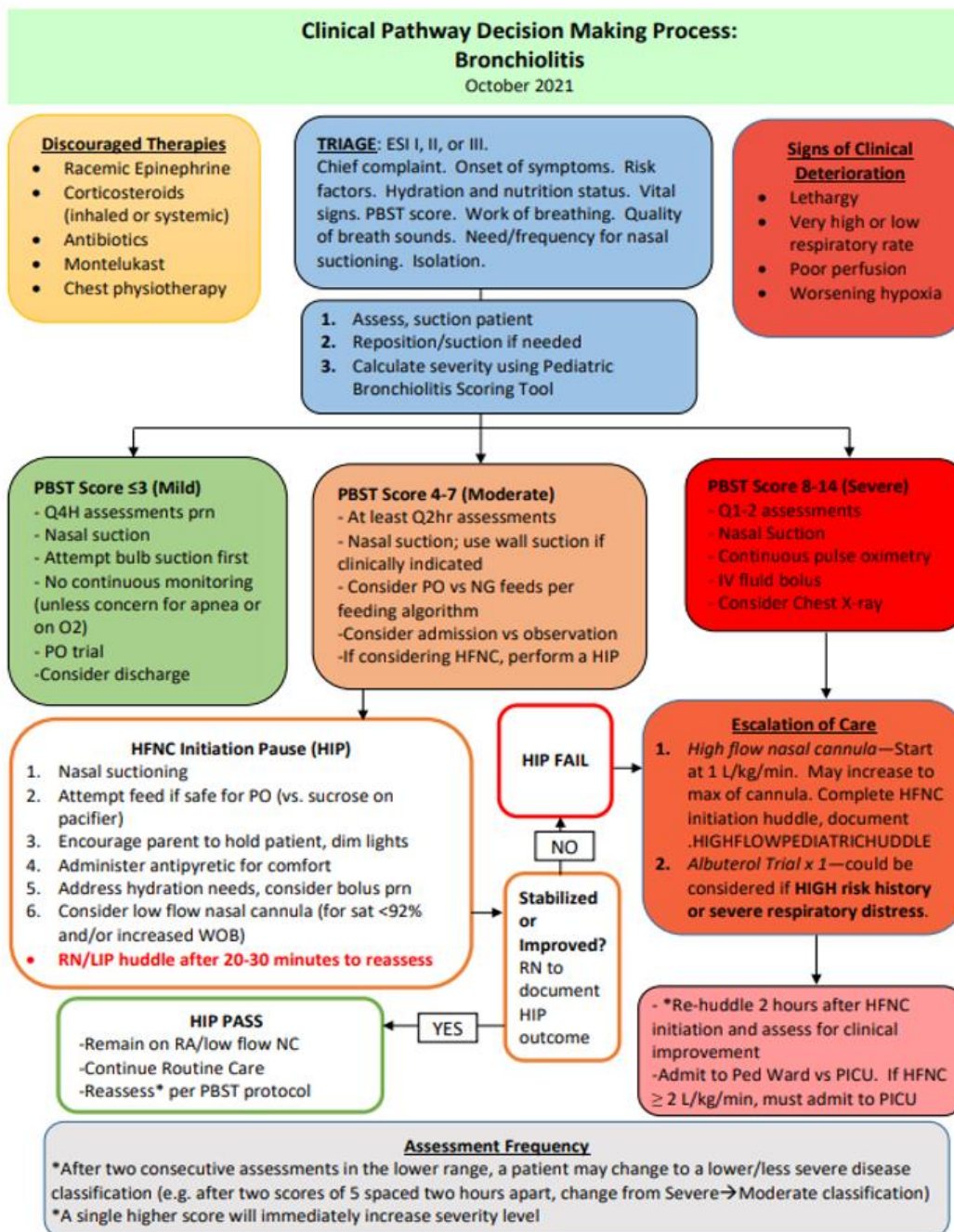
Pediatric Bronchiolitis Scoring Tool (PBST)

SCORING: All patient assessments should use the Pediatric Bronchiolitis Scoring Tool. Patient should be suctioned and repositioned if needed prior to scoring. Document PBST score in appropriate flowsheet rows.

	0 points	50 1 point	51 2 points	2 3 points
Respiratory Rate:				
<3 months	30-60	61-69	≥70 or below normal for age	
3-12 months	25-50	51-59	≥60 or below normal for age	
12-24 months	20-40	41-44	≥45 or below normal for age	
Accessory Muscle Use	None	1 point each for: - Flaring - Intercostal retractions - Substernal retractions - Head bobbing		
Breath Sounds	Normal or End expiratory wheeze only	Fair air entry	Poor air entry	
Alertness	"Age Appropriate" Normal feeding, vocalizations, activity	Agitated	Doesn't arouse appropriately	Confused or somnolent
Dyspnea	None	SOB with activity	SOB with talking or feeding	SOB at rest

Appendix C

Clinical Pathway Decision Making Process: Bronchiolitis



Appendix D

OHSU IRB Determination



IRB MEMO

Research Integrity Office

3181 SW Sam Jackson Park Road - L106RI
Portland, OR 97239-3098
(503)494-7887 irb@ohsu.edu

NOT HUMAN RESEARCH

September 19, 2023

Dear Investigator:

On 9/19/2023, the IRB reviewed the following submission:

Title of Study:	Increasing Early Discharge with Implementation of a Nurse-Driven Conditional Discharge Protocol for Pediatric Patients with Bronchiolitis: A Quality Improvement Project
Investigator:	Sandra Banta-Wright
IRB ID:	STUDY00026336
Funding:	None

The IRB determined that the proposed activity is not research involving human subjects. IRB review and approval is not required.

Certain changes to the research plan may affect this determination. Contact the IRB Office if your project changes and you have questions regarding the need for IRB oversight.

If this project involves the collection, use, or disclosure of Protected Health Information (PHI), you must comply with all applicable requirements under HIPAA. See the [HIPAA and Research website](#) and the [Information Privacy and Security website](#) for more information.

Sincerely,

The OHSU IRB Office

Appendix E

Letter of Support from Clinical Agency

Date: *July 13, 2023*

Dear *Taylor Tran*

This letter confirms that I, *Deidra Weinert*, allow *Taylor Tran* (OHSU Doctor of Nursing Practice Student) access to complete his/her DNP Final Project at our clinical site. The project will take place from approximately *July 1, 2023* to *June 2024*.

This letter summarizes the core elements of the project proposal, already reviewed by the DNP Project Preceptor and clinical liaison (if applicable):

- **Project Site(s):** *Doernbecher Children's Hospital Inpatient Care Units: 9N, 9S, and 10N.*
- **Project Plan: Use the following guidance to describe your project in a brief paragraph.**
 - *Identified Clinical Problem: Bronchiolitis is a common viral lower respiratory tract infection with approximately 130,000 annual admissions in the United States and greater than 18% of hospitalizations in infants less than 12 months of age (Hasegawa et al., 2013). Infants are admitted to Doernbecher Children's Hospital inpatient care for increased respiratory support and hydration needs. Management for RSV consists of In 2014, the American Academy of Pediatrics [AAP] released a clinical practice guideline for bronchiolitis with evidence-based recommendations indicating supportive care including suctioning, maintaining hydration, and providing low oxygen supplementation for hypoxemia as the primary therapy for bronchiolitis. Yet, culturally, pediatric healthcare providers have resorted to the use of High Flow Nasal Canula [HFNC] for infants with moderate to severe bronchiolitis to avoid escalation of care (Durand et al., 2020; Wiser et al., 2021). The use of HFNC in bronchiolitis on the inpatient floor can negatively impact nutrition, leading to longer hospitalization if weaned more slowly than medically indicated. During RSV season inpatient floors are at high patient capacity leaving many children with other health conditions not getting the care they need.*
 - *Rationale: A conditional discharge order is a quality improvement initiative allowing nursing to use their full scope of nursing practice which will be guided by the Institute for health improvement (IHI) Model for Improvement (MFI) which is a framework to guide improvement work based on testing changes in the healthcare organization by setting measurable goals and testing changes with a Plan-Do-Study-Act (PDSA) Cycle to implement change.*
 - *Specific Aims: The aim of this quality improvement project is to provide nursing education and assessment of early clinical deterioration and reduced length of hospital stay when caring for pediatric patients 0-24 months hospitalized with moderate to severe bronchiolitis from September 2023 to March 2024.*
 - *Methods/Interventions/Measures: Pre/Post surveys will be administered during the implementation of conditional discharge for infants with bronchiolitis. Additionally, in service education with nursing staff will be implemented.*
 - *Data Management: Data management will be collected as we implement a series of PDSA cycles.*
 - *Site(s) Support: QR questionnaire surveys with IT, Webex, and learning engagement with nursing staff. Finally, multi-disciplinary collaboration with the medical team, respiratory, QI members, and EPIC team.*

During the project implementation and evaluation, *Taylor Tran* will provide regular updates and communicate any necessary changes to the DNP Project Preceptor.

Our organization looks forward to working with this student to complete their DNP project. If we have any concerns related to this project, we will contact *Taylor Tran* and *Sandra Banta-Wright* (student's DNP Project Chairperson).

Regards,
Deidra, Weinert RN

Appendix F

Bronchiolitis Nursing Poster Resource


CARING FOR INFANTS WITH BRONCHIOLITIS

Resource to facilitate less HFNC use, promote early safe discharge, and optimize care for infants with bronchiolitis.

01 General
Bronchiolitis is common, up to 90% of children are infected by RSV by age 2. Nearly 1 in 5 infected children require hospitalization.

02 Pathophysiology
Acute inflammation of the small airways in the lungs
Viral infection causes inflammation and increased mucus production. Airway becomes restricted and breathing becomes difficult.

03 Clinical Signs and Physical Exam
Fever, rhinorrhea, cough, wheeze, increased respiratory effort, and irritability. Tachypnea, wheezing or crackles on auscultation, grunting, nasal flaring, and/or retractions. Symptoms peak days 3-5 of illness.



RSV is #1 cause
Rhinovirus, parainfluenza, HMPV, influenza, adenovirus, coronavirus and human bocavirus.

SIX SUPPORTIVE THERAPIES
Evidence Based Recommendations from the AAP

SOOTHING

SUCTIONING
*ensure use of saline to thin secretions

FEEDING

ANTIPYRETICS

HYDRATION

SUPPLEMENTAL OXYGEN

SIX SUPPORTIVE THERAPIES NOT RECOMMENDED
Without Evidence of Benefit from the AAP

ALBUTEROL
Wainwright et al. (2012) may reduce clinical symptom scores, but does increase hospitalization or length of stay LOS.

ANTIBIOTICS
Schuh et al. (2007) showed no difference in clinical outcomes.

ANTIVIRALS
ongoing research, no benefit to this date.

CPT
Rogue et al. (2012) study showed no benefit to LOS or clinical scores.

RACEMIC EPI
Skjerven et al. (2013) study showed longer LOS and lack of efficacy.

STERIODS
Fernandez et al. (2013) showed no reduction in admission or LOS.

NOTIFY LIP IMMEDIATELY
If there are signs of clinical deterioration:

Lethargy

Very High RR or Very Low RR

Poor Perfusion

Worsening Hypoxia

PBST SCORING

Score	0	1	2	3	4	5	6	7	8	9	10
Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High
High	High	High	High	High	High	High	High	High	High	High	High
Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild
Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

HIGH FLOW INITIATION PAUSE (HIP)

The HIP is a PAUSE
Addresses patient state, comfort, hunger, hydration, fever, fear, and congestion.

CONSIDERING HFNC for mild to moderate PBST score

- PAUSE
- Perform HIP Supportive Care
- Pause 15-30 mins
- Reassess

HHFNC HUDDLES should occur:

- Initiating HHFNC
- 2 hours after initiation
- As needed

EPIC DOCUMENTATION
Initiation huddle: "HIGHFLOWPEDIATRICHUDDLE"
Re-huddles: "HIGHFLOWREHUDDLE"

SCRATCH
Standardized daily trial off HHFNC

Once Eligible:

- Ensure LIP order in place
- RN & RT coordinate time 0400/1600
- Prior to SCRATCH: note baseline WOB, hold feeds during trial

STEP 01

STEP 02

STEP 03

RT to initiate SCRATCH Trial

- Document RR, R, SPO2, PBST
- RN & RT to monitor for 1 hr

STEP 04

After 1 hr, if PASS:

- RT to document on SCRATCH flowchart post-trial assessment
- Switch to standard cannula
- Notify LIP of outcome

ELIGIBILITY CRITERIA:

- Age <24 mo with dx of bronchiolitis
- Saturation > 90% on < 40% FIO2
- Flow rate < 1L/kg/min
- Heart rate within normal limits for age when calm
- Absence of lung disease
- Absence of congenital heart disease
- Absence of active pulmonary hypertension
- Absence of neuromuscular disease requiring support for feeding or breathing

FEEDING ON HHFNC

Lack of feeding on HHFNC is associated with:

- Longer length of stay
- Worsening of vital signs
- Discomfort and irritability

Babies otherwise healthy on HHFNC are at low risk for aspiration.

- If NPO consider reassessing 1-2 hr
- No specific HHFNC flow rate to indicate when to feed or NPO status

USE YOUR CLINICAL JUDGEMENT

- Use PBST scoring to help determine stability and ability to feed safely
- Consider the trajectory of illness and tolerance of feeds

Tips to maximize success:

- Nasal suction before feeding
- Utilize smaller more frequent feeds
- Consider side lying for young infants
- Advocate for NG if not tolerating PO feeds
- Teach parents about pacing

KNOW YOUR RESOURCES

DCH Acute Care
Bronchiolitis and
HHFNC Patient Driven
Protocol (MCN)

SCRATCH (MCN)
AnerHealthic Federal
Feeding Algorithm
(MCN)

Charge RN, RT, HIP
Huddles, LIP, Nurse
Consult, and RRT Nurse

Bronchiolitis
Bustler
Series

Appendix G

“Conversation Starters” Clinical Case Scenarios

 <p>04 Clinical Assessment Previously healthy 8 month old (8kg) admitted with bronchiolitis on BL at 45%.</p> <ul style="list-style-type: none">• VS: Febrile 101F, HR 166, RR 62, and SpO2 95%• Worsened tachycardia and tachypnea. Early HR 140 and RR 55.• Now less interactive than normal, fussy but consolable• Mild nasal flaring and retractions	<p>05 Independent Scope and Decision Making 15 month female (11kg) previously healthy, day 5 of illness on 15L at 45% VS: 37.3 RR: 40 HR: 140 SpO2: 90 Mild intercostal retractions and some nasal flaring. Fussy and irritable. Currently NPO status and you are considering feeding.</p> 
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Appendix H

Nursing Education Pre and Post Surveys

This section is about your knowledge of bronchiolitis in infants and toddlers. Please rate the level of knowledge of the following:

	No knowledge	Limited knowledge	Basic Knowledge	Very knowledgeable
General understanding of bronchiolitis disease process and course of illness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supportive care interventions to facilitate less overuse of HFNC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The pediatric bronchiolitis scoring tool (PBST) and the scoring indication.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The HFNC inabon' pause (HIP) for patients with bronchiolitis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
General understanding of how feeding influences the course of illness for patients with bronchiolitis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

This section is about discharging infants and toddlers with bronchiolitis. Please rate of the following:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel confident in my clinical assessment skills to safely discharge previously healthy infants with bronchiolitis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have the necessary resources and materials to educate families about bronchiolitis at time of discharge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel discharging patients given a conditional discharge order is NOT out of my scope of nursing practice.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

This section is about your clinical assessment skills. Please rate yourself in the following:

	Novice	Advanced Beginner	Competent	Proficient	Expert
Detecting early signs of clinical deterioration and responding to infants and toddlers with bronchiolitis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Able to use basic assessment information to determine emergent patient needs such as shock, respiratory failure, and CNS emergency.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recognizing clinical readiness for discharge in previously healthy infants and toddlers admitted with bronchiolitis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The final section is about feeding in infants and toddlers with bronchiolitis. Please rate the following:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel comfortable feeding an infant on HFNC with a flow of 1L/kg/min	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel comfortable feeding an infant on HFNC with a flow of 2L/kg/min	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel comfortable feeding an infant with PBST score <3 (mild)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel comfortable feeding an infant with PBST score >3 (mild)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>