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The Effect of High Flow Nasal Cannula Weaning Protocol on Decreasing Length of Stay in Pediatric Intensive Care

Debbie Farrell
University of Louisville, debbie.farrell@twc.com

THE EFFECT OF HIGH FLOW NASAL CANNULA WEANING PROTOCOL ON DECREASING LENGTH OF STAY IN PEDIATRIC INTENSIVE CARE

by

Debbie Farrell, DNP, APRN

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[signature]	07/24/2019
Signature DNP Project Chair	Date
Barbara J Palinkas	
	7/24/2019
Signature DNP Project Committee Member	Date
[signature]	8/13/2019
Signature Program Director	Date
[signature]	8·13·19
Signature Associate Dean for Academic Affairs	Date

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Dedication

This is dedicated to my Grandmother, Mabel Hutchison, who passed away before she could see me complete my degree. She was my biggest fan and she always said that she was so proud of me and what I have accomplished.

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Abstract

Background: High-flow nasal cannula (HFNC) is a type of non-invasive respiratory support that has decreased the rate of intubation in infants and children. It is utilized in the PICU and the wards. Due to the increased volume of patients on HFNC, a standard HFNC weaning protocol was created to improve the management of these patients.

Methods: Potential patients were identified through the Virtual Pediatric System (VPS) with the criteria of ages 1 month to 6 years old, admitted to the PICU during the months of January to March of 2018 and 2019, with diagnosis of bronchiolitis and requiring HFNC. Chart review was then conducted to eliminate the patients that did not meet the inclusion criteria. There were 48 patients in the pre-protocol group and 70 patients in the post protocol group. Further chart review was conducted to gather the information on the 2 groups.

Results: Using independent *t*-test comparing the pre- and post-weaning protocol groups showed no significant differences between the pre- and post-protocol groups in PICU length of stay (2.3±1.8 vs 2.1±2.1d), hospital length of stay (4.8±2.2 vs 4.2±1.6d), and duration of HFNC use (87.4±47 vs 74.2±37.4 hr). The magnitude of difference in the means of the hospital length of stay and PICU length of stay were small (eta squared=0.02; 0.002 respectively).

Key words: Bronchiolitis; weaning; protocol; HFNC; RSV; infants; children; pediatric; hospital length of stay; PICU length of stay

The Effect of High Flow Nasal Cannula Weaning Protocol on Decreasing Length of Stay in Pediatric Intensive Care

Bronchiolitis in infants and young children is one of the most common reasons for admission to the hospital as it causes lower respiratory infections (McKiernan, Chua, Visintainer, & Allen, 2010). Symptoms of bronchiolitis include increased work of breathing, cough, rhinorrhea, tachypnea, tachycardia, fever, wheeze, and hypoxia related to bronchiole obstruction due to mucus plugging and edema (McKiernan et al., 2010). The management of bronchiolitis involves solely supportive care which can include respiratory support, IV hydration, and comfort measures (Hanlon, 2014).

High-flow nasal cannula (HFNC) is a method of non-invasive respiratory support that delivers heated high flow via nasal cannula providing continuous positive airway pressure and having the option to increase or decrease oxygen concentration (McKiernan et al., 2010). HFNC tends to be well-tolerated in infants and children, decreasing the need for sedation, and most likely decreasing the rate for invasive mechanical ventilation (McKiernan et al., 2010).

At Norton Children's Hospital, weaning of HFNC liter flow was dependent on the decision of healthcare providers (physician, resident, and/or nurse practitioner) caring for the patient which could be delayed due to unexpected interruptions. A multidisciplinary team created a weaning protocol for the patients on the wards and this was extended to the PICU. With the use of a weaning protocol by both the PICU and wards, the hope that this will lead to fewer PICU and hospital days. With the use of the HFNC protocol, one would hypothesize a decrease in the time on HFNC.

A literature review was conducted determine if there are any standard use protocols for HFNC for infants and children in the Pediatric Intensive Care and Medical-Surgical floors.

The literature review was performed using CINAHL, Cochrane, National Guidelines Clearinghouse and MEDLINE with the following keywords: high-flow nasal cannula, bronchiolitis, weaning, pediatric intensive care, infants, and children. Limitations in this review include literature published from 2010-2017, in English, children ages 0-18, and hospital-based studies. Fifteen articles were reviewed and of those 15 articles, seven were retrospective studies, five prospective studies, and three literature reviews (See Appendix A). The seven retrospective studies include two that evaluated the efficacy of the HFNC by comparing pre-HFNC and post-HFNC in the PICU (Kawaguchi, Yasui, deCaen, & Garros, 2017; McKiernan et al., 2010) and one study compared the use of CPAP verses the use of HFNC (Metge et al., 2014). Two of the studies compared the use of HFNC in the PICU and in the wards (Goh, Kirby, Schell, & Egan, 2017; Riese, Fierce, Riese, & Alverson, 2015) and two evaluated the use of HFNC in the PICU (Coletti, Bagdure, Walker, Remy, & Custer, 2017; Wraight & Ganu, 2015). Of the five prospective studies, one study created and evaluated a “holiday” based weaning protocol (Betters et al., 2017), two evaluated the effect of different flow rates on the effect of breathing (Hough, Pham, & Schibler, 2014; Weiler et al., 2017), and two evaluated the efficiency of oxygen therapy via HFNC (Bressan et al., 2013; Oto, Erdoğan, & Boşnak, 2016). Two of the three articles that were reviewed examined the mechanisms of action, effectiveness, safety, tolerance, and complications of HFNC with the reviews providing evidence of the safety, efficacy, and well-tolerated HFNC (Hutchings, Hilliard, & Davis, 2015; Mikalsen, Davis, & Øymar, 2016), while the third literature review searched for protocols to wean or discontinue HFNC in preterm infants with the conclusion there is an absence of protocols and further studies are needed to provide evidence for practice (Farley, Hough, & Jardine, 2015).

With the wide use of HFNC in the PICU, the use of HFNC has expanded to the pediatric wards at some institutions as a means of respiratory support. Several retrospective studies examined the use of HFNC in the PICU before and after introduction to the pediatric wards (Goh et al., 2017; Riese et al., 2015). Although starting HFNC on the pediatric wards did not decrease the rate of PICU admission, the use of HFNC did lead to a decrease in need for intubation and length of hospital stay (Goh et al., 2017; Riese et al., 2015). Another prospective observational study examined the introduction of HFNC on the pediatric wards and evaluated patients less than 12 months old admitted for moderate to severe bronchiolitis (Bressan et al., 2013). Twenty-seven patients were enrolled and placed on HFNC; all patients saw an improvement in respiratory rate and ETCO2; none of the twenty-seven patients required PICU admission (Bressan et al., 2013).

The literature review search resulted in a single study evaluating a weaning protocol and a 2015 Cochrane review for weaning protocols for pre-term infants. This Cochrane review was conducted examining available literature regarding weaning strategies for infants on HFNC (Farley et al., 2015). The review included randomized control studies, quasi-RCT, and any weaning protocols searching up to the year 2015, but was unable to find any studies meeting the inclusion criteria (Farley et al., 2015). The authors stated the need for specific criteria to define what parameters would constitute the time to wean HFNC and what defines failure to wean HFNC (Farley et al., 2015).

Since the Cochrane review was completed in 2015, one single center study created a "holiday" protocol for the PICU using a Respiratory Assessment Score (RAS) to evaluate the readiness of the patient for weaning from HFNC (Betters et al., 2017). The HFNC holiday protocol is based on the RAS scores which will determine if the patient remains on the same flow rate, decrease flow rate by half, or transition to conventional nasal cannula. Of the 133

patients in the study, 119 patients were successfully weaned off HFNC to low flow nasal cannula with 83 patients weaned in the first attempt, 26 patients with the second attempt, nine patients with the third attempt, and one patient weaned in four attempts (Betters et al., 2017). None of the 36 patients who were weaned after several attempts require escalation of respiratory support. The RAS was created from a combination of the Wood-Downes score and Silverman-Andersen Respiratory Distress Index with scores ranging from 0-2 in six categories with a potential total score of 12 points. Respiratory therapists (RTs) screened the patients twice a day with the use of RAS to determine if the patient qualified for a "holiday" off HFNC. Scores of six or less qualified for a "holiday," scores of 7-8 prompted a decrease in the flow rate by half, and scores greater than eight had no direct change. They also examined the PICU LOS (5 vs 21 days; $p<0.0001$) and total hospital LOS (9 vs 28.5 days; $p<0.001$) and both LOS were lower in the successful weaning group as compared to the unsuccessful weaning group (Betters et al., 2017). This study was the first to examine a protocol for weaning HFNC and showed it was efficient, timely, and safe.

Hutchings, Hilliard, and Davis (2015) discussed the development of guidelines of HFNC management in their institution and the use of the Pediatric Early Warning (PEW) Score as an indication to escalate or wean the HFNC. An algorithm was created to develop guidelines in the management of HFNC and the timing of transferring a patient to the PICU (Hutchings et al., 2015). Initial FIO2 was set at 40 % and the flow was set dependent on age. However, the authors did not discuss the timing, success or failure of the guidelines.

Theoretical Framework

Donabedian's health care quality model is a framework designed to evaluate the quality of health care (See Appendix D). The Donabedian's model has three categories which include

structure, process, and outcome (Donabedian, 1988). The structure is the setting in which health care is provided. This may include a facility, equipment, providers, and patients. The process is the operations between patients and providers that occur throughout the healthcare delivery. The process ranges from diagnosis to preventive intervention to treatment. The outcome is the effects of healthcare on patients' health. This model is perfect for the quality improvement study of evaluating the HFNC weaning protocol.

Setting and Organizational Assessment

Data were reviewed during 3-month periods of January to March 2018 (pre-protocol) and January to March 2019 (post protocol) at Norton Children's Hospital PICU. The Children's Hospital has a 300-bed capacity with PICU having 36-bed unit serving the tri-state area (Kentucky, Indiana, and Ohio).

Purpose

The use of HFNC is increasing in the hospital setting, including the wards, ED, and PICU. With the increased use of HFNC, the implementation of a standard weaning protocol that can be used for infant and children in any inpatient hospital setting could potentially improve multiple child outcomes. The hypothesis is that the use of a standardized HFNC protocol would decrease the length of stay in the PICU, hospital length of stay, and length of time on HFNC. With the decrease in length of stay, this would lead to improved child outcomes and decreased healthcare costs to the family.

This study compared data from infants and children three months (January-March 2018) prior to the initiation of the HFNC weaning protocol with infants and children during the same three months (January-March 2019) post-initiation of the protocol examining the LOS in PICU, hospital LOS, adverse events, and length of HFNC use. During the winter and spring months,

our institution has the highest frequency of admissions for bronchiolitis. The Children's Hospital wards have implemented a weaning protocol that is accessible in EPIC, which is our electronic medical record system (see Appendix C). This protocol was used in the PICU and continued with the transfer of the patient to the wards.

Intervention

The HFNC weaning protocol was implemented in the PICU in January-March 2019. The HFNC weaning protocol order set is present in EPIC (See Appendix C). The weaning protocol was initiated when the patient required oxygen of 40% or less, with saturations greater than 90 %, and respiratory rate less than 60 breaths per minute for infants one-month to one-year old, less than 40 breaths per minute for one-to-two-year-old, and less than 30 breaths per minute for three- to six-year-old children. The protocol was implemented by the RTs. Once the PICU patient was on HFNC settings appropriate for the ward, the patient was transferred to the pediatric wards and continued with the weaning protocol. The purpose of the project was to examine the impact of standard HFNC weaning protocol on infants and children with bronchiolitis ages one-month to six-years and shortening PICU LOS and hospital LOS, when compared to those infants and children who did not receive the weaning protocol.

The quality improvement project was sent to the IRB for approval but was exempt. A retrospective chart review was conducted to identify patients not placed on the HFNC weaning protocol during the months of January to March 2018, for comparison with the data obtained from patients placed on the HFNC weaning protocol during the months of January to March 2019.

Participants

The participants were children admitted to the PICU at Norton Children's Hospital requiring HFNC support. The inclusion criteria were patients who were one-month to six-years, diagnosed with bronchiolitis via clinical or viral confirmation, admitted to the PICU, and requiring HFNC. The exclusion criteria were patients with diagnosis of status asthmaticus requiring continuous albuterol, superimposed pneumonia demonstrated on chest x-ray, and an additional history of chronic lung disease, neuromuscular disorders, and/or congenital heart disease.

Data Collection

Virtual Pediatric System (VPS) which is a PICU comparative database used nationally and internationally comparing the individual PICU data to other PICUs was used to search for potential patients meeting the criteria. Data were collected using the Epic Electronic Medical Record (EMR) system during the months of January to March 2018, for comparison with the data obtained from patients placed on the HFNC weaning protocol during the months of January to March 2019. Demographic characteristics, insurance, admission, transfer, and discharge dates, and past medical history, were collected using EMR. The patients' symptoms, vital signs, laboratory tests, and medications were obtained along with length of time on HFNC, highest and lowest HFNC settings, complications, and readmission to PICU within 24 hours of transfer.

Measurement

Multiple discussions were had with several PICU attendings to assess what information would be beneficial to collect. The following data were deemed important to collect. Demographic data collected included gender, ethnicity, insurance, age, and prematurity. Hospital course data included admission, transfer, discharge dates, interval times on HFNC to time off HFNC, and time weaning order placed. Vital signs collected included heart rate, respiratory rate,

and saturations at initiation of HFNC and at one-hour post HFNC initiation. Additional tests assessed included chest x-ray, blood, urine, and spinal fluid cultures, and respiratory panel. Additional therapies utilized included antibiotics, breathing treatments, steroids, and fluids. Complications of significance included escalation of respiratory support or development of pneumothorax (See Appendix B). The data that were missing pertained to vital signs and this was addressed in the SPSS.

Results

SPSS 25 statistical software was used to analyzed the data. The sample included 48 patients (26 males; 54.1 %) in the pre-protocol group versus 70 (39 males; 55.7 %)) in the post-protocol group. Ages range from one month to 37 months (mean 7.6 mo and SD 7.57). Ethnicity results were 70 % white, 20 % African American, and 17 % Hispanic. In regards to insurance, 39 % with private insurance and 59 % had government insurance (See Table 1). Twenty-four percent were born premature (<37 weeks) with 15 patients in the pre-protocol and 13 patients in the post-protocol groups. Forty-three percent of patients tested positive for RSV, 9% tested positive for Rhino/Enterovirus, 21 % tested positive for multiple viruses, 14 % tested positive for other viruses, 3 % tested negative, and 10 % were not tested (Table 5).

The independent *t*-test was used to compare the pre-post weaning protocol groups. The results showed no significant differences between the pre- and post-protocol groups in PICU length of stay (2.3±1.8 vs 2.1±2.1d; $t(116)=0.52$, $p<0.603$, two-tailed), hospital length of stay (4.8±2.2 vs 4.2±1.6d; $t(116)=1.66$, $p<0.098$ two-tailed), and duration of HFNC use (87.4±47 vs 74.2±37.4 hr; $t(116)=1.69$, $p<0.093$ two-tailed). The magnitude of difference in the means of the PICU length of stay (mean difference=0.15, 95 % CI: -0.42 to 0.71), hospital length of stay

(mean=0.59, 95% CI: -0.11 to 1.29), and length of time on HFNC (mean difference= 13.19, 95% CI: -2.25 to 28.64) were small (eta squared=0.02; 0.002; 0.02 respectively) (See Table 2).

Discussion

Interpretation

The results showed no significant difference of PICU length of stay and hospital between the pre-post protocol groups (p<0.603 and p<0.098, respectively). The results counteract what Betters et al. (2017) discovered when they implemented a HFNC weaning protocol at their institution and reported a significant difference in PICU LOS between the group (n=119) successful with the weaning protocol and the group (n=14) who failed the weaning protocol (median 9 vs 21 d; p<0.001) and hospital LOS (median 9 vs 28.5; p<0.001). The difference in results reflect the different parameters used as they compared the successful group to the unsuccessful group whereas this author compared anyone placed on the protocol making the comparisons between the two studies unequals. The protocol they created was in the form of "holiday" as opposed to primarily weaning in specific time frame. The patients in the 2 groups had a variety of diagnoses included asthma, bronchiolitis, trauma, pneumonia, and postoperative which are difficult to compare due to the progression of the disease process. Those patients who failed the weaning protocol were complicated postoperative patients including liver and bone marrow transplants. Riese et al. (2015) saw a reduction in hospital LOS after initiation of HFNC on the general pediatric wards (median 4 vs 3 d; p<0.001) and a decrease in HGNC length of time from 2.4 days to 1.8 days. Goh et al (2017) also found a reduction in PICU LOS and hospital LOS once HFNC was utilized on the general pediatric wards (median 2.2 d and 6 d respectively). In the current study, there was no significant difference in HFNC length of time between the pre-post protocol groups (p<0.093). The non-significant difference could be related

to the small sample sizes and unequal groups with pre-protocol group of 48 patients and post-protocol group of 70 patients. Other factors that could have affected the results are the compliance of following the protocol, the lack of timeliness in ordering the protocol, or lack of ordering the protocol. These factors could be related to the fact that the protocol was new to the PICU and with that there may be educational lacking with the RTs and healthcare providers.

The implementation of the HFNC weaning protocol remains an excellent way to utilize the Respiratory Therapists' (RT) skills and give them autonomy in respiratory care practice and patient care. The HFNC weaning protocol gives professional ownership to RTs and takes the sole responsibility from the healthcare providers who often have other distractions during the day that may delay their ability to reassess the patients and wean HFNC as often as possible. Betters et al., (2017) demonstrated that with the implementation of a HFNC weaning protocol it was safe, timely, and efficient but also acknowledge the need for further studies with the use of weaning protocol of larger population to determine the effectiveness of the weaning protocol on PICU and hospital LOS.

As of now, at our hospital, the RTs are the only healthcare professionals to be able to wean the flow rate. The bedside nurses are allowed to wean the oxygen. If the bedside nurses were allowed to wean the flow, then the HFNC weaning protocol would be better utilized as both nurses and RTs would assess the patient at different times which would promote consistency with the weaning process. Betters et al., (2017) documented the use of RTs in using the weaning protocol but made mentioned that the RTS were the only ones who were knowledgeable with the scoring system created. With the potential for improved HFNC weaning procedures, then this could lead to improved patient outcomes.

Limitations

The limitations with this project include a small sample size which could lead to non-significant results and not represent the population well. The inconsistency of following the HFNC weaning protocol by the RTs due to the busyness of the unit or delay in recognition of the HFNC order placed could negatively influence patient outcomes. The timing of placing the HFNC weaning protocol could be delayed due to multiple admissions or busyness of the unit. The healthcare providers may not be aware of the HFNC weaning protocol.

Conclusion

The HFNC weaning protocol has great potential but consistency in physicians ordering the protocol and RTs following the protocol remains potentially lacking. The results of the project were insignificant but represented a small mean decrease in the post-protocol groups concerning pediatric ICU and hospital length of stay and hours on HFNC. There needs to be a change in the implementation of the HFNC weaning protocol such as including the weaning protocol in place on admission to allow the RTs to use at their discretion. Also, it is important to investigate if a bedside nursing practice change with nursing is feasible by contacting the Board of Nursing and Norton Children's Hospital. With the input of both nursing and RTs, the use of HFNC weaning protocol would be maximized and more consistent implementation of the protocol and following the protocol would occur to improve patient outcomes.

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Appendix A

Citation	Findings
Farley et al, 2015	No studies met the criteria for protocols weaning of HFNC in preterm infants
Metge et al, 2014	No difference between using nCPAP (19 pt) and HFNC (15 pts) Weaning: started when FiO2<25 %, PCO2<45 mmHg;
Coletti et al, 2017	HFNC utilization on variety of dx (asthma, bronchiolitis, CHD) Majority of pts <12 yrs; 10 % of pts (NIV) or intubation;
McKiernan et al, 2010	68 % decrease in need for intubation with the use of HFNC; pts on HFNC had improvement within 1 hour of initiating HFNC
Riese et al, 2015	Decreased LOS with ward protocol; weaning HFNC faster on wards vs PICU; 30 % of PICU pts transferred to floor on HFNC
Wraight et al, 2015	42 pts (78%) on HFNC did not require intubation; 7 pts required CPAP; 5 were intubated; 75% of patients failed within 8 hours
Goh et al, 2017	No difference in PICU admits from wards with HFNC on wards; Decrease need for intubation and hospital LOS; Did not require higher than 2 L/kg/min
Kawaguchi et al, 2017	HFNC group less likely to be intubated; shorter Mechanical ventilation days; longer PICU LOS;
Betters et al, 2017	119 of 133 pts weaned off HFNC (85%); median duration of 15 hrs; PICU LOS lower (5vs21, p<0.001)
Weiler et al, 2017	Increase in flow rates decreased WOB, with most effective at 1.5-2L/kg/min; and greater in pts <8kg
Oto et al, 2016	40 of the 50-pts improved on HFNC while 10 pts required intubated; improvement seen on HFNC at 30 minutes/12 hrs;
Hough et al, 2014	Increased in end-expiratory lung volume with higher HFNC of 8L/min; improved respiratory status; decreased FiO2 needs
Bressan et al, 2013	HFNC used improved saturations, work of breathing; optimal option for pts with bronchiolitis; safe use on wards
Mikalsen et al, 2016	HFNC safe, well-tolerated; increased PEEP, improve pulmonary compliance
Hutchings et al, 2015	PEW scores used for escalation/weaning of HFNC, flow rate dependent on age, start at 40 % FiO2, algorithm for escalation

Abbreviations

HFNC-high flow nasal cannula; PICU-pediatric intensive care unit; pts-patients; EMR-electronic medical record; dx-diagnosis; wt-weight; resp-respiratory; assess-assessment; hrs-hours; LOS-length of stay; RT-respiratory therapist; HR-heart rate; RR-respiratory rate; WOB; work of breathing; nCPAP-nasal continuous positive airway pressure; mos-months; yrs-years; NIV-non-invasive ventilation; MV-mechanical ventilation

Appendix B

Data Collection Sheet

Age(months)		Treatment in ED		Treatment in PICU:	
Sex		Albuterol		IVFs	
Ethnicity		Steroids		Dietary	
Insurance		ABX		Steroids	
Weight(kg)		Fluid Hydration		Albuterol	
Allergies				Mucolytic	
Admit last 30 days		Prematurity (<37 weeks)		Antibiotics	
		Syndrome/Genetic			
ED admit date		RAD/CLD		Complications-BiPAP	
PICU admit date		FTT		Intubate	
Transfer floor date				Pneumothorax	
D/C home date		Labs: CXR			
Bounce back within 24 hours		Respiratory Panel		Initial Time placed on HFNC	
		Blood culture		Time of order placed	
Initial HFNC Heart Rate		Urine Culture		Time of 1st wean	
Respiratory Rate		Lumbar puncture		Time removed from HFNC	
Saturations				Highest Flow	
HFNC-Liters		# days of symptoms		Highest FiO2	
HFNC-FiO2		Rhinorrhea		Lowest Flow	
		Fever		Lowest FiO2	
1 hr. post HFNC initiation Heart Rate		Cough		Respiratory support at time of transfer to floor-HFNC; NC; RA	
Respiratory Rate		Congestion			
Saturations		Decreased PO intake			
HFNC-Liters		Increased WOB			
HFNC-FiO2					

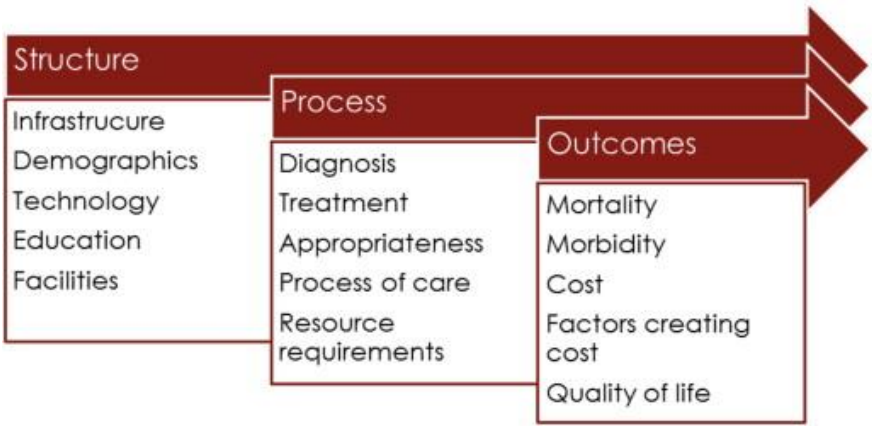
Appendix C

HFNC Weaning Order Protocol

Patient less than 12 months of age	Patient 12 months or greater
• RT to evaluate every 4 hours • Wean HFNC every 4 hours • Wean by 1 LPM • Respiratory rate <60 • Minimal retractions/accessary muscle use: no retractions or only mild subcostal or intercostal retractions • Goal 3 LPM and 25 % to transition to nasal cannula	• RT to evaluate every 4 hours • Wean HFNC every 4 hours • Wean by 1-2 LPM • Respiratory rate <30-40 • Minimal retractions/accessary muscle use: no retractions or only mild subcostal or intercostal retractions • Goal 5 LPM and 25 % to transition to nasal cannula

Appendix D

The Donabedian Model



Lighter, D. E. (2015). How (and why) do quality improvement professionals measure performance?. *International Journal of Pediatrics and Adolescent Medicine*, *2*(1), 7-11.

Table 1

Demographics

Demographic Variables		N (%)
Gender-	Male	65 (55.1)
	Female	53 (44.9)
Ethnicity-	White	83 (70.3)
	African American	23 (19.5)
	Hispanic	8 (16.8)
	Other	4 (3.4)
Insurance-	Private	46 (39)
	Government	70 (59.3)
	Unknown	2 (1.7)

N = 118

Table 2

Independent t-tests comparison of pre-post weaning groups

Variable Groups	Mean ± SD	*t*	d*f*	*p*
PICU LOS				
Pre-Protocol(n=48)	2.3±1.8d	0.52	116	0.603
Post-Protocol(n=70)	2.1±2.1d			
Hospital LOS				
Pre-Protocol(n=48)	4.8±2.2d	1.66	116	0.098
Post-Protocol(n=70)	4.2±1.6d			
HFNC Length of time				
Pre-Protocol(n=48)	87.4±47hr	1.69	116	0.093
Post-Protocol(n=70)	74.2±37.4hr			

Table 3

Age/weight

Age	1 month-37 months (M=7.4 mo; SD=2.7)
Weight	2.8-16.6 kg (M=7.4 kg; SD=2.7)

Table 4

Prematurity

Prematurity	N (%)
No	90 (76.3)
Yes	28 (23.7)

Table 5

Viruses

Viruses	N (%)
RSV	51 (43)
Rhino/Enterovirus	11 (9)
Other	16 (14)
Multiple Viruses	25 (21)
Negative Test	3 (3)
No Test	12 (10)