Clinical Safety & Effectiveness
Cohort # 9
Decreasing the number of hours on HFNC in the PI MC at CSRCH

EDUCATING FOR QUALITY IMPROVEMENT & PATIENT SAFETY
Financial Disclosure

Sandra Ehlers, MD has no relevant financial relationships with commercial interests to disclose.

Michelle W. Shepherd, RN, PIMC has no relevant financial relationships with commercial interests to disclose.
The Team

• Department: Pediatrics
  CS&E Participants
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Team Members
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• Sponsor Department
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Trisha Montague, RN, CNO of CSRCH
What We Are Trying to Accomplish?

OUR AIM STATEMENT

To decrease the number of hours pediatric patients < 18 months are on HFNC at the CSRCH PIMC by 10% by February 15th 2012.

HFNC: High Flow Nasal Cannula
CSRCH:CHRISTUS Santa Rosa Children’s Hospital
PIMC: Pediatric Intermediate Care Unit
Project Milestones

• Team Created
  September 2011

• AIM statement created
  September 2011

• Weekly Team Meetings
  October 2011

• Background Data, Brainstorm Sessions, Workflow and Fishbone Analyses
  September 2011

• Interventions Implemented
  November 2011

• Data Analysis
  February 2012

• CS&E Presentation
  February 24, 2012
Background

• Bronchiolitis is a lower respiratory tract infection caused by a variety of viral infections, the most notorious virus being RSV or Respiratory Syncytial Virus.
• The virus affects the smallest of the airways, the bronchioles. Symptoms range from upper respiratory infection symptoms, with mild cough to full blown respiratory distress, requiring mechanical ventilation.
• All ages can contract the viruses, however, those 2yrs of age and under are those who commonly suffer the highest morbidity.
• Furthermore, those infants and children with predisposing illnesses, such as prematurity, congenital heart defects or other chronic lung disease, are usually the hardest hit.
• That being said, the previously well child can also become very ill and require respiratory support.
• The treatment for Bronchiolitis is, at this time, purely supportive in nature:
  - Nasal Suctioning
  - Assistance with feedings via nasogastric/orogastric tube feedings/ or Intravenous fluids
  - 3% Saline, Racemic Epinephrine or Albuterol nebulization treatments
  - Supplemental Oxygen
    - Simple nasal cannula
    - High Flow Nasal Cannula (HFNC)- a method of delivering oxygen with the added assistance of positive pressure flow.
    - Intubation and Mechanical ventilatory support
Burden

• The significance of Bronchiolitis in infants and children is evident in the number and costs of hospitalizations. It is estimated that approximately 150,000 hospitalizations a year are accounted for by Bronchiolitis, costing over $500,000,000.*

• Not to mention the overriding significance of the approximately 400 infant deaths per year from the complications of this illness.**

* Pediatrics 2006; 118: 2418-23
** Cincinnati Children’s Evidenced Based Care Guideline, updated 11/2010
Benefits of Change

• Available studies in the use of HFNC as a treatment option for infants with Bronchiolitis are limited; we found only one.
• They designed a study to find out if using HFNC in infants with Bronchiolitis who were admitted to the PICU (Pediatric Intensive Care Unit) were less likely to require intubation if they were placed on HFNC first.
• They compared 58 infants from the season prior to the use of HFNC to 58 infants from the season after the introduction of the HFNC.
• There was a 68% reduction in the length of hospital stay from a median of 6 days in the first year, to a median of 4 days in the HFNC year.
• We wanted to show that adding a weaning protocol to the use of the HFNC, would further improve our length of stay at CHRISTUS Santa Rosa Children’s Hospital Pediatric Intermediate Care Unit (PIMC).
Flowchart for HFNC weaning in PIMC at CSRCH

1. Patient on HFNC in the PIMC
   - Pt is assessed
   - Is pt ready to be weaned?
     - Yes: Wean Flow
     - No: No protocol
     - No specific Time

2. Wean Flow
   - Wean FiO2
     - No: Reassess?
     - Yes: Wean both

3. Wean both
   - HFNC Off
     - Regular Nasal Cannula
       - Pt transferred to floor
     - No specific Time

4. No specific Time
Cause and Effect diagram for HFNC weaning in PIMC at CSRCH

Physicians
- Residents lack experience/education
- Time constraints
- No Standard Protocol
- No Scoring System
- Delay in assessing
- Short Staff

Communication
- Lack of communication between professions
- Delay in carrying out orders
- Inconsistent use of Whiteboard
- No timely charting
- No scoring tool
- No protocol
- Delay in carrying out orders

Increased HFNC

Nursing
- Lack of education/experience
- Short Staff

Process
Implementing the Change

- HFNC Weaning Protocol
- Bronchiolitis Scoring system: Both RN/RT can assess patient and make changes to the HFNC
- Changed current Bronchiolitis standard orders to be floor or PIMC friendly
- Educated Physicians, Nurses and Respiratory Therapists.

Metric used: number of hours on HFNC(SEASONAL)
What Changes Can We Make That Will Result in an Improvement?

- Implement a HFNC weaning protocol

- Bronchiolitis Scoring scale
Cont. Changes that were Implemented

- Standardized Bronchiolitis orders for Pediatric Patients
Challenges

• We had a very light and late RSV season
• Having a very high unit census in the PIMC, which required nurses to float into the unit that were unfamiliar with the HFNC weaning protocol
• Communication between RN/RT regarding changes made to the HFNC. (we implemented writing any changes made to the HFNC on the patients white board in their room to assist with communication)
• Having rotating residents/attending physicians making it difficult to ensure that all physicians were familiar with the new protocol
How Will We Know That a Change is an Improvement?

- We reviewed the charts of all patients that were admitted with Bronchiolitis to the PIMC from November 2009 to March 2011. We measured the number of hours the patients were on the HFNC. Also, we made sure that the patients were less than 18 months of age, had no predisposing conditions, and born greater than 36 wks.
- November 1, 2011 to February 15, 2012 all infants with Bronchiolitis on HFNC were evaluated and reviewed for meeting criteria for the HFNC weaning protocol.
- We hope to decrease the amount of hours patients are on the HFNC by 10% (decrease of 8.2hrs)
Expansion of Our Implementation

• This project just concentrated on only previously well children <18 months of age, we believe that the HFNC weaning protocol can benefit all children requiring HFNC for Bronchiolitis despite their age.

• Also, we can expand the HFNC weaning protocol to patients with Bronchiolitis who have previous predisposing conditions, i.e. cardiac defects, neurovascular defects.

• We can further consider using the HFNC weaning protocol for ALL patients on the HFNC for the treatment of other illnesses.
Return on Investment

• Our pre-intervention data revealed that the average # of hrs patients were on HFNC was 82 hrs
• Our post-intervention data revealed that we decreased by an average of 34.8 hours per a patient.
  – Decreasing time on HFNC ($23/hr) by 37.2 saves $800/pt
  – Decreasing time in hospital by 2 days saves $5,676/pt
• For the six patients in this study we saved $38,856
Conclusion

• In conclusion, we found that by instituting a weaning protocol to assist us in weaning patients off of the HFNC, we were able to reduce the variability and the number of hours required on HFNC. The average number of hours on HFNC decreased from 82 hours to 47.2 hours or 42%, thus exceeding our expectations.

• Thus, we extrapolated that we have also been able to reduce the number of hospital days for these patients, increase the number of available beds in the PIMC unit (which are usually at a premium during RSV season), and ultimately, improve the care we give to these infants.
Future Goals

• Continue to record the number of hrs on HFNC for the remainder of the season and further evaluate any roadblocks there may be in the implementation of the protocol.

• Broaden the indications for the utilization of this protocol, to include children of all ages and with any predisposing conditions.

• Continue to promote CHRISTUS Santa Rosa Children’s Hospital’s goal of never being closed to new admissions; by decreasing the number of hours/days these infants need to be hospitalized and thus increasing bed availability.
Thank you!

Educating for Quality Improvement & Patient Safety