A Novel Approach to Weaning of High-Flow Nasal Cannula for Children Admitted with Bronchiolitis

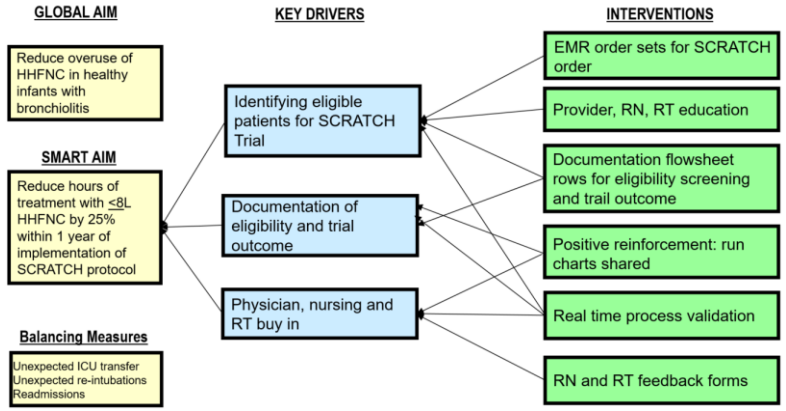
Michelle Noelck, MD, Ashley Arehart, MSN, RN, CPN, Bobbie Hildreth, BSN, RN, CPN &
The Bronchiolitis Improvement Group

Problem Statement (Challenge):

- Significant increase in the use of High-Flow Nasal Cannula (HFNC) for children admitted with bronchiolitis.
- HFNC is associated with increased cost and increased length of stay (LOS).
- Varying practices among health care team for how HFNC managed, including initiation rates and weaning practices.

Target Condition (Measures):

- Initiate HFNC for infants with moderate to severe bronchiolitis at 2L/kg/min, reflecting evidence based practice.
- Reduce hours of treatment with sub-therapeutic flow rates (<8L HFNC) in healthy infants with bronchiolitis.



Actual Condition:

- Age based initiation flow rate recommendations for HFNC.
- Protocol included HFNC wean recommendations that were not universally followed.
- Average number of hours on sub-therapeutic flow rates was 38.3 hrs between 2016-2017, and 2017-2018 bronchiolitis seasons.

Areas of Opportunities (Obstacles):

- Inconsistent practices around initiation and weaning of HFNC.
- Fear that weaning HFNC could lead to patient decompensation.

Improvement Projects (Experiments):

- Key stakeholders developed Simple Cannula/Room-Air Trial for Children (SCRATCH).
  - The group proposed that patients who met certain criteria could be transitioned to a simple cannula or room air more rapidly than current weaning practices.
- Implemented SCRATCH trials in PICU and Pediatric Acute Care Floors.
  - Monthly review of process measures and run charts at Bronchiolitis Improvement Group meetings
  - Reviewed RN and RT feedback forms
  - Identified next steps and PDSAs:
    1) Embedded SCRATCH order into HFNC order set
    2) Use of wall adapter to connect high-flow cannula to standard flow meter
    3) Changed order from once to twice daily, with recurrence for 5 days
- Process measures include HFNC initiation slow rates, SCRATCH order placement, completion of SCRATCH trial, and SCRATCH outcome (pass/fail).
- Outcome measures include time on sub-therapeutic flow rates and average LOS.

SCRATCH Bronchiolitis Process Validation

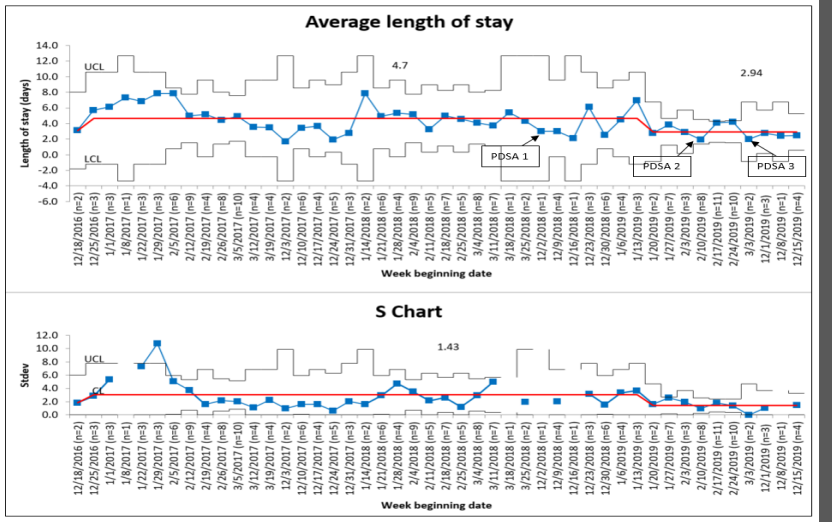
RN/RT Feedback

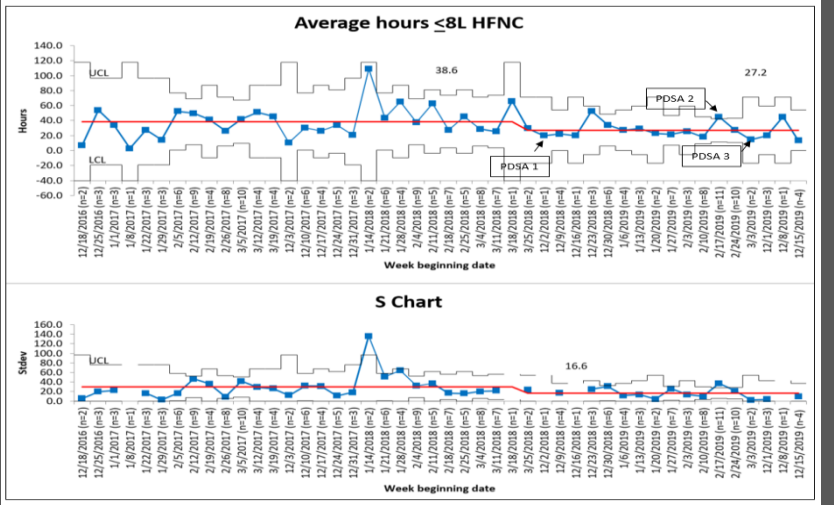
Goal Met	Not Met	N/A	HFNC
			Patient weight: _____ *Age:* _____ Level of Support at 0400: *HFNC rate:* _____ FIO2: _____ Level of Support after SCRATCH: *HFNC rate:* _____ FIO2: _____
Goal Met	**Not Met**	**N/A**	**SCRATCH**
			SCRATCH trial ordered
			SCRATCH trial performed when eligible
			If not performed, reason documented
			If failed, failure reason documented

Results (End Learnings):

- SCRATCH Trial was successfully implemented on the pediatric acute care floors and PICU setting, with an average pass rate of 82%.
- Reduction in avg LOS from 4.7 to 2.94 days and avg length of time on sub-therapeutic flow rates from 38.3 to 27.2 hours.
- Trend toward reduced LOS for patients following SCRATCH Trial implementation, ongoing data collection needed.
- 67% of patients started at therapeutic rates of HFNC (1-2L/kg).

Results (End Learnings):





Next Steps (Next Experiments):

- Focus on team huddles/re-huddles, huddle outcome documentation
- Ongoing sustainability work around SCRATCH, data collection and review