McMaster Children's Hospital

Children's Hospital
London Health Sciences Centre

Ontario West Region - Pediatric Advisory Group
Clinical Quality Initiatives: High Flow Working Group
Algorithm for Use of Heated High Flow Nasal Cannula Oxygen Therapy
October 15, 2023

Initiating HHFNC-O_2 Therapy

Infant with ongoing respiratory distress (TAL score* greater than 5) and hypoxia SpO_2 less than or equal to 92% despite low flow greater than age defined recommendations or FiO_2 (via venturi mask) greater than 40%

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MRP consults RRT/RN for HHFNC-O_2 Therapy

MRP and RRT/RN review Indications/Contraindications

Evaluate HR, RR, BP, WOB and SpO_2

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Initiate HR, RR, SpO_2 monitoring

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Initiate flow rate based on Table 1.0 & FiO_2 to keep SpO_2 greater than or equal to 92% or target

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Post HHFNC-O_2 initiation assessment within 30 minutes

Reassess HR, RR, BP, WOB & SpO_2

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Patient Improving ?

Yes → Reassess 2 and 4 hours or sooner after initiation → RRT/RN to follow Q4H & PRN while on HHFNC-O_2

No → Escalate respiratory support as per hospital policy

and/or

Activate CritiCall: 1-800-668-4357 (HELP)

Low Flow Nasal Cannula

Ultra-Low Flow: Can use ultra-low flowmeter to deliver 25 mL/min to 200 mL/min of FiO_2 for newborns or infants less than 1 yr (if available)

Low-Flow: Use standard oxygen flowmeter (15 L/min) to deliver FiO2

Max O_2 Flow Rates for Nasal Cannula

- 1 L/min for newborns to **maximum** of 2 L/min for infants less than 1yr
- 4 L/min for child greater than 1 yr
- Consider starting HHFNC-O_2 Therapy for flow rates ≥ 3 L/min

Table 1.0: Initiating HHFNC-O_2 therapy:

Weight	***Starting Flow Rates***
0-15kg	2L/kg/min
16-30kg	35Lpm
31-50kg	40Lpm
>50kg	50Lpm
Establish FiO2 based on ordered SpO2 target range	

Modified TAL Score

	Respiratory Rate (breaths/min)				
Score	**Age less than 6 months**	**Age 6 months and older**	**Wheezing/Crackles**	**O_2 Saturation (room air)**	**Accessory Muscle Use**
0	Less than or equal to 40	Less than or equal to 30	None	Greater than or equal to 95%	None (no chest in-drawing)
1	41-55	31-45	Expiration only	92-94%	+ Presence of mild intercostal in-drawing
2	56-70	46-60	Expiration and inspiration with stethoscope only	90-91%	++ Moderate amount of intercostal in-drawing
3	Greater than or equal to 71	Greater than or equal to 61	Expiration and inspiration without stethoscope	Less than or equal to 89%	+++Moderate or marked intercostal in-drawing, with presence of head bobbing or tracheal tug
Mild 0-5			**Moderate 6-10**		**Severe 11-12**

Note: If infant is on oxygen they are scored a "3" for O_2 saturation.

*Centres may choose to use another distress scoring tool for bronchiolitis used by their institution.

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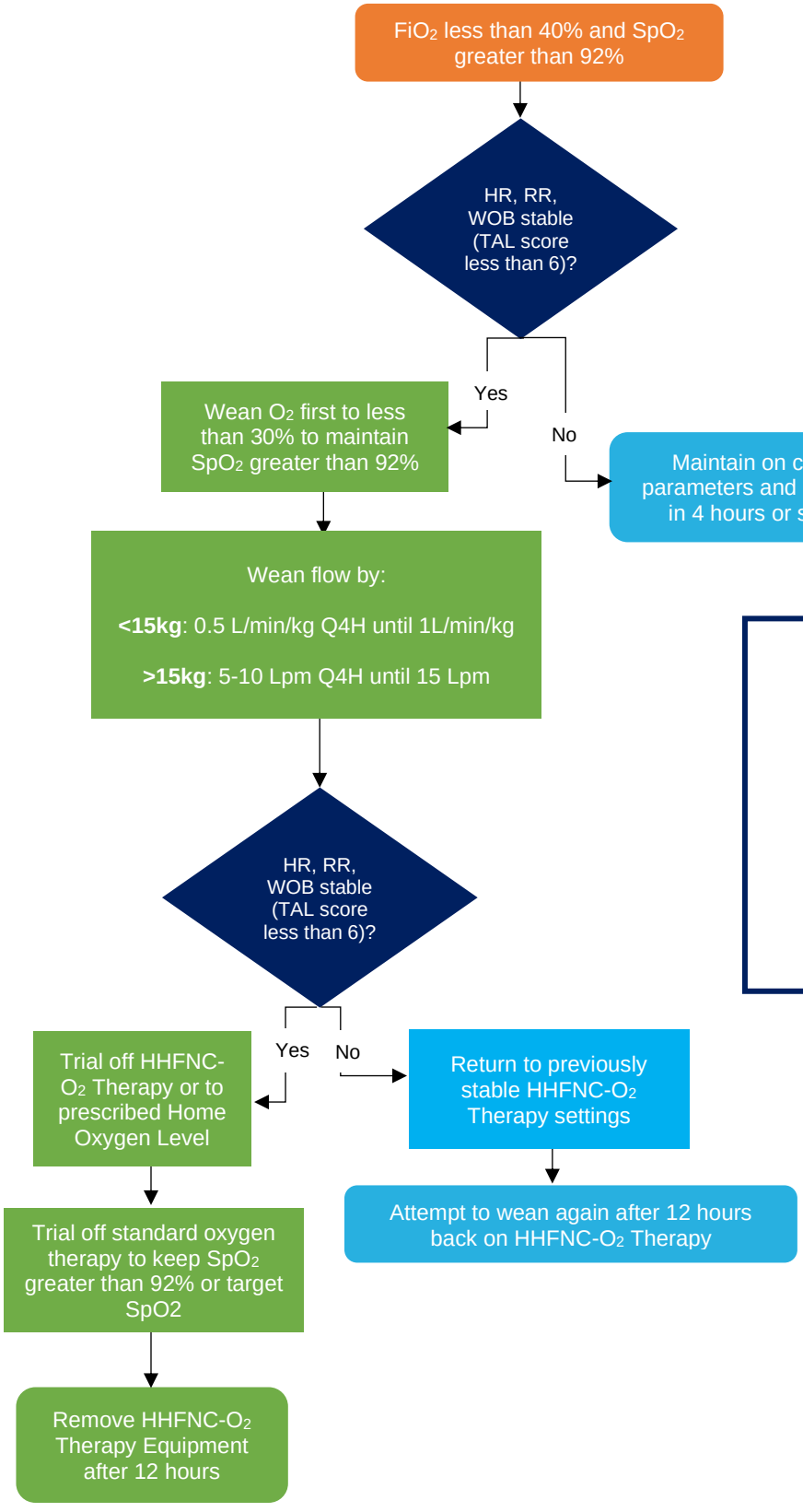
Weaning HHFNC-O_2 Therapy



SIGNS OF CLINICAL STABILIZATION

- Work of breathing improved (reduction in TAL score)
- Maintain SpO_2 within target range with FiO_2 less than 40%

SIGNS OF NO IMPROVEMENT or CLINICAL DETERIORATION

- FiO_2 requirement greater than 40%
- Flow requirement greater than 2 L/min/kg
  - Worsening TAL score
- HR, RR, BP, WOB and O_2 requirements remain unchanged or deteriorating at the 1- hour and/or at any time while on HHFNC
- Other signs of clinical deterioration such as apneas, bradycardias, deteriorating level of consciousness, poor peripheral perfusion (delayed capillary refill, cool extremities, weak pulses, etc.)
- Worsening blood gases

ABBREVIATIONS

SpO_2 – oxygen saturation
FiO_2 – fraction of inspired oxygen
MRP – most responsible person
RRT – registered respiratory therapist
RN – registered nurse
HHFNC-O_2 – heated high flow nasal cannula oxygen
HR – heart rate
RR – respiratory rate
BP – blood pressure
WOB – work of breathing
Q4H – every four hours
PRN – pro re nata (as needed)

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Recommendation Statement:
The Clinical Quality Initiatives working group for Heated High Flow Nasal Cannula Oxygen (HHFNC-O_2) Therapy recommends that all pediatric patients requiring HHFNC-O_2 therapy have continuous heart rate, respiratory rate and oxygen saturation monitoring (with or without lead tracing as per organizational policy) while on high-flow respiratory support. Monitoring capability should include central monitoring or nurse to patient monitoring of 1:1 or 1:2 while patients are on HHFNC-O_2 support.

Note:
This algorithm was developed as a guidance to support hospitals when using HHFNC-O_2 therapy.

This was developed by Ontario's West Region Pediatric Advisory Group's Clinical Quality Initiatives: High Flow Working Group.