

Acute Care High Flow Nasal Cannula (HFNC) Pathway

Pathway Purpose: Provide a process for initiation and weaning of HFNC by MD/APPs and respiratory care practitioners (RCP) on acute care units.

Inclusion Criteria:

- Patient appropriate for acute care
- HFNC \leq max support permitted on acute care (pg 2)
 - For ICU transfers to floor: HFNC support should be stable/decreasing & within acute care appropriate levels for 4 hours prior to transfer to floor

Exclusion Criteria:

- $> 50\%$ FiO₂ required while on HFNC
- Chronic lung disease or on home HFNC
 - May be appropriate for acute care on case-by-case basis, but must be managed OFF pathway

High Flow Nasal Cannula Initiation on Acute Care

- MD/APP to order HFNC in Epic, specifying weaning pathway in order
 - If ICU transfer, MD/APP to modify order to specify weaning pathway
- Flow not to exceed max acute care flow rates (see pg 2).
- RCP will not initiate weaning until patient meets readiness criteria as below.

ICU transfers should have RCP present for transport

High Flow Nasal Cannula RCP-led Weaning

Respiratory Diagnosis RCP-led HFNC Weaning Pathway



RCP q4h Wean Readiness Assessment:

1. Normal to mildly elevated work of breathing (WOB)?
2. SpO₂ within goal range on $< 50\%$ FiO₂?
3. RR and HR within parameters (pg 2)?

If YES to 1-3 above, RCP to:

- Wean by **2 lpm q4h** until reaches 4 lpm
- Then wean from HFNC 4 lpm to regular nasal cannula at 2 lpm, 100% FiO₂
- Assess q4h x 24h off HFNC

If NO to 1, 2, or 3 above, RCP to:

- Step back to last flow rate

Cardiac Diagnosis RCP-led HFNC Weaning Pathway



RCP q4h Wean Readiness Assessment:

1. Normal to mildly elevated WOB?
2. SpO₂ within goal range on $< 50\%$ FiO₂?

If YES to 1 & 2 above, RCP to:

- Wean by **1-2 lpm q12h** until reaches min flow rate for age (pg 2)
- Then wean from HFNC min flow rate to 2 lpm regular nasal cannula, FiO₂ per cardiologist
- Assess q4h x 24h off HFNC

If NO to either 1 or 2 above, RCP to:

- Step back to last flow rate

Regular Nasal Cannula RN led Wean

RN to assess resp status q4h and wean regular nasal cannula as able, keeping SpO₂ within goal range.

Concern for Clinical Worsening

Patient may remain on acute care if FiO₂ $< 50\%$ and HFNC flow rate \leq age-specific acute care max (pg 2).

IF patient remains in respiratory distress despite escalating HFNC, call RRT.

***** If RRT/Code, ensure bag mask is delivering 100% FiO₂ by connecting to wall oxygen instead of blender.*****



Owner: Lauren Destino & Amy Chapman (resp arm), Alaina Kipps & Sheila Connelly (cardiac arm), Carlos Malo
Team: K. Steffen, M. Tracy, D. Cornfield, F. Su, C. Slaney, S. Feehan, A. Graves, L. Sacks
Date 1st Approved: 1/16/2020; Last Updated: 11/16/2022
Associated Epic Order: High Flow Nasal Cannula
Associated Policies: [Oxygen: High-Flow Nasal Cannula Procedure](#), [Oxygen: High-Flow Nasal Cannula Policy](#)

Packard Clinical
Pathway Program



Acute Care High Flow Nasal Cannula (HFNC) Pathway

Definitions:

High Flow Nasal Cannula (HFNC): Heated and highly humidified air-oxygen blend delivered via a specialized nasal cannula at high flow rates. Oxygen delivered via regular nasal cannula is not heated and not always humidified.

Mechanics:

- HFNC prongs are longer and more flexible than traditional nasal cannula prongs, therefore reducing oxygen leakage.
- The HFNC system has no audible alarms, so patients should remain on cardio-respiratory monitors.



Pathophysiology:

The exact mechanism of HFNC is still under study but is thought to decrease airway inflammation, improve mucociliary mucous clearance, and provide end expiratory pressure. Oxygen delivery to alveoli is also augmented by higher flow rates, as **high flow rates (exceeding minute ventilation) minimize oxygen dilution from mouth breathing and improve washout of anatomic dead space.**

Minute Ventilation (lpm) = RR (breaths/min) * Tidal Volume (L)*

Estimate Tidal Volume (L) = 5mL/kg * weight (kg) * 1L/1000mL

- **Example #1** (10 kg toddler with a RR of 20): MV = 20 breaths/min * 0.05 L/breath = 1 lpm
- **Example #2** (70 kg teenager with a RR of 15): MV = 15 breaths/min * 0.35 L/breath = 5.2 lpm

Criteria for High Flow on Acute Care

Age	Cannula Size (HHFNC)	Min Flow (lpm)	Max Acute Care Flow (lpm)	Max Acute Care FiO ₂
1 month to < 12 months	Infant/Pediatric	3*	6	50%
≥ 12 months	Pediatric/Adult	3*	10	

* Cardiac patients < 3 years may wean to a min high flow rate of 2 lpm, depending on the clinical scenario (wean orders will specify).

Respiratory Diagnosis: RR/HR parameters

AGE	HR	RR
≤ 5 mos	<170	<50
6-11 mos	<150	<40
1-3 yr	<150	<30
4-5 yr	<130	<25
6-8 yr	<115	<25
9-11 yr	<110	<25
12-15 yr	<100	<25
≥ 16 yr	<100	<20

References:

1. Chidekiel, A et al. The effects of gas humidification with high-flow nasal cannula on cultured human airway epithelial cells. *Pulm Med* 2012
2. Dysart, K et al. Research in high flow therapy: mechanisms of action. *Resp Med* 2009.
3. Mayfield S, et al. High-flow nasal cannula oxygen therapy for infants with bronchiolitis: pilot study. *J Paediatr Child Health* 2014.
4. Bressen S, et al. High-flow nasal cannula oxygen for bronchiolitis in a pediatric ward: a pilot study. *Eur J Pediatr*. 2013.
5. Pilar F.J., Fernandez Y.M.L. (2016) High-Flow Nasal Cannula Oxygen in Acute Respiratory Post-extubation Failure in Pediatric Patients: Key Practical Topics and Clinical Implications. In: Esquinas A. (eds) *Noninvasive Mechanical Ventilation and Difficult Weaning in Critical Care*. Springer, Cham

