

Inpatient Guidelines for HFNC in children <3 years

CONE HEALTH PEDIATRICS

January 2022

Pre-HFNC care & Deciding whether to start HFNC

- Optimize NP suctioning before HFNC
- Administer antipyretic if febrile
- Dim lights, parents to hold patient
- If persistent (>15min) WOB or hypoxemia despite these measures and wall O2, proceed with HFNC

Initiate HFNC at 1.5 L/kg, FiO2 titrate to keep sat>90%

- RN to call RT to initiate
- Suction + VS q 30 min x 2

NUTRITION

- Routine NPO is not indicated unless concern for respiratory failure
- If HFNC > 6 L, RN should witness the first feeding
- Strongly consider NG or IVF if PO inadequate for 8 hours

Safe for floor

Floor Management:

- VS q2 hours x 2, then routine or per MD order
- Suction before each feed

Watch for signs of clinical worsening:

- Worsening WOB or persistent sats <90% despite suctioning
- If worsening may titrate HFNC up. If HFNC increased by ≥ 2 L then RT or RN should notify MD

Clinically worsening

Watch for signs of clinical improvement:

- Lower respiratory rate with improved aeration
- Improved WOB

Clinically improving

Weaning HFNC on the medical unit:

- Improving patient should be assessed by RT or RN for readiness to wean **q4 hours**.
- Wean flow for WOB and FiO2 for sats
- **Rapidity:** Flow and FiO2 should be weaned quickly in improving patients, including at night.
 - Weaning from max flow directly to off is also possible, as patient condition allows.
- **Monitoring:** patient should be observed for 10 minutes after flow turned down, and re-assessed within 2 hours to ensure sustained successful wean.
- **Definition of failed wean:** persistent sats < 90% or increased work of breathing that the team judges difficult to sustain for next 12-24 hours, which resolves when flow wean is reversed.
- **Switch to low flow (wall) setup once $\leq 2-4$ L flow for 4 hours**

Off Pathway

Huddle 60 minutes post HFNC initiation after 2nd set of vitals
MD (Sr resident or attending), RN, RT

Decide on PICU vs floor
(See below)

Criteria for transfer to the ICU:

- Consider transfer if prolonged/severe subcostal or suprasternal retractions, nasal flaring despite floor max HFNC
- Desaturations below 90% despite 80% FiO2
- Other late findings of respiratory failure:
 - Inappropriately low respiratory rate with worsening obstruction
 - Lethargy despite noxious stimuli
 - Poor perfusion
- Apnea ≥ 10 seconds with associated bradycardia/desaturation requiring intervention
- Need for frequent RN interventions

Age	HFNC floor MAX (L/min)
44wk PMA – 90 days	4
91 days – 6 months	6
>6 months – 1 year	8
>1 year	10

Requires PICU

Transition Management:

- May escalate respiratory support with ICU guidance while waiting for transfer
- Suction and vitals q30 minutes while waiting for transfer

PICU Management:

- Escalate respiratory support as needed for increased WOB or dropping sats
- Consider SiPap or advanced airway in consultation with PICU attending

Criteria for transfer from the ICU to floor:

- Flow rate at or below floor max
- None of the "Criteria for PICU transfer" apply
- Proceed to "Floor Management" box above

This clinical pathway is based upon medical evidence and a consensus of pediatric practitioners at Cone Health Pediatrics. These clinical pathways are intended to be a guide for practitioners with a special emphasis on those working at community hospital sites. Management needs to be adapted for each specific patient based on the practitioner's professional judgment, unique patient circumstances, the needs of each patient and their family, and the availability of resources at the health care institution where the patient is located.

Accordingly, these clinical pathways are not intended to constitute medical advice or treatment, or to create a doctor-patient relationship between/among Cone Health physicians and the individual patients. These clinical pathways may not be in every respect accurate or complete, and may not apply to a particular patient or medical condition.

HFNC Evidence Base

- HFNC provides a heated & humidified mixture of air and oxygen delivered at a flow rate that is higher than the patient's inspiratory flow. Theoretical benefits of HFNC include a wash-out of CO₂-rich dead space and provision of a low positive end expiratory pressure. The benefits of HFNC over standard cannula therapy include the ability to provide higher levels of flow without significant patient discomfort that would be caused by unheated and un-humidified standard cannula. Heating and humidification also allow patients to avoid expending energy to warm and humidify incoming gas.
- A 2018 multicenter NEJM study showed that among infants with bronchiolitis who were treated outside an ICU, those who received high-flow oxygen therapy had significantly lower rates of escalation of care due to treatment failure than those in the group that received standard oxygen therapy. (n engl j med 378;12)
- A 2017 Hospital Pediatrics study showed that there is a low incidence of aspiration-related respiratory failure in term children with bronchiolitis on HFNC receiving enteral nutrition. Oral nutrition was tolerated across a range of HFNC flow and respiratory rates, suggesting the practice of withholding nutrition in this population is unsupported. (HOSPITAL PEDIATRICS Volume 7, Issue 5, May 2017)

HFNC guidelines exclusion criteria

- Primary diagnosis other than bronchiolitis, asthma, or pneumonia
- Requires positive pressure ventilation
- Pneumothorax
- Anatomic functional disorders of the upper airway
- Neuromuscular disease
- Hemodynamically significant cardiac condition