



Bronchiolitis Clinical Practice Guideline:

High Flow Nasal Cannula Initiation in Specialty Pediatrics

High flow nasal cannula (HFNC) is an accepted treatment modality in infants with respiratory distress due to viral bronchiolitis.

HFNC therapy helps by:

- Washing out anatomic dead space
- Decreasing inspiratory resistance
- Providing positive pressure during the respiratory cycle
- Decreasing air trapping by stenting swollen airways
- Providing increased humidity to moisten retained secretions

Patients exhibiting significant hypoxemia or respiratory distress can be successfully treated with high flow nasal cannula. HFNC can prevent respiratory failure and the need for more advanced support, such as CPAP, NIV and mechanical ventilation.

Inclusion Criteria:

- Infants with viral bronchiolitis, adequately hydrated (receiving IV or NG fluids if necessary), and respiratory distress (i.e. retractions, tachypnea, coarse breath sounds) that does not improve with conventional therapy (generally a Bronchiolitis score of 8 or higher).

Exclusion Criteria:

- Patient exhibiting signs of respiratory failure (i.e. severe respiratory distress, decreased level of consciousness, lethargy, apnea or bradycardia) should be transferred to the PICU immediately. Patients with cardiac co-morbidities, chronic respiratory disease, history of non-elective intubation, and/or history of pulmonary hypertension should also be excluded from this protocol. A PRT should be called for any of these types of patients requiring increased support.

RCP Protocol:

Many of our patients with bronchiolitis are started on HFNC in the ED. Guidelines have been established for disposition decisions on these patients.

Patients placed on HFNC can be managed in PICU or in specialty pediatrics, based on the following criteria:

HFNC patients who will be admitted to the PICU:

- Patients with cardiac co-morbidities
- Patients with history of non-elective intubation
- Patients who require HFNC support and are ≤ 8 weeks of age
- Patients 2m -6m requiring 8L and 40% oxygen or greater
- Patients 7m - 12m requiring 10L and 40% oxygen or greater
- Patients >12m requiring 12L and 40% oxygen or greater
- Patients having apnea and/or bradycardic events

Any patient placed on max HFNC settings for the floor in the ED must be admitted to the PICU. This should help to prevent emergent transfers to the PICU for increased HFNC support.

HFNC patients who may be admitted to specialty pediatrics care on central monitoring:

- Patients 2m-6m old on HFNC requiring < 8 L and 40% oxygen to maintain SpO₂ of 91-94% and show improvement in work of breathing
- Patients 7m-12m old on HFNC requiring < 10 L and $< 40\%$ oxygen to maintain SpO₂ of 91-94% and show improvement in work of breathing
- Patients >12m old on HFNC requiring < 12 L and $< 40\%$ oxygen to maintain SpO₂ of 91-94% and show improvement in work of breathing
- Max of 2L/kg/min on specialty pediatrics

Patients placed on HFNC in specialty pediatrics who can stay on the specialty pediatrics floors on central monitoring:

- Patients 2m - 6m old on HFNC requiring ≤ 8 L and 40% oxygen to maintain SpO₂ of 91-94% and show improvement in work of breathing
- Patients 7m-12m old on HFNC requiring ≤ 10 L and $\leq 40\%$ oxygen to maintain SpO₂ of 91-94% and show improvement in work of breathing
- Patients >12m old on HFNC requiring ≤ 12 L and $\leq 40\%$ oxygen to maintain SpO₂ of 91-94% and show improvement in work of breathing

***Patients who require HFNC support and are ≤ 8 weeks of age must go to PICU**

Prior to initiation of HFNC the RCP should consult with the respiratory supervisor and the medical team managing the patient. The hospitalist team should come to the bedside to evaluate the patient.

COVID-19 Guidelines:

- HFNC is considered potentially aerosol-generating when a patient:
 - <9 kg requiring above 12lpm
 - 9-15kg requiring above 15lpm
 - 15-25kg requiring above 20lpm

- Based on current hospital guidelines, patients on HFNC do not need to be placed in a negative pressure room.

HFNC initiation –first hour:

- Patient will be set up on Vapotherm Precision Flow up to the maximum settings for the floor:
 - a. For patients 2m -6m maximum settings are 8L and 40% oxygen
 - b. For patients 7m -12m maximum settings are 10L and 40% oxygen
 - c. For patients >12m maximum settings are 12L and 40% oxygen

*Or a max of 2/L/min whichever comes first
- Oxygen will be adjusted for SpO2 and increased as needed
- Patient will be continuously monitored for HR, RR and SpO2
- Patient will be scored prior to initiation of therapy and scored after the first hour of therapy

Call PRT to immediately contact PICU medical staff for:

- Rapidly deteriorating clinical appearance
- Worsening respiratory distress or impending respiratory failure
- Apnea and bradycardia requiring manual ventilation or other interventions

Patients who demonstrate no response will require evaluation by medical staff; call PICU for transfer. Those who improve will remain in specialty pediatrics care.

Patients meeting max high flow settings, and showing no signs of improvement, or signs of worsening should be transferred to the PICU. The decision to transfer a patient should be made with the entire floor team (resident, attending, bedside RN, and RT) during a bedside huddle. The resident team / attending will contact the PICU resident / attending, the bedside RN will contact the unit clinical team leader who will contact the PICU clinical team leader, and the RT will contact the ICU RT regarding the need to transfer a patient.

Specialty Pediatrics: Patient Assessment and Care

- HFNC patients will remain in general care on continuous central monitoring with HR, RR and SpO2.
- Nursing will assign staffing based on a goal of 1 RN: 3 Patient ratios
- After the first hour of HFNC, respiratory therapy will assess patients Q2 hrs x 2, then Q4, documenting all vital signs and bronchiolitis scores and suctioning.
- All staff will observe for signs of worsening respiratory distress; any worsening of symptoms will be called to the medical team, i.e., ↑WOB, ↑ Respiratory Rate, ↑ HR, decreasing saturations.
- All patients on HFNC will have a nightly huddle with the resident, nurse, and RT to discuss the patient's status and plan of care.
- Patient to remain on watcher list until stable. Status will then be changed to HFNC until high flow nasal cannula is discontinued.

Feeding on HFNC

- Initial Feed on HFNC to be completed or observed by speech therapist, RN or provider (MD, DO, NP, PA) monitoring for signs of aspiration (coughing, choking, gagging and/ or increased FiO2 requirement by > 10%, increase in RR > 20 bpm)
- High Flow Nasal Cannula-Routine adjustment of flow/ turning down flow for feeds is not recommended
- Please see separate document for detailed guidelines

Post-acute care:

PICU HFNC transfers to general care for weaning: We are requesting that the PICU send out their HFNC patients on high flow not wall gas, to continue high humidity until the oxygen requirement is gone. Patients 8 weeks old and younger may transfer out of the PICU on HFNC they just cannot be initially admitted to specialty pediatrics. Patients with exclusion criteria for the specialty pediatrics floors initially (i.e. history of non-elective intubation, cardiac comorbidities, etc.) can be transferred out of the PICU on HFNC if patient is stable and hospitalist and PICU staff agree.

HFNC transfers to the floor must meet these criteria:

- $O_2 \leq 40\%$
- Stable for >12 hours on current therapy
- Patients will be "HFNC SA" when they leave the PICU until the HFNC is discontinued

General Care HFNC weaning: HFNC weaning should not begin until the patient has shown stability on current settings. Adjustment of flowrate and O2 should be primarily limited to the RCP. If the RN or provider increases O2 or flow, they should immediately notify the RCP assigned via Vocera.

- Maintain the established flowrate and wean oxygen to 21% while maintaining target saturations of 91-94%
- Provided that the patient is stable and shows improving respiratory status, look to wean FiO2 as soon as possible
- After oxygen is 21% wean flow rate watching work of breathing and respiratory rate
- An order is not needed to initiate weaning of flow or FiO2

Patients should not need to go to a low flow cannula. If there is a need, give just enough flow to maintain target SpO2 levels, not the same flow on HFNC.

After patients are weaned off HFNC whether it is to low flow oxygen or room air, the head of bed needs to be lowered back to flat.

Any increase in O2 or flow during the weaning process should be called immediately to the medical team.

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