

Newborn Critical Care Center (NCCC) Clinical Guidelines

Nasal Cannula Guidelines

Introduction:

Use of the nasal cannula is intended for non-invasive oxygen delivery via variable liter flow and fractions of inspired oxygen.

- **Low flow nasal cannula** delivers a fraction of inspired oxygen by variable flow of 100% oxygen (FiO₂ 1.0), typically with flow rates up to 1 liter per minute (LPM).
- **High flow nasal cannula** delivers a variable fraction of inspired oxygen at a fixed flow rate to generate positive airway pressure, (typically ≥ 1.5 LPM, as lower flows do not exceed the patient's maximum inspiratory demand, which in neonates is ~2 LPM). The amount of flow necessary to provide various levels of positive airway pressure is related to the infant's body weight in a linear fashion. Higher flow produces increased (but variable and unpredictable) positive end-expiratory pressure compared to bubble CPAP. There is insufficient evidence to support the use of HFNC in preterm infants. For these reasons, we preferentially use bCPAP for the initial management of preterm infants <34 weeks GA.

	Low Flow Nasal Cannula	High Flow Nasal Cannula
Definition	≤ 1 liter per minute (LPM)	≥ 1.5 liters per minute (LPM)
Equipment	Nasal cannula is attached to a humidifier and flow meter which then attaches directly to oxygen source from the wall.	Nasal cannula is attached to heater & humidifier, flow meter, and oxygen blender.
Initial Settings	<p>Flow: Initial flow should be set to achieve the desired oxygen saturation levels.</p> <p>Oxygen: FiO₂ is set and fixed at 1.0, sourced directly from the wall.</p>	<p>Flow: Set liter flow to provide positive pressure for improvement in work of breathing and estimated end-expiratory lung volume.</p> <p>Oxygen: Set the blended oxygen level (FiO₂ 0.21-1.0) on humidified blender to achieve desired saturation levels.</p> <p><i>* See below for transition from bCPAP to HFNC</i></p>
Optimization of Therapy	<p>Flow: Titrate flow to maintain goal saturations per EPIC orders.</p> <p>Oxygen: The FiO₂ is set and fixed at 1.0.</p> <p><i>* Blended oxygen on LFNC can be utilized at the provider's discretion in select circumstances (i.e. cardiac patients)</i></p>	<p>Flow: Titrate flow based on work of breathing and oxygen requirement. The rate of weaning is dependent on patient characteristics and the underlying disease process.</p> <p>Oxygen: Titrate to maintain goal saturations per EPIC orders.</p>
Feeding	No contraindications to feeding while on LFNC.	May start working on PO feeding at ≤ 2 LPM.

TRANSITION FROM BUBBLE CPAP TO HFNC

Consider a transition from bCPAP to high-flow nasal cannula when it will benefit the developmental status of the infant. To be considered for this transition, the infant must be on bCPAP 5cm H₂O and FiO₂ ≤ 0.30 and either of the following:

1. Greater than or equal to 34 weeks corrected gestational age AND feeding cues
- OR**
2. Greater than 35 weeks corrected gestational age without signs of feeding cues

The RT will transition infants who meet these criteria to 4 L/min high-flow nasal cannula. Some larger infants may need to start on higher liter flow (2L/kg). The respiratory therapist will wean the infant by 1 L/min of flow no faster than every 12 hours if the infant's work of breathing remains appropriate and FiO₂ ≤ 0.30.

See [BCPAP Guidelines](#) for assistance in determining whether bCPAP is required or nasal cannula may be used.

References:

1. Chao KY, Chen YL, Tsai LY, et al. The Role of Heated Humidified High-flow Nasal Cannula as Noninvasive Respiratory Support in Neonates. *Pediatr Neonatol* 2017; 58:295.
2. Cummings JJ, Polin RA, Committee on Fetus and Newborn, American Academy of Pediatrics. Noninvasive Respiratory Support. *Pediatrics* 2016; 137.
3. Martin, R, Deakins, KM, (2024). Respiratory Support, Oxygen Delivery, and Oxygen Monitoring in the Newborn. *UpToDate*, Retrieved March 2024.
4. Yoder BA, Manley B, Collins C, et al. Consensus approach to nasal high-flow therapy in neonates. *J Perinatol* 2017; 37:809.
5. Hodgson KA, Wilkinson D, De Paoli AG, Manley BJ. Nasal high flow therapy for primary respiratory support in preterm infants. *Cochrane Database of Systematic Reviews*, May 2023, Issue 5. Article No: CD006405. DOI: 10.1002/14651858.