HHFNC Administration (Adult & Pediatric)

HHFNC use is limited to Critical Care providers who have completed HHFNC training, are approved by the Critical Care Inter Facility Patient Transport Physician Director and are equipped with HHFNC Equipment. For use of this protocol, patients must meet the Inclusion Criteria. Contraindicated patients and those that do not meet the inclusion criteria will be treated according to existing protocols without the application of HHFNC.

Indications:
Respiratory distress with any of the following (see **Respiratory Distress Protocol** as needed):

1. Patients with hypoxia unresolved with nasal cannula oxygen supplementation, which may be due to: ARDS/pulmonary edema, pneumonia, bronchiolitis, pulmonary embolism, pulmonary hypertension, asthma/COPD, CHF, near drowning, and other hypoxic respiratory conditions
2. Pediatrics, in addition to the above:
    a. Significant tachypnea and/or retractions
    b. Concern for evolving/impending respiratory muscle fatigue

Contraindications:

1. Respiratory/cardiac arrest or apnea
2. Unresponsive to speech
3. Inability to maintain patent airway
4. Any of the following injuries: basilar skull fracture, severe facial trauma, pneumothorax, penetrating chest trauma
5. Vomiting or active GI bleeding with emesis
6. Significant or uncontrolled epistaxis
7. Inability to provide continuous heated oxygen for entire duration of transport
8. Pediatrics:
    a. Inability to provide therapy through appropriately sized nasal prongs
    b. Nasal genetic abnormalities such as choanal atresia

Procedure

1. ENSURE THERE IS AN ADEQUATE SUPPLY OF OXYGEN FOR TRANSPORT.
2. Explain the procedure to the patient and/or parent.
3. Apply HHFNC per manufacturer's recommendations including appropriate nasal prong sizing.
4. Place the patient on continuous pulse oximetry, cardiac monitor, and record rhythm and vital signs every 10 minutes (5 minutes in short transport situations).
5. Continue to coach the patient to keep the nasal prongs in place, readjust as needed.
6. Check the tubing/nasal cannula for presence of condensation intermittently.
7. See Initiation/Titration Considerations below for generic instructions – contact Medical Control as necessary.
8. Advise medical control of HHFNC use during radio report.
9. If respiratory status deteriorates, remove the device, and assist ventilations with a BVM/supplemental O2; place an appropriate airway control device in accordance with the **Emergency Airway Procedure**, or see **Respiratory Distress Protocol**.
10. Administer medications, per respiratory distress protocol, as indicated**.**

11. Consider sedation to reduce anxiety per **Patient Sedation Procedure**; however, contact medical control prior to sedation for all patients.

Initiation/Titration Considerations

1. Continue current settings for patient transfer if indications/contraindications are appropriate and vital signs are stable.
2. If necessary, see therapy guide for initiation/titration:

AIRVO 2 HHFNC					
High-Flow	**0-1 month (>3kg)**	**1-12 months**	**1-4 years**	**5-10 years**	**10+ years**
Cannula Size	Nasal prongs to occupy close to but NOT exceeding 50% of nare passage Nasal Prongs should not "pinch" the nasal septum				
	Infant	Infant	Pediatric	Pediatric	Small/Medium/Large
Humidifier Temp.	34 degrees Celsius				37 degrees Celsius
Initial/Minimum Settings	0.5 L/kg/min (minimum of 3 L/minute) 40% FiO2				30 L/min 40% FiO2
Max Flow Rate	2 L/kg/min				60 L/min
Titration Considerations for Stable Patients					
Approach	Titrate OXYGEN for low O2 saturation & Titrate FLOW RATE for work of breathing				
1st Titration	Titrate oxygen supplementation to desired SpO2				
2nd Titration	Titrate Flow by 1-2 L/min for pediatrics and 5-10 L/min for adults, as patient tolerates (Do NOT exceed max L/kg flow rate)				
3rd Titration	See **Emergency Airway Procedure** & contact Medical Control				
Notes	• Use "JUNIOR" mode on AIRVO 2 for Infant and Pediatric Cannulas • If initiating therapy do NOT start at maximal settings, begin at "Initial/Minimum Settings" as above				

Complications

1. Pneumothorax
2. Gastric distension
3. Epistaxis
4. Blocked HHFNC due to secretions
5. Aspiration

Removal Procedure

1. Once applied, HHFNC therapy needs to be continuous in the prehospital setting until patient care is transitioned to the Emergency Department team and should not be removed unless

the patient cannot tolerate the nasal prongs or has marked deterioration including the contraindications listed above.
2. Assist ventilations as necessary

Special Notes:

1. Do not remove HHFNC until hospital therapy is ready to be placed on the patient.
2. Watch the patient for gastric distention.
3. HHFNC may be used on DNR patients not in arrest.
4. Refer to oxygen consumption reference if available