NASAL HIGH FLOW OXYGEN

Nasal high flow oxygen therapy offers another option for patients requiring non-invasive respiratory support. Nasal high flow oxygen therapy allows delivery of a prescribed FiO₂ with reduced air entrainment and dilution. This therapy may be beneficial in that nasal interfaces may be better tolerated and children receive the benefits of humidification and likely also receive a low level positive airway pressure.

APPLICATIONS

- Patients with high oxygen requirements or increased work of breathing.
- Patients who may benefit from humidity/assistance clearing secretions.
- Poor tolerance of masks where the mask impairs ability to eat, drink, talk.

CONTRAINDICATIONS

- Maxillofacial trauma.
- Complete nasal obstruction.
- Presence of suspected base of skull fracture.
- All contraindications to CPAP/ BiPAP apply.

CLINICAL CONSIDERATIONS

High flow can only be delivered via the Optiflow cannula. The cannula should not be occlusive (as it requires a gap for expiration), or cut to ‘fit’ into the nares.

Use of high flow is restricted to within PICU/PHDU. Senior medical advice should be sought at the earliest opportunity if the patient’s condition deteriorates or an increase in FiO₂ is required to maintain status.

WHAT FLOW RATE IS BEST?

In adults providing a flow rate of 30-40 L/min ensures that most if not all of the patient’s breath is humidified and oxygenated at a flow rate that is tolerable. It is thought that a flow rate of 40 L/min provides a CPAP of 2-3cmH₂O. It is not clear in children what CPAP is provided at different flow rates.

- For children less than 5 kg, use Bubble CPAP.
- For children more than 5kg, use the appropriate sized optiflow cannula (see below) at 2L/kg/min.
- In children greater than 20kg, flow rates may be increased to 45-50 L/min, but only if the duty intensivist is aware of this.

Cannula Maximum Flow Limits

- Infant (OPT316)  20L/min
- Paediatric (OPT 318)  25L/min
- Small Adult (OPT 542)  60L/min
- Medium Adult (OPT 544)  60L/min
WHAT FIO₂?

With high flow, the flow rate is fixed and then the Fio₂ is adjusted to requirements. Usually the Fio₂ is titrated to maintain a target SPO₂ >92-95% unless otherwise prescribed.

WEANING

Wean to 40% Fio₂. If the child has an acceptable SPO₂ and is breathing comfortably, then a trial on low flow oxygen at 1-2L/min is appropriate. Do not use intermediated flow rates – children should be either on high flow as above or low flow. Low flow O₂ can be administered using the Optiflow cannula. When progressing the patient to low flow humidified O₂ the O₂ should be delivered via the wall flow meter and not the oxygen mixer system. If the child will require humidified O₂ on transfer to the ward, then a BC cannula should be used prior to discharge to the ward. Children are not to be transferred to the ward with an Optiflow cannula.

DOCUMENTATION

Fio₂ and gas flow rate must be prescribed by medical staff. Hourly documentation of Fio₂, gas flow rate, SPO₂ and respiratory status should be maintained throughout therapy. If patients are requiring >50% O₂ and >40 L/min of flow, ensure that the intensivist on duty is aware of this. If an arterial line is present, blood gases should be performed 6hrly.

SETTING UP THE NASAL HIGH FLOW CIRCUIT

Equipment Required for the Infant (OPT316) and Paediatric (OPT318) Optiflow Cannula:

- Oxygen and Blender with high flow meter.
- Fisher and Paykel MR850 humidifier.
- RT330 circuit.
- Nasal interface Infant (OPT 316) or Paediatric (OPT 318).

Procedure:

1. **Fit the chamber:** Slide the humidification chamber onto the humidifier. Remove the blue caps.
2. **Hang the water bag:** Hang the water bag. Spike the water bag. Ensure the water feed set is not kinked and that water is present in the chamber.
3. **Connect the circuit:** Connect the short blue circuit to the flow meter. Connect the other end of the short blue circuit and the elbow of the breathing circuit to the humidification chamber.
4. **Connect the temperature probes:** Connect the yellow probe plug into the black socket on the side of the humidifier base. Connect the other cable with the blue temperature probes into the breathing circuit at the patient end and above the chamber. Connect the heater wire adaptor into the circuit socket. Match triangle to triangle.
5. **Oxygen/Air:** Ensure oxygen and air pipes are attached to pendant / wall supply.

6. **Turn on the humidifier:** The humidifier will start warming; the patient symbol will be lit. Turn on flow. It is ready when temperature has reached mid 30’s (Allow 10 – 15 minutes). Attach to the nasal interface. The patient delivery indicator should be set to the invasive (intubated pt) mode.

![Image of humidifier and nasal interface]

7. **FiO2 and Flow rate:** ensure FiO2 and flow rate are set on blender and flow meter according to prescription.

8. **Patient interface set-up:** Remove the adhesive backing and fit the nasal prongs into the patient’s nostrils ensuring there is a 2mm gap from the base of the prongs to the septum. Apply the adhesive strips to the face. (It is possible to directly connect to a tracheostomy tube with a specific tracheostomy direct connector.)

![Image of nasal prongs and adhesive strips]

9. **Maintenance:** assess for evidence of pressure area formation on the nares and perform nasal care at least 4hourly and oral hygiene 2 hourly.

**THESE INFANT AND PAEDIATRIC CANNULA ARE INCOMPATIBLE FOR USE WITH THE DELIVERY OF OXYGEN THERAPY VIA THE DRAGER VENTILATOR.**

**Equipment required For Small Adult (OPT 542) and Medium Adult (OPT 544) Optiflow Cannula:**

- Oxygen and Air blender with high flow meter.
- Fisher and Paykel MR850 humidifier.
- Bag of sterile water for irrigation.
- RT202 circuit or existing ventilator tubing.
- Nasal interface - small adult or medium adult dependant on patient size.

**Procedure:**

1. **Fit the chamber:** Slide the humidification chamber onto the humidifier. Remove the blue caps.
2. **Hang the water bag:** Hang the water bag. Spike the water bag. Ensure the water feed set is not kinked and that water is present in the chamber.

3. **Connect the circuit:** Connect the short blue circuit to the flow meter. Connect the other end of the short blue circuit and the elbow of the breathing circuit to the humidification chamber.

4. **Connect the temperature probes:** Connect the yellow probe plug into the black socket on the side of the humidifier base. Connect the other cable with the blue temperature probes into the breathing circuit at the patient end and above the chamber. Connect the heater wire adaptor into the circuit socket. Match triangle to triangle.

5. **Oxygen/Air:** Ensure oxygen and air pipes are attached to pendant / wall supply.

6. **Turn on the humidifier:** The humidifier will start warming; the patient symbol will be lit. Turn on flow. It is ready when temperature has reached mid 30’s (Allow 10 – 15 minutes). Attach to the nasal interface.

7. **FiO2 and Flow rate:** Ensure FiO2 and flow rate are set on blender and flow meter according to prescription.

8. **Patient interface set-up:** Fit the nasal prongs into the patient’s nostrils. Place the elastic head strap around the back of the patient’s head above the ears. Adjust the strap to be firm but not tight. (It is possible to directly connect to a tracheostomy tube with a specific tracheostomy direct connector.)

9. **Maintenance:** Assess for evidence of pressure area formation on the nares and perform nasal care at least 4hourly and oral hygiene 2 hourly.

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### Setting up the BC Cannula Circuit in Preparation for Discharge to Ward if Humidified O2 Required

#### Equipment required:

- Oxygen Low flow meter.
- Fisher and Paykel MR850 humidifier.
- RT329 circuit.
- Standard oxygen tubing.
- BC cannula dependant on patient size.
- Bag of sterile water for irrigation.

#### Procedure

1. **Fit the chamber and hang water bag** as per 1 and 2 above.
2. **Connect the circuit:** Connect the standard oxygen tubing from the low flow meter to the pressure manifold provided in the circuit and connect to the humidifier bowl. Connect the elbow of the breathing circuit to the humidification chamber.
3. **Connect the temperature probes** as per 4 above.
4. **Turn on humidifier.**
5. **Fit the nasal prongs** into the infants’ nostrils. Connect to circuit.
6. **Turn flow** to prescribed rate.

The respiratory circuit and chamber are single patient use and are to be changed every 7 days and disposed at end of therapy. The probes must be cleaned with alcohol and returned to equipment room with the humidifier base at completion of therapy.