

## High Flow Nasal Oxygen for adults Guidelines for use

Fisher and Paykel produces the **Optiflow™ High Flow Nasal Oxygen (HFNO)** delivery system. It comprises 4 parts



- The disposable single patient use **nasal cannulae** set, 3 sizes (S, M, L).
- Heated wire tubing system breathing **circuit, humidification chamber** and **HME**.
- The **heater humidifier device** (Currently we use the F&P MR850)
- The **oxygen flow meter** with flows up to 100lpm (or can be run via the Draeger V500 ventilator).

### Introduction

- HFNO systems provide two key elements – **humidification** and **flow**.
- **Heated humidification** provides better tolerance and mucociliary clearance (37°C, 44mg/l)
- **High flows** deliver accurate levels of oxygen, washout anatomical deadspace and may provide very small levels of positive airway pressure

### The evidence

- |             |  |
|-------------|--|
| <b>PROs</b> | HFNO is tolerated well and comfortable compared with facemask or other CPAP (1)<br>HFNO may improve survival by reducing total time of invasive ventilation (3)<br>HFNO may be helpful post-extubation in critical care patients (5) |
| <b>CONs</b> | HFNO may delay the decision to intubate which may increase mortality (2)<br>HFNO does not improve pre-oxygenation in critical care patients (4)  |

***We do not know if prolonged (>48hrs) of HFNO with very high FiO<sub>2</sub> (>0.6) is harmful***

### Indications for use

- ***Hypoxaemia that requires high FiO<sub>2</sub> (alternative to humidified oxygen via face mask)***
- ***Need for very low pressure CPAP as an alternative to facemask or hood CPAP***

### Cautions

- Given the above evidence we advocate HFNO use only in appropriately staffed and trained areas (ie HDU, ICU and in some circumstances ward 204)
- Escalation plans **MUST** be made in advance of starting HFNO therapy
- The use of HFNO therapy **MUST** be reviewed at least twice daily by a consultant

### Contraindications

- Patients with Type 2 respiratory failure who need ventilatory support
- Post oesophagectomy or gastrectomy
- Pneumothorax or bronchopulmonary fistula
- Recent lobectomy or pneumonectomy
- Depressed conscious level and at high risk of aspiration
- Base of skull fracture or CSF leak

## References

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4. Vourc'h M, et al. High-flow nasal cannula oxygen during endotracheal intubation in hypoxemic patients: a randomized controlled clinical trial. Intensive Care Med. 2015. Epub
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# High Flow Nasal Oxygen Algorithm

## ESCALATION PLAN

*The appropriateness and plan for intubation or ceiling of therapy must be clearly documented in notes prior to or upon initiation of treatment*

### **Initial settings**

CONSULT WITH MEDICAL STAFF AND ESTABLISH TARGETS AND PARAMETERS OF THERAPY

Flow rate **30 l/min**

FiO<sub>2</sub> 21-100% to achieve initial SaO<sub>2</sub> 88-92% unless otherwise stated

Switch humidifier to invasive setting

Ensure prongs are ½ the size of patients nares for comfort

Continuously monitor and document: SaO<sub>2</sub>, resp rate and heart rate.  
ABG within 30 mins if possible and after every change

Has the work of breathing eased?

i.e. Resp rate improved? Less use of accessory muscles?

NO

**INFORM MEDICAL STAFF**

Increase flow rate in 10 l/min increments to max 60 l/min

YES

SaO<sub>2</sub> or PaO<sub>2</sub> at target levels?

NO

Increase FiO<sub>2</sub> to achieve target SaO<sub>2</sub> or PaO<sub>2</sub>

YES

If clinical improvement maintained for **at least 2 hours**

1) Decrease FiO<sub>2</sub> gradually to minimum of 40%  
**THEN**

2) Decrease flow rate in 10l/min steps to 30l/min

Once on 40% and 30l/min flow, can try alternative oxygen delivery system for weaning periods

If tolerated, extend weaning periods off HFNO till completely weaned from HFNO

## IN CASE OF DETERIORATION

**Inform ITU/HDU Consultant or Registrar immediately**

**Increase FiO<sub>2</sub> to 100% and flow rate to 60 l/min**

**Consider reversible causes (CXR?)**

**Follow documented escalation plan**

**Set up for intubation if appropriate**

### ***Troubleshooting***

#### **Persistent hypoxaemia:**

Consider pneumothorax or lobar collapse (CXR?)

Check **correct O<sub>2</sub> connections** into the circuit

Increase FiO<sub>2</sub>

Increase flow rate

Deteriorating clinical condition with hypoxaemia should lead to **urgent clinical re-evaluation** with reference to the agreed **escalation plan**

#### **Increasing PaCO<sub>2</sub>:**

Seek medical review. Refer to escalation plan and consider NIV or intubation as appropriate.

#### **Nasal problems:**

Ensure prongs sit well into the nares

Prongs should not totally occlude nares

Assist with reposition of prongs frequently to prevent pressure sores

#### **Patient position:**

Patient should be positioned sitting upright with head up

Consider additional support (soft collar/rolled up towel) if necessary

#### **Non cooperative/aggressive behaviour:**

Maybe due to **hypoxaemia**. Exclude reversible causes (see above)

**Sedation must be discussed ONLY with Senior Medical Staff.**

Humidification temperature

If the patient is unable to tolerate the invasive setting temperature adjust the setting to mask temperature but **do not** turn the humidification off.

### ***Weaning Considerations***

Patients should feel a clinical improvement within 2 hours of starting therapy. If this improvement is maintained (i.e. correction of hypoxemia maintained and reduced work of breathing evident) it is appropriate to start a weaning plan.

#### **Recommendations**

Weaning periods off NFNO will occur ideally during the day

There are 2 elements to weaning

1. Weaning the HFNO (weaning FiO<sub>2</sub> and flow rate) – See Algorithm
2. Weaning off HFNO – See below
  - a. When the FiO<sub>2</sub> is at 40% and flow rate 30L/min for at least 2 hours  
THEN:
    - b. Change to O<sub>2</sub> therapy via mask at same FiO<sub>2</sub>. Humidify O<sub>2</sub> if required.  
Continuously monitor and document SaO<sub>2</sub>, resp rate and heart rate.
  - IF TOLERATED:
    - c. Gradually increase intervals off HFNO till fully weaned

Always closely monitor patients during weaning and if signs of deterioration develop, consider recommencing therapy and seek medical advice.

Always consider the indications for nasal high flow therapy and if patient develops signs of respiratory failure treat immediately.