

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

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

We do not know if prolonged (>48hrs) of HFNO with very high FiO₂ (>0.6) is harmful

Indications for use

- ***Hypoxaemia that requires high FiO₂ (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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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**

FiO₂ 21-100% to achieve initial SaO₂ 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: SaO₂, 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

SaO₂ or PaO₂ at target levels?

NO

Increase FiO₂ to achieve target SaO₂ or PaO₂

YES

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

1) Decrease FiO₂ 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 FiO₂ 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 O₂ connections** into the circuit

Increase FiO₂

Increase flow rate

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

Increasing PaCO₂:

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 FiO₂ and flow rate) – See Algorithm
2. Weaning off HFNO – See below
 - a. When the FiO₂ is at 40% and flow rate 30L/min for at least 2 hours
THEN:
 - b. Change to O₂ therapy via mask at same FiO₂. Humidify O₂ if required.
Continuously monitor and document SaO₂, 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.