Humidified High Flow Nasal Prongs (HFNP) Guideline

HFNP is a system that has the ability to provide humidified high flow mix of air and oxygen via a specific nasal cannula system. It is able to deliver PEEP of approximately 4-8 cm H$_2$O. Unlike conventional oxygen administration or NIV the inspired gas is warmed and humidified, and is much better tolerated than NIV via occlusive mask.

**Indications of HFNP**
- Any adult or paediatric patient in respiratory distress (for paediatrics please refer to paediatric guideline) for example exacerbation COPD, pneumonia, pulmonary oedema
- Weaning non invasive ventilation (NIV)

**Contraindications**
Contraindications for use of HFNP are for:
- Patients with significant facial trauma
- Patients who require continuous nebulisers. Spacers can be used in conjunction with HFNP
- Any condition that PEEP would be a disadvantage

**The Resuscitation Bays**
There is 1 humidifier set up in the each of the resuscitation bays. The humidifiers are to be set up, turned on and left running with low flow oxygen/air. This is necessary to ensure that the humidifiers are ready for patients who present acutely short of breath. If the humidifier has not been turned on it will take approx 10min to warm for the high flow. High flow air/oxygen will not be tolerated by the patient and therefore and can not be used until it is warm.

The manufacturer, Fisher & Paykel, state there is no risk of bacteria growing within the humidifier tubing if pre-set up. This is due to the heat and the size of the water molecules compared to the bacteria size. If the humidifier has not been used within a week the set needs to be discarded.
Patient requirements and HFNP Set up

1. Flow = Work of Breathing
   - It is the flow that assists work of breathing by flushing the anatomical dead space
   - For patients who are acutely short of breath they can be commenced on 50-60L flow depending on their requirements
   - Encourage the patient to breathe in and out through their nose if possible. This will slow their inspiratory and expiratory time and maintain the pressure
   - As the system is not a closed system, when the patient opens their mouth some of the pressure will be lost. Depending on the size of the patient and if they have their mouth open or closed this will determine the pressure the system delivers

2. Oxygen Concentration = Oxygen Saturations
   - The system is able to deliver an oxygen concentration of 30%-100%
   - This should be titrated according to the patient’s oxygen saturations

Equipment
After the humidifier has been used on a patient the chamber, tubing and nasal prongs ALL need to be discarded.

The humidifier, temperature cables, blender and flow meter can all be wiped down.
Ongoing Management of patients on HFNP
Most patients will be commenced on the HFNP in the resuscitation bays. The ongoing patient management may include the following:

- Once the patient has been stabilised and are on requirements of flow less than 45L and a FiO2 of less than 45% than the patient can be managed in acute prior to transfer to ward. The wards that receive patients on the HFNP are listed in the table below.
- For respiratory patients consider NIV and referral to the respiratory failure team if the patient is not improving and you are unable to wean to less than 45L flow or 45% FiO2.
- If the patient is unable to be weaned to a flow of less than 45L and FiO2 of less than 45% then HDU/ICU may need to be considered and/or NIV

Wards that have HFNP

<table>
<thead>
<tr>
<th>Ward</th>
<th>Humidifier</th>
<th>Maximum Flow</th>
<th>FiO2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>MR850 humidifier</td>
<td>60L</td>
<td>100%</td>
</tr>
<tr>
<td>11W</td>
<td>AIRVO</td>
<td>45L</td>
<td>45%</td>
</tr>
<tr>
<td>CCU</td>
<td>AIRVO</td>
<td>45L</td>
<td>45%</td>
</tr>
<tr>
<td>7E1</td>
<td>AIRVO</td>
<td>Utilised more for the humidification of tracheostomy patients and patients who have had head &amp; neck radiation rather than patients with a need for high flow oxygen</td>
<td></td>
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<tr>
<td>8W2</td>
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<tr>
<td>6CW</td>
<td>MR850 humidifier</td>
<td>See paediatric guideline: Maximum 6L Flow or 1L/kg and 50%</td>
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</tbody>
</table>

Patient Transfer to the Ward
Fisher & Paykel with our Biomedical Engineers are currently trying to develop a battery system that will allow us to transfer patients to the ward on HFNP. Until then patients need to be stable enough to be transferred on a Venturi mask or Hudson mask then be recommenced on the HFNP once on the ward. They should be on the mask, maintain saturations and not have a significant increase in their work of breathing (exceed CERS or altered CERS) for 10minutes prior to transfer

If the patient will not tolerate the decrease in flow then NIV may need to be considered.

Our humidifier tubing and chambers are not compatible with the AIRVO system however the nasal prongs should go with the patient. For the HDU/ICU patients and paediatric patients these areas have the same system as ours therefore we should take the chamber and tubing to be recommenced once transferred.

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