1. Introduction and Who Guideline applies to

1.1.1 This document provides guidance for Healthcare Professionals in identifying patients who require Continuous Positive Airway Pressure (CPAP), initiating the treatment and then the on-going management for patients requiring CPAP.

1.1.2 CPAP therapy is used for patients who are suffering from an acute type 1 respiratory failure (PaO2 <8kPa with a normal or low PacO2).

1.1.3 CPAP is a form of positive airway pressure. It applies a pre-set positive pressure-PEEP, throughout the respiratory cycle whilst breathing spontaneously and increases functional residual capacity by a pneumatic splinting effect on the airways, therefore:

- Reduces work of breathing
- Improves atelectic lung
- Improves ventilation and oxygenation.

1.1.4 CPAP also improves cardiovascular and pulmonary function in acute cardiogenic pulmonary oedema.

1.2 Scope

1.2.1 This guideline applies to all UHL staff authorised and competent to care for patients requiring CPAP therapy.

1.2.2 There are ward areas at the LRI and GH sites that can provide care for patients requiring CPAP therapy. These areas have received specific training from the Outreach Team in the management of patients with CPAP. Outreach will inform the referring clinician of these areas on request.

Wards at the LRI site are: Ward 16 ACB, A & E Resus and the Kinmonth Unit.

Wards at the GH site are: Wards 17 HDU, CDU, CCU and 26 HDU.

1.2.3 Patients who require CPAP at the LGH site will be commenced on CPAP by the Outreach team or the Hospital at Night team and if required long term (greater than six hours) will require transfer to a High Dependency area on another site if ITU at the LGH is not appropriate.

1.2.4 CPAP must only be prescribed by Medics/Intensivist at SpR level and above or an Outreach nurse.

1.2.5 CPAP will be commenced by the Outreach team. If the nursing staff on the ward are not competent in caring for patients on CPAP, the therapy will not be delayed. The patient will be managed by the Outreach Team until they care be transferred to an appropriate clinical area.

1.3 Roles and Responsibilities

1.3.1 The Critical Care Outreach Team will review and commence CPAP therapy on all patients that require CPAP. Specific roles and responsibilities of the Outreach team include:

Guidelines for Initiating and Managing CPAP (Continuous Positive Airway Pressure) on a General Ward


NB: Paper copies of this document may not be most recent version. The definitive version is held on InSite Documents
The maintenance, storage and servicing of CPAP equipment.

Setting up the CPAP equipment and commencing it on the patient.

The Outreach team will ensure that designated nursing staff are educated on issues such as trouble shooting alarms, achieving the correct oxygen delivery, risks and complications of CPAP therapy and completing the correct documentation.

Setting oxygen parameters according to the clinical need, based on oxygen saturations and arterial blood gas results.

The continuous monitoring of the patient receiving CPAP whilst under the care of Outreach until the treatment is no longer required.

2. Guideline Standards and Procedures

2.1. Identifying the patient suitability for CPAP

2.1.1 Inclusion Criteria:

- Remains hypoxic after treatment with the appropriate supplementary O2. (PaO2 <8kpa & SpO2 <94%).
- Respiratory rate >28 breaths per minute.
- Cardiogenic pulmonary oedema with hypoxia. (SpO2 <94%) – Diuretics and/or Nitrates should be commenced at the same time.
- Atelectasis.
- Obstructive sleep apnoea.
- Upper abdominal surgery causing post-operative restrictive defect in pulmonary function.

2.1.2 Contraindications to CPAP (Absolute)

- Patient refusal.
- Respiratory or Cardiac arrest.
- Agonal respirations.
- Major trauma (i.e. head injury with increased ICP)
- Inability to maintain airway patency.
- Broncho-pleural fistula.
- Surgical anastomosis involving intra thoracic procedures, including but not limited to oesophagus/stomach/trachea and larynx (i.e. oesophagectomy/gastrectomy).

In these cases, it is essential to refer these to an appropriate specialist or Critical Care and Outreach to discuss the patient’s requirements.

2.1.3 Contraindications to CPAP (Relative)

The following patients are considered high risk or inappropriate for ward CPAP. Critical Care or Outreach must be contacted before commencing CPAP for patients with one or more of the following:

- Patients with respiratory failure that may be due to hypoventilation (i.e. patients with elevated PCO2 levels and/or respiratory acidosis - e.g. asthma/COPD).
- Respiratory muscle failure.
2.1.4 Caution applying CPAP

Caution must be taken in the following circumstances.

- Acute myocardial infarction
- Hypotension (BP <80mmHG systolic) or unstable CVS.
- Intermittent CPAP can be used in patients who have excess secretions. (Two hours on, two hours off).

In these cases, the benefits may outweigh the risk.

2.1.5 Once CPAP therapy has been agreed by the medical team, Intensivist and/ or the Critical Care Outreach Team, this decision must be documented in the patient’s medical notes.

2.1.6 Refer to appendix one for the flowchart to assess patient suitability for CPAP.

2.2 Initiating CPAP

2.1.1 The Outreach team will commence CPAP on patients and will provide all equipment required for this, if the ward area does not stock these items.

2.1.2 If a patient requires transfer to another area whilst on CPAP therapy, a discussion by the accepting ward at SpR level should take place and the Outreach team.

2.1.3 The Adult Critical Care Consultant must be informed of any patients on CPAP therapy if the patient would be a candidate for Critical Care.

2.1.4 The Adult Critical Care Consultant will decide if the patient is to be admitted to the Critical Care Unit if the patient does not respond to the CPAP therapy.

2.3 On-going patient management and care

2.3.1 Specific management and care whilst using CPAP

- Baseline observations pre CPAP therapy must include Blood pressure, Pulse, Respiratory rate, Saturations and Oxygen requirements.
- Continuous Sp02 monitoring.
- Hourly Blood pressure, Pulse and Respiratory rate.
- An ABG should be performed before commencing CPAP therapy and repeated one hour post commencement and as directed by the Outreach team thereafter.
- Conscious level, either using GCS or AVPU prior to treatment and continuously during therapy.
- Hourly checks on flow of gas into the system, temperature and water level of humidifier.
- Assessment of pressure areas on face/ ears and head/ mask fitment. (The use of siltape to prevent pressure sores).
A record of CPAP observations and safety checks must be maintained and recorded on the CPAP prescription and monitoring chart. 
Maintain fluid balance chart.

2.3.2 Potential Complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Cause</th>
<th>How to Avoid/ Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemodynamic Instability</td>
<td>Increased intra-thoracic pressure and decreased venous return.</td>
<td>Do not give CPAP to patients with systolic &lt;90mmHg unless benefit outweighs the risk.</td>
</tr>
<tr>
<td>Risk of Aspiration</td>
<td>Gastric distension and vomiting.</td>
<td>Patients who develop gastric distension or are nauseas should have a NG tube inserted and put on free drainage. Regular anti-emetics should be prescribed for nausea. Ensure patient is alert and able to remove mask if needed.</td>
</tr>
<tr>
<td>Anxiety and Confusion</td>
<td>Claustrophobia, unpleasant feeling and may feel it is more difficult to breath.</td>
<td>Reassurance and encouragement. Reinforce the benefits of the therapy.</td>
</tr>
<tr>
<td>Pressure Sores</td>
<td>Mask fits very tightly with elastic straps.</td>
<td>Sil tape around areas where mask is sitting. Check areas hourly. Consider the use of CPAP hood.</td>
</tr>
<tr>
<td>Acidosis</td>
<td>CPAP may worsen respiratory or uncompensated metabolic acidosis, due to the continuous positive pressure impairing elimination of C02.</td>
<td>CPAP may not be suitable.</td>
</tr>
<tr>
<td>Drying of Conjunctiva</td>
<td>Due to where mask sits.</td>
<td>Reassess type, size and fit of mask. Consider eye drops.</td>
</tr>
<tr>
<td>Drying of oral and nasal mucosa</td>
<td>Due to high flow O2.</td>
<td>Perform regular mouth care and consider nasal drops.</td>
</tr>
</tbody>
</table>
Inadequate humidification—leading to dry secretions.  
Due to high flow 02.  
If patient requires CPAP for longer than 4 hours, administer regular 0.9% saline nebulisers.

2.3.3 Outreach will oversee the maintenance, supply and serving of the CPAP equipment.

2.4 Weaning from CPAP
Please refer to flowchart for weaning patients off CPAP in appendix two.

3. Glossary of terms used in this guideline

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>CPAP</td>
<td>Continuous Positive Airway Pressure</td>
</tr>
<tr>
<td>PEEP</td>
<td>Positive End Expiratory Pressure</td>
</tr>
<tr>
<td>SpO2</td>
<td>Saturation of oxygen</td>
</tr>
<tr>
<td>PaCO2</td>
<td>Partial Pressure of Carbon Dioxide</td>
</tr>
<tr>
<td>ABG</td>
<td>Arterial Blood Gas</td>
</tr>
<tr>
<td>PaO2</td>
<td>Partial Pressure of Arterial Oxygen</td>
</tr>
<tr>
<td>FiO2</td>
<td>Fraction of Inspired O2</td>
</tr>
</tbody>
</table>

3. Education and Training
As stated in 1.2- Education and training will be provided by the Critical Care Outreach Team to the allocated wards that care for patients requiring CPAP. Please see 1.2 for further information.

4. Monitoring Compliance
4.1 All patients who are commenced on CPAP are monitored by the Critical Care Outreach team. The team will ensure the CPAP prescription and monitoring chart has been completed. The team will also complete at CPAP Checklist Audit Proforma for every patient which details:

- Who made the decision to commence CPAP
- Escalation plan for higher dependency care
- Patient outcome.

4.2 The team will review and discuss this information on an ongoing basis and any concerns/issues will be escalated to the Critical Care Outreach Lead Nurse and/or the Consultant Intensivist to action.

5. Supporting References

Guidelines for Initiating and Managing CPAP (Continuous Positive Airway Pressure) on a General Ward

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<table>
<thead>
<tr>
<th>CONTACT AND REVIEW DETAILS</th>
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</thead>
<tbody>
<tr>
<td>Guideline Lead (Name and Title)</td>
</tr>
<tr>
<td>Katrina Short</td>
</tr>
<tr>
<td>Emma McDonald</td>
</tr>
<tr>
<td>Details of Changes made during review:</td>
</tr>
<tr>
<td>• Standard footer inserted into guideline.</td>
</tr>
<tr>
<td>• Minor typing error in section 1.2.3 (H@N) corrected to Hospital at Night team.</td>
</tr>
</tbody>
</table>
Flowchart to assess Patient Suitability for CPAP

Perform ABG if indicated. Patient hypoxic with PaO₂ <8kPa, SpO₂ <94%?

- **Yes**  
  Is PaCO₂ elevated?  
  - **Yes**  
    Consider NIV. Inform ICU if ICU admission is to be considered.  
  - **No**  
    Is their RR high? +/- large tidal volumes?  
    - **Yes**  
      Try high flow O₂ with a flow generator. Set the flow to the same rate as the fiO₂. (To meet the demands of the inspiratory flow).  
    - **No**  
      Cardiopulmonary oedema not responding to drug therapy.

- **No**  
  Repeat ABG if indicated.

- **Decision to commence CPAP. Inform ICU team if admission to ICU is to be considered.**

Choose appropriate PEEP valve i.e. 5/7.5cm H²O. Consider pathology/patient

**Appendix One**

Guidelines for Initiating and Managing CPAP (Continuous Positive Airway Pressure) on a General Ward

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Flowchart for Weaning Patients off CPAP

Is the patient stable receiving CPAP? i.e. is the BP, conscious level, RR and Sp02 continuously stable?

Yes

Is the PEEP value >5cm H²O?

Yes

Reduce PEEP by 2.5cm H²O until PEEP 5cm H²O is reached.

No

Trial off CPAP onto high flow at the same fiO2.

Have the observations remained stable?

Yes

Continue to wean fiO2. Keep Sp02 94-98%.

No

Return to CPAP as previously.