

Acute Continuous Positive Airway Pressure Guideline

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REVIEW DATES AND DETAILS OF CHANGES MADE DURING THE REVIEW

This policy is specific to **acute** CPAP only- there will need to be a separate policy to cover chronic CPAP patients.

- Updated aerosol generating procedure classification.
- Removal of outdated COVID-19 guidance – (STARTED Bundle Appendix 2)
- Introduction of Phillip Trilogy EVO equipment
- Removal of NIPPY 3 Equipment
- Removal of Appendix 5 Use of oxygen therapy for adult inpatients during COVID-19 pandemic.
- Removal of NICE COVID-19 Rapid guidance: Critical Care (March 2020)
- Removal of The escalation of respiratory support decision aid for COVID-19.

KEY WORDS

CPAP – Continuous Positive Airway Pressure

1. INTRODUCTION AND OVERVIEW

1a) This document provides guidance for Healthcare Professionals in identifying patients who require Acute Continuous Positive Airway Pressure (CPAP), initiating the treatment and then the on-going management for patients requiring CPAP.

1b) CPAP will be delivered via the Philips Resironics Trilogy EVO (OBM).

1c) CPAP therapy is used for patients who are suffering from an acute type 1 respiratory failure (PaO₂ <8kPa with a normal or low PaCO₂).

1d) CPAP is a form of positive airway pressure. It applies a pre-set positive pressure- positive end expiratory 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 atelectasis
- Improves ventilation and oxygenation.

1e) CPAP also improves cardiovascular and pulmonary function in acute pulmonary oedema.

2 POLICY SCOPE –WHO THE POLICY APPLIES TO AND ANY SPECIFIC EXCLUSIONS

2a) This guideline applies to all UHL staff trained and competent to care for patients requiring CPAP therapy.

2b) There are designated non-ITU areas within the trust that can provide care for patients requiring CPAP therapy. These areas have received specific training and have practitioners who are competent in the initiation and ongoing management of patients with CPAP.

DART can inform the referring clinician of these areas on request.

LRI site: ACB& ED Resus

GH site: CDU, CCU, RSU & SECU

LGH site: LGH Critical beds

2c) Patients who require CPAP at the LGH site will be commenced on CPAP by the deteriorating adult response team (DART) or the out of hours response team (OOHRT) and if required long term (greater than six hours) will require transfer to an appropriate non-ITU area competent in CPAP (unless ITU admission is indicated).

2d) CPAP must only be prescribed by Medics/Intensivist at SpR level and above, DART practitioner or other competent staff member. It is also accepted that in areas of specialist skill ie. In RRCV, CPAP may be prescribed and utilised outside

of this policy.

2e) CPAP can be commenced by DART, OOHRT, respiratory support team (RST), a suitably trained physiotherapist or the ward nursing/medical team if competent. If 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 DART, OOHRT or RST until they can be transferred to an appropriate clinical area. DART currently provide a 24 hour seven day a week service at all three hospital sites.

3 ROLES AND RESPONSIBILITIES – WHO DOES WHAT

3a) DART, OOHRT, suitably trained physiotherapists or RST will review and commence CPAP therapy on Patient's that require CPAP where needed in collaboration with the patients' parent team. Specific roles and responsibilities of DART include:

- Setting up the CPAP equipment and commencing it on the patient. It is acknowledged that local procedures may be in place for those non-ITU areas that regularly commence and manage CPAP. These patients will still require referral to DART for follow up and ongoing support.
- DART will ensure that designated nursing staff are competent and educated on issues such as trouble shooting alarms, achieving the correct oxygen delivery, risks and complications of CPAP therapy and completing the correct documentation (See appendix 1 for CPAP monitoring chart.)
- Setting oxygen parameters according to the clinical need based on oxygen saturations and arterial blood gas results.
- The continuous monitoring of physiological parameters of patients receiving CPAP whilst under the care of DART until the treatment is no longer required.

3b) Responsibilities within UHL:

- Guideline Lead- Deteriorating Adult Response Team Matron
- Trust Lead – Medical Director
- Input from Deteriorating Patient Board

4 GUIDELINE STANDARDS & PROCEDURES

4a) Inclusion criteria

- Remains hypoxic after treatment with the appropriate supplementary O₂. (PaO₂ <8kpa & SpO₂ <94%).

- Respiratory rate >28 breaths per minute, with associated type 1 respiratory failure.
- Cardiogenic pulmonary oedema with hypoxia. (SpO₂ <94%) – Diuretics and/or Nitrates should be considered at the same time.
- Atelectasis.
- Upper abdominal surgery causing post-operative restrictive defect in pulmonary function.

4b) Inclusion criteria- COVID-19 suspected or swab positive

- Respiratory tract infections causing hypoxia ie. COVID-19. Failure to maintain saturations >92% on 10l oxygen for COVID-19 patients **for** escalation to ITU/intubation and saturations <88% or increased work of breathing on 10L oxygen if **not** for escalation to ITU and COVID-19 (Messer et al, 2021)

All COVID-19 suspected or confirmed positive patients being considered for CPAP should have a documented Clinical Frailty Score (Andrew et al, 2020).

- Please also see attached Escalation of Respiratory Support Decision Aid (Appendix 2) for guidance when deciding whether escalation to CPAP is appropriate in this instance.
- NICE guidelines for the role and use of non-invasive respiratory support in adult patients with COVID-19 (confirmed or suspected) can be found here

[Managing COVID-19 - The National Institute for Health and Care Excellence \(NICE\)](#)

4c) CPAP is no longer considered as an AGP (aerosol generating procedure).

Seven studies assessed non-invasive ventilation (NIV) and are consistent in suggesting that NIV is not associated with increased aerosol generation and aerosol concentrations were lower than that associated with natural respiratory activities. Therefore, consideration should be given to removing NIV from the extant UK AGP list.

https://www.england.nhs.uk/wp-content/uploads/2022/04/C1632_rapid-review-of-aerosol-generating-procedures.pdf

4d) Contraindications to CPAP (Absolute)

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

- In these cases, it is essential to refer these patients to an appropriate specialist, ITU or DART to discuss the patient's requirements and possible alternative therapies. These patients should be managed within the ITU or an appropriate ceiling of care put in place by way of Respect form.

4e) Contraindications to CPAP (Relative)

The following patients are considered high risk or inappropriate for CPAP in non-ITU areas.

ITU or DART 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/chronic obstructive pulmonary disease).
- Respiratory muscle failure.
- Kyphoscoliosis.
- Hypoventilation.
- Reduction in GCS or a risk of aspirating.
- Acute asthma and bronchospasm
- Facial abnormalities or trauma (burns, fractures).
- Vomiting.
- Lung bullae.
- Emphysema.
- Pneumonia

Caution applying CPAP

Caution must be taken in the following circumstances.

- Acute myocardial infarction
- Hypotension (BP <80mmHG systolic) or unstable CVS (cardio vascular system).
- Intermittent CPAP can be considered in patients who have excess secretions. An individualized plan should be made to mitigate this including breaks off the CPAP, optimization of medication and referral for a physiotherapy opinion.

In these cases, the benefits **may** outweigh the risk.

Once CPAP therapy has been agreed by the parent team, Intensivist and/or DART, this decision must be documented in the patient's medical notes and CPAP prescription completed.

4f) Commencing CPAP

- DART can commence CPAP on patients (when the decision for CPAP has been deemed appropriate and proportionate by the parent team/senior clinician responsible for the patient) and can source all equipment required for this, if the non-ITU area does not stock these items. Equipment, consumables and support can also be accessed via the respiratory physiotherapy team. These can be accessed on ACB and ED at the LRI. RSU, CCU and SECU at the GH. DART office at LGH.
- If a patient requires transfer to another area whilst on CPAP therapy, a discussion by the accepting area at SpR level should take place and with inclusion of DART also.
- The Adult Intensive Care Consultant must be informed of any patients on CPAP therapy if the patient would be a candidate for Intensive Care admission. This should be by way of formal referral to ITU following local processes for referral.
- The Adult Intensive Care Consultant will decide if the patient is to be admitted to the Intensive Care Unit if the patient does not respond to the CPAP therapy.

- On commencement of CPAP it is imperative that a discussion around escalation happens (wherever possible with the patient themselves). A documented plan for escalation (or non- escalation) must be entered into the notes and completion of a ReSPECT form expressing patients' wishes should be completed.

5) Specific management and care whilst using CPAP

- Baseline observations pre CPAP therapy must be taken and entered into NerveCentre via eobs
- Continuous SpO2 monitoring.
- Observations recorded as per NEWS2 criteria. Suggest hourly monitoring to start with and a minimum of 4hrly when stabilised on CPAP.
- An ABG should be performed before commencing CPAP therapy and repeated one hour post commencement and considered if suggested by DART, respiratory physiotherapy or the parent team thereafter.
- Conscious level, either using GCS or ACVPU prior to treatment and continuously during therapy as documented on NerveCentre eobs.
- Assessment of pressure areas on face/ ears and head/ mask fit. (The use of siltape to prevent pressure ulcers).
- A record of CPAP observations and safety checks must be maintained and recorded on the CPAP prescription and monitoring chart.
- Ensure correct mode of oxygen delivery is recorded onto NerveCentre (for surveillance purposes) and accurately documented amount of oxygen delivered.
- Accurate recording of level of respiratory support on patient's NerveCentre handover profile.
- Maintain accurate fluid balance chart and assessment of nutritional needs.

6) Common issues

2.3.2 Potential Complications	Cause	How to Avoid/ Action
Haemodynamic Instability	Increased intra-thoracic pressure and decreased venous return.	Do not give CPAP to patients with systolic <90mmHg unless benefit outweighs the risk. Optimise fluid balance- consider IV fluid challenge if appropriate
Risk of Aspiration	Gastric distension and vomiting.	Patients who develop gastric distension or are nauseas should have a NG tube (wide bore if required for gastric decompression) 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.
Anxiety and Confusion.	Claustrophobia, unpleasant feeling and may feel it is more difficult to breath.	Reassurance and encouragement. Reinforce the benefits of the therapy. Careful consideration of pharmacological therapies to aid treatment compliance- low dose opiates or benzodiazepines may provide management of symptoms such as dyspnoea or anxiety. Consider Palliative care referral for symptom management if indicated.
Pressure Ulcers	Mask fits very tightly with straps.	Siltape around areas where mask is sitting. Check areas hourly. Consider the use of hybrid masks if necessary.
Acidosis	CPAP may worsen respiratory or uncompensated metabolic acidosis, due to the continuous positive pressure impairing elimination of CO ₂ .	CPAP may not be suitable. Consider carefully whether this is the patients' ceiling of therapy or not.
Drying of Conjunctiva	Due to where mask sits.	Reassess type, size and fit of mask. Consider eye drops/artificial tears.
Drying of oral and nasal mucosa	Due to high flow O ₂ .	Perform regular mouth care and consider nasal drops.

- **EDUCATION AND TRAINING REQUIREMENTS**

- Attendance of a DART or RST CPAP study day with achieved competence.
- Evidence of documented competence from a level 2 or 3 area
- Demonstrate an understanding of Arterial Blood Gas analysis
- Demonstrate an understanding of Respiratory physiology
- Only develop practice in relation to the appropriate part of their registration
- Accept accountability for their practice
- If staff cannot show competence in caring for CPAP then they should not be solely responsible for caring for the CPAP patient.
- These competencies apply to all registered staff working in the before mentioned areas deemed able to accept and care for CPAP patients.

- **PROCESS FOR MONITORING COMPLIANCE**

- **EQUALITY IMPACT ASSESSMENT**

- 9a) The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
- 9b) As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

● **SUPPORTING REFERENCES, EVIDENCE BASE AND RELATED POLICIES**

- A Craig Davidson,1 Stephen Banham,1 Mark Elliott,2 Daniel Kennedy,3 Colin Gelder,4 Alastair Glossop,5 Alistair Colin Church,6 Ben Creagh-Brown,7 James William Dodd,8,9 Tim Felton,10 Bernard Foëx,11 Leigh Mansfield,12 Lynn McDonnell,13 Robert Parker,14 Caroline Marie Patterson,15 Milind Sovani,16 Lynn Thomas,17 (2016) BTS/ICS guideline for the ventilatory management of acute hypercapnic respiratory failure in adults BTS Standards of Care Committee Member, British Thoracic Society/Intensive Care Society Acute Hypercapnic Respiratory Failure Guideline Development Group, On behalf of the British Thoracic Society Standards of Care Committee
- COVID-19 and Palliative End of Life and Bereavement Care in Secondary Care. Role of the specialty and guidance to aid care V1.0. Association of Palliative Medicine, Northern Care Alliance NHS Group. (<https://apmonline.org/> - online version evolving with time)
- Dr Ben Messer, Ms Pearlene Antoine-Pitterson, Ms Angela Blundell, Dr Graham Burns Dr Michael Davies, Professor Ramani Moonesinghe, Dr Alain Vuylsteke, Dr Stephen Webb, Ms Samantha Wood. BTS/ICS Guidance: Respiratory care in patients with Acute Hypoxaemic Respiratory Failure associated with COVID-19, on behalf of the British Thoracic Society and the Intensive Care Society. 18/1/2021, version 2.0
- Withdrawal of Assisted Ventilation at the request of a patient with MND. Association of Palliative Medicine, 2015.
- Melissa K Andrew, Samuel D Searle, Janet E McElhaney, Shelly A McNeil, Barry Clarke, Kenneth Rockwood, David J Kelvin. COVID-19, frailty and long-term care: Implications for policy and practice, J Infect Dev Ctries 2020; 14(5):428-432. doi:10.3855/jidc.13003
- NHS England, 2022. A rapid review of aerosol generating procedures (AGPs) An assessment of the UK AGP list conducted on behalf of the UK IPC Cell. Available at: https://www.england.nhs.uk/wp-content/uploads/2022/04/C1632_rapid-review-of-aerosol-generating-procedures.pdf
- NICE guideline, 2023. COVID-19 rapid guideline: managing COVID-19, 22 June 2023. Available at: Overview | COVID-19 rapid guideline: managing COVID-19 | Guidance | NICE

- **PROCESS FOR VERSION CONTROL, DOCUMENT ARCHIVING AND REVIEW**

10a) This document will be uploaded onto the Policy and Guideline Library and available for access by Staff through INsite. It will be stored and archived through this system.

- **LEGAL LIABILITY**

The Trust will generally assume vicarious liability for the acts of its staff, including those on honorary contract. However, it is incumbent on staff to ensure that they:

- Have undergone any suitable training identified as necessary under the terms of this policy or otherwise.
- Have been fully authorised by their line manager and their CMG's to undertake the activity.
- Fully comply with the terms of any relevant Trust policies and/or procedures at all times.
- Only depart from any relevant Trust guidelines providing always that such departure is confined to the specific needs of individual circumstances. In healthcare delivery such departure shall only be undertaken where, in the judgement of the responsible clinician it is fully appropriate and justifiable - such decision to be fully recorded in the patient's notes.

It is recommended that staff have Professional Indemnity Insurance cover in place for their own protection in respect of those circumstances where the Trust does not automatically assume vicarious liability and where Trust support is not generally available. Such circumstances will include Samaritan acts and criminal investigations against the staff member concerned. Suitable Professional Indemnity Insurance Cover is generally available from the various Royal Colleges and Professional Institutions and Bodies. For further advice contact: Head of Legal Services on 0116 258 8960.

Appendix One

CPAP PRESCRIPTION AND MONITORING CHART											
Ward:						Date:					
Prescribed Start Date:						Infection Prevention Status:					
Please request Medical Review if: Resp Rate: NEWS2 score: SpO2: ACVPU:						Patient ID Label:					
Device Used to Deliver CPAP:						Please Review Hourly for the First 4 hours and request a senior review.					
Target SpO2:						DART Nurse informed: Yes / No / N/A					
Prescribed PEEP:						Prescribers Signature / Print:					
Escalation Plan:						Site: LRI / LGH / GH / ED					
Date	Time	Oxygen %	SpO ₂	Resp Rate	HR	BP (↑PEEP can cause Hypotension)	PEEP	Viral Filter Insitu	Siltap e Insitu / Facial PA'S Checked	Signature	
02/03/16 Example	18:00	60	94%	26	89	110/65	Yes	Yes	Yes	J.Bloggs	
CPAP PRESCRIPTION AND MONITORING CHART											

Appendix Three

Emergency Floor - Adult

Philips Trilogy Evo - Setting Up

Items needed: - Foam air inlet filter, standard NIV patient circuit with bacterial filter (to be changed every 24 hours), correct size mask for Patient.

- 1.** Change air inlet filter on the back of the machine.



- 2.** Connect oxygen hose into walled oxygen port. Connect power lead to main wall socket.



- 3.** Press on/off (standby) button and listen for the beeps as device performs system start-up checks.



- 4a. To calibrate O2 sensor**
Ensure there are no connections to the inspiratory port at the side.



Philips Trilogy Evo - Setting Up

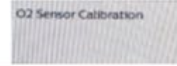
- 4b. To calibrate O2 sensor**

On the screen, press the options icon for the options menu 

Then press Calibration & Setup



Then press O2 Sensor Calibration



- 4c. To calibrate O2 sensor**

Message will show last calibration date.

Follow the steps then press **Start**



- 4d. To calibrate O2 sensor**

There are 3 test steps. Follow the instructions and then press **Continue** when each step has passed.

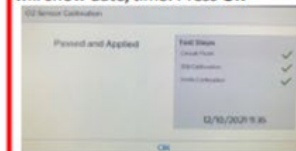


Note: For the last 2 steps place a red cap onto inspiratory port to block circuit outlet.



- 4e. To calibrate O2 sensor**

When each test step has passed screen will show date/time. Press **OK**

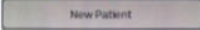


- 5.** Remove red cap and attach NIV patient circuit onto inspiratory port at the side. Connect Patient mask onto bacterial filter at the end of circuit.

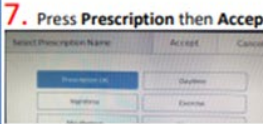


Emergency Floor - Adult
Philips Trilogy Evo – Screen settings


6. Press **New Patient**




7. Press **Prescription** then **Accept**



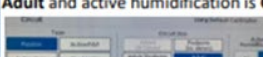
8. Press **Acknowledge** to confirm use of bacterial filter with circuit



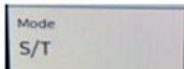
9. Press the prescription icon for prescription settings



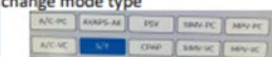
10. Check circuit type is highlighted **Passive**, circuit size is **Adult** and active humidification is **Off**



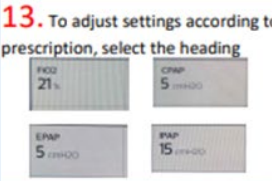
11. Select **Mode**




12. Press **S/T (NIV)** or **CPAP** to change mode type



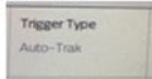
13. To adjust settings according to prescription, select the heading



14. Then drag the number or tap +/-




15. Check **Trigger Type** is on **Auto - Trak**

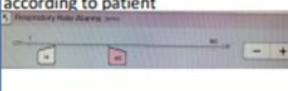


Emergency Floor - Adult
Philips Trilogy Evo – Screen settings


16a. **To set alarms**
 Press alarm icon



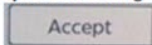
16b. **To set alarms**
 Press **Resp. Rate**, adjust upper & lower limits by dragging values. Set lower at **14** and upper at **40**.
 Note: this may need to be changed according to patient



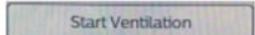
16c. **To set alarms**
 Press **Circuit Disconn**, adjust upper & lower limits by dragging values. Set to **10**



17. Check all setting correct then Press **Accept** to save settings



18. Ensure mask is correctly fitted to Patient. Press **Start Ventilation**



19. For Power off/Standby mode, press on/off and then select preferred option

