



**Coronavirus (COVID-19): guidance  
on treating patients**

Guidance from the Chief Medical  
Officer (CMO)

# COVID-19 position statement: CPAP for COVID-19-related respiratory failure

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## Overview

The purpose of this document is to provide NHSScotland with advice on the appropriate use of continuous positive airway pressure (CPAP) for patients with COVID-19.

This guideline is for:

- health and care practitioners
- health and care staff involved in planning and delivering services
- national procurement teams.

The recommendations are based on:

- Scottish Thoracic Society Position Statement: CPAP for COVID-19 related respiratory failure (16.04.20)<sup>1</sup>
- advice from respiratory physicians with an interest in ventilation support and intensive care specialists working in NHSScotland.

These recommendations have been developed in response to the COVID-19 pandemic situation and so have not followed the standard process used by SIGN to develop guidelines. The recommendations are based on available evidence and expert opinion, with fast expert peer review as assurance.

This guidance will be reviewed and updated in two months or as new evidence emerges.

## Recommendations

- Facilities and the associated staffing model required to provide CPAP therapy in high dependency or hi-care ward settings should be explored to enhance and expand critical care and respiratory medicine COVID-19 surge response capability.
- Session respiratory PPE (gloves, gown, FFP/N95 mask, visor) is currently recommended by Health Protection Scotland for use in ward areas where CPAP/NIV is being undertaken. Health Protection Scotland guidelines should be reviewed regularly to ensure local protocols are up to date.
- CPAP therapy is usually “oxygen neutral” with regard to provision but oxygen provision capacity across and within hospital sites is an important consideration.
- The creation of site-specific SOPs for CPAP for people with COVID-19 pneumonia is recommended. [See Appendix 1](#)
- Local team familiarity with equipment is the most important consideration for device, mask and circuit choice for CPAP provision.
- Droplet spread risk is reduced by use of non-vented mask-circuits where use of these is familiar and available.
- Local appraisal of all of these factors will determine site-specific capacity for CPAP provision, and also the clinical scenarios (bridging or deferral of intubation, weaning, ceiling of care) for which CPAP can be safely provided.
- CPAP is regarded as an AGP, and Health Protection Scotland and local infection control team advice on appropriate PPE and safe location to provide this treatment should be sought.

## Use of CPAP

Continuous positive airway pressure (CPAP) treatment delivered via face mask and simple device is widely used for home management of obstructive sleep apnoea syndrome.

Evolving European and UK experience notes benefit from CPAP treatment for carefully selected patients with COVID-19-related pneumonia, as part of bridging, deferral, weaning and possibly ceiling of care breathing-support strategies. This is rapidly evolving and further information will emerge.

General considerations for provision of acute CPAP treatment are similar to those for acute non-invasive ventilation (NIV), which is widely used for periods of hours to a few days in acute wards, respiratory wards and high-dependency units. There are important COVID-19 specific considerations including PPE, monitoring of patients for deterioration and timely escalation and feasibility of safe and good-quality provision of CPAP for patients with COVID-19 pneumonia, with all required ancillary care for extended treatment periods.

### CPAP in patients with COVID-19

A proportion of patients with COVID-19 pneumonia-acute respiratory distress syndrome (ARDS) have CPAP-responsive hypoxaemia. Other institutions and territories have produced position statements endorsing CPAP treatment in COVID-19 pneumonia.<sup>2</sup>

CPAP therapy for COVID-19 respiratory failure achieves FiO<sub>2</sub> of 50–60% with pressure of 10–15 cm H<sub>2</sub>O and 10–15 L/minute entrained oxygen flow. A non-rebreather mask also requires 10–15 L/minute, so CPAP therapy will usually be “oxygen neutral”.

Additional considerations for CPAP COVID-19 management include fluid management, enteral nutrition, thromboprophylaxis and vigilance for thrombotic complications, prone positioning, pressure care, bowel management, symptom-control strategy and risk of delayed recognition of deterioration and/or development of patient-induced lung injury with high-minute ventilations on CPAP.

CPAP is regarded as an aerosol generating procedure (AGP), and Health Protection Scotland<sup>3</sup> and local infection control team advice on appropriate PPE and safe location to provide this treatment is recommended.

### Procurement issues

Extensive benchmarking work has been done by ventilation centres in Glasgow, Edinburgh and Dundee to define optimum device and circuit setup and determine what CPAP/FiO<sub>2</sub> therapy can be obtained with the range of equipment available in NHSScotland.

Providing CPAP treatment for patients with COVID-19 pneumonia safely will require close collaboration between respiratory and ICU teams at all NHSScotland acute sites, to determine capacity including staffing, training, location of care and treatment escalation plans.

NHSScotland’s national procurement team has moved rapidly to obtain suitable equipment for CPAP provision at national scale during the COVID-19 surge.

Nationally procured equipment for CPAP will be distributed based on availability, local capacity and caseload.

This Guidance has been produced on behalf of the Scottish Government's Chief Medical Officer.

## Authors

**Dr David Anderson** Consultant Respiratory Physician, NHS Greater Glasgow & Clyde  
**Dr Christopher Carlin** Consultant Respiratory Physician, NHS Greater Glasgow & Clyde  
**Dr Tom Mackay** Consultant Respiratory Physician, Royal Infirmary of Edinburgh

## Peer/editorial review


### Clinical Guidance Cell

**Chair: Professor Tom Evans** Professor of Molecular Microbiology, Institute of Infection, Immunity & Inflammation, University of Glasgow and Consultant Infectious Disease Physician, NHS Greater Glasgow & Clyde  
**Dr Safia Qureshi** Director of Evidence, Healthcare Improvement Scotland

## Appendix 1:

### Example SOP for CPAP in patients with COVID-19 pneumonia<sup>4</sup>

**QEUH Respiratory Medicine COVID-19 Respiratory Failure Management**  
SOP for CPAP in patients with COVID-19 pneumonia



**CPAP trial**

**Establish treatment escalation plan:** is CPAP trial bridging or ceiling of care?

**Consider CPAP trial if sustained oxygen requirement 40-60% with :-**

- Increased respiratory rate - observe during conversation. Is breathlessness affecting ability to eat+drink?
- Incomplete response to time prone **or** unable to prone

**Care bundle:** time prone, hydration, oral hygiene, nutrition, thromboprophylaxis/thrombovigilance, antibiotics if indicated.

**Clinical trial if eligible.**

**Review initial response**

- Continue: if improved oxygenation / work of breathing > with treatment breaks and encourage regular 2 hour CPAP spells
- Escalate: if unimproved oxygenation / persisting high work of breathing

**Preparation**

PPE check  
2 clinicians prepared for setup  
Plan to undertake any other clinical care at same contact  
Review device, mask fit, circuit assembly and oxygen connection supporting videos or documentation, if required.

**Select mask** Size to patient using packaging guide. Good mask fit is priority. Use non-vented mask when available.

**Select circuit** appropriate for mask. If using non-vented mask, expiratory valve is required as per circuit diagram.

**Setup and check device** and set initial CPAP pressure 12

**Ensure all oxygen connections and tubing**

**Check monitoring equipment**

**CPAP setup**

Preferred device: A40, Nippy3, A10 or Lumis 100/150.  
If near continuous use >12 hours rotate device if possible, particularly if A10/Lumis.

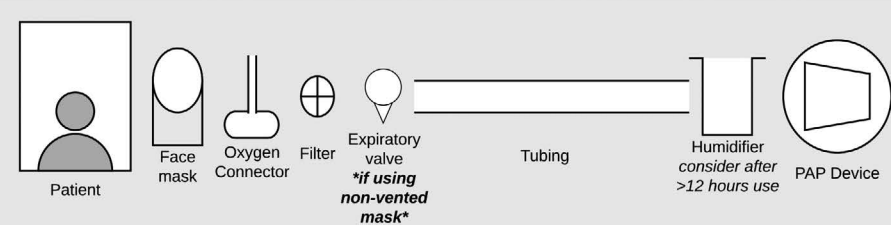
**Start with CPAP 12cmH2O, oxygen 10l/min (15l/min if >60% FIO2 prior to CPAP)**

**Establish mask fit and tolerance**

**Titrate oxygen** to maintain target - accepted SpO2 for patient. Higher flow rates typically required with higher CPAP pressures.

**CPAP titration:** not usually necessary but can try vary 10 - 18cmH2O to determine optimum for tolerance, improved oxygenation and improved work of breathing.

**Change antimicrobial filter** after total of 24 hours of circuit usage.



**Humidifier**

Aim to add in humidifier to all patients established on bridging/ceiling of care CPAP or NIV if >12 hours use anticipated following initial setup.

**Additional information**

**Clinical physiologist QEUH**  
Available Mon - Fri 9-5 on 83598

**Videos: mask fit, mask troubleshooting and device setups**  
[bit.ly/NHSGGCYouTubeCPAP-NIVCOVID](https://bit.ly/NHSGGCYouTubeCPAP-NIVCOVID)

**Device quick setup guides and manuals**  
[bit.ly/NHSGGCRespFailure](https://bit.ly/NHSGGCRespFailure)

If weblinks blocked, paste links into [www.checkshorturl.com](http://www.checkshorturl.com) to expand.

Chris Carlin Apr 13, 2020

## References and useful resources

- 1 Scottish Thoracic Society. Position Statement: CPAP for COVID-19-related respiratory failure. 16 April 2020
- 2 NHS England and NHS Improvement. Guidance for the role and use of non-invasive respiratory support in adult patients with COVID19 (confirmed or suspected). [cited 15 May 2020]. Available from url: <https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/specialty-guide-NIV-respiratory-support-and-coronavirus-v3.pdf>
- 3 Health Protection Scotland. Transmission based precautions literature review: aerosol generating procedures. [cited 13 May 2020]. Available from url: [https://hpspubsrepo.blob.core.windows.net/hps-website/nss/2893/documents/1\\_tbp-lr-agp-v1.1.pdf](https://hpspubsrepo.blob.core.windows.net/hps-website/nss/2893/documents/1_tbp-lr-agp-v1.1.pdf)
- 4 NHS Greater Glasgow and Clyde. QEUH respiratory medicine COVID-19 respiratory failure management, SOP for CPAP in patients with COVID-19 pneumonia. 13 April 2020