

# RESPIRATORY SUPPORT FOR ADULTS WITH SEVERE TO CRITICAL COVID-19

## LEGEND

**EBR:** Evidence-Based Recommendation  
**CBR:** Consensus-Based Recommendation  
**PP:** Practice Point

Living  
guidance

Not prioritised  
for review

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## HIGH-LEVEL RESPIRATORY SUPPORT

### Guiding principles of care

### MANAGING RISK OF INFECTION

#### HFNO/NIV/intubation CONSENSUS RECOMMENDATION

For patients with COVID-19 for whom respiratory support (HFNO/NIV) is being considered, decisions should balance likelihood of patient benefit against the risk of infection for healthcare workers. For patients with COVID-19 receiving respiratory support (HFNO/NIV) or requiring intubation, use single rooms or negative pressure rooms wherever possible and ensure contact, droplet and airborne precautions are in place. Closed circuit NIV should be used.

**CBR** [Taskforce]

As per the current national guidance on the use of personal protective equipment (PPE) in hospitals during the COVID-19 outbreak:

- follow contact and droplet precautions for routine patient care of people with suspected or confirmed COVID-19
- add contact and airborne precautions when aerosol-generating procedures are required.

**PP** [Taskforce/AHPPC]

### Definition of disease severity

#### Severe illness

Adult patients meeting any of the following criteria:

- respiratory rate  $\geq 30$  breaths/min
- oxygen saturation  $\leq 92\%$  at a rest state
- arterial partial pressure of oxygen (PaO<sub>2</sub>/inspired oxygen fraction (FiO<sub>2</sub>)  $\leq 300$

#### Critical illness

Adult patients meeting any of the following criteria:

Respiratory failure

- Occurrence of severe respiratory failure (PaO<sub>2</sub>/FiO<sub>2</sub>  $< 200$ ), respiratory distress or acute respiratory distress syndrome (ARDS). This includes patients deteriorating despite advanced forms of respiratory support (NIV, HFNO) OR patients requiring mechanical ventilation

OR other signs of significant deterioration

- Hypotension or shock
- Impairment of consciousness
- Other organ failure

## MEDICAL TREATMENTS AND MANAGEMENT OF SHOCK

Refer to **MANAGEMENT OF SEVERE TO CRITICAL COVID-19 Clinical Flowchart**

### Supplemental oxygen

### HIGH-FLOW NASAL OXYGEN THERAPY (HFNO)

High-flow humidified oxygen should be considered when unable to maintain SaO<sub>2</sub>  $\geq 92\%$  despite conventional oxygen delivery at  $> 6$  L/min or an FiO<sub>2</sub>=0.4. **Info** [Taskforce]

#### Negative pressure rooms/ Single room/COVID-19 ward CONDITIONAL RECOMMENDATION FOR

Consider using HFNO therapy for patients with hypoxaemia associated with COVID-19, ensuring it is used with caution and strict attention is paid to staff safety including the use of appropriate PPE. If HFNO is being used, ideally this should be in a negative pressure room. If none is available, other alternatives are single rooms, or shared ward spaces with cohorting of confirmed COVID-19 patients only. **EBR** [Taskforce]

Use the lowest flow necessary to maintain oxygen saturation  $\geq 92\%$ . **PP** [Taskforce]

#### Shared wards/ED cubicles/ Patient transfer/retrieval NOT RECOMMENDED

Do not use HFNO therapy for patients with hypoxaemia associated with COVID-19 in shared wards, emergency department cubicles or during inter-hospital patient transfer/retrieval. **EBR** [Taskforce]

## ADVANCED RESPIRATORY SUPPORT

### Mechanical ventilation

### GENERAL

#### Videolaryngoscopy CONDITIONAL RECOMMENDATION FOR

In adults with COVID-19 undergoing endotracheal intubation, consider using videolaryngoscopy over direct laryngoscopy if available and the operator is trained in its use.

**EBR** [Taskforce]

In mechanically ventilated adults with COVID-19 and ARDS, use low tidal volume (Vt) ventilation (Vt 4-8 mL/kg of predicted body weight) rather than higher tidal volumes (Vt  $> 8$  mL/kg) and aim for plateau pressures (Pplat) of  $< 30$  cm H<sub>2</sub>O.

**CBR** [Taskforce/SSC]

#### Neuromuscular blockers CONDITIONAL RECOMMENDATION AGAINST

For mechanically ventilated adults with COVID-19 and moderate to severe ARDS, do not routinely use continuous infusions of neuromuscular blocking agents (NMBAs).

**EBR** [Taskforce]

However, if protective lung ventilation cannot be achieved, consider using NMBAs for up to 48 hours. If indicated, consider cisatracurium as first-line agent; if cisatracurium is not available alternatives include atracurium or vecuronium by infusion.

**PP** [Taskforce]

#### Positive end-expiratory pressure CONSENSUS RECOMMENDATION

For mechanically ventilated adults with COVID-19 and moderate to severe ARDS, consider using a higher PEEP strategy (PEEP  $> 10$  cm H<sub>2</sub>O) over a lower PEEP strategy.

**CBR** [Taskforce]

In mechanically ventilated adults with COVID-19 and ARDS, use a conservative fluid strategy rather than a liberal fluid strategy.

**PP** [Taskforce/SSC]

## NON-INVASIVE VENTILATION (NIV)

Non-invasive ventilation (NIV), also known as non-invasive positive pressure ventilation (NIPPV) or bilevel positive pressure support (BiPAP), is a form of respiratory support. Bilevel positive pressure is delivered throughout the respiratory cycle by a firm-fitting nasal-face mask. The patient breathes spontaneously and triggers the device to cycle. **Info** [Taskforce]

**Negative pressure rooms/Single room/COVID-19 ward** CONDITIONAL RECOMMENDATION FOR

Consider using NIV therapy for patients with hypoxaemia associated with COVID-19, ensuring it is used with caution and strict attention is paid to staff safety including the use of appropriate PPE. If NIV is being used, ideally this should be in a negative pressure room. If none is available, other alternatives are single rooms, or shared ward spaces with cohorting of confirmed COVID-19 patients only. **EBR** [Taskforce]

**Shared wards/ED cubicles/Patient transfer/retrieval** NOT RECOMMENDED

Do not use NIV therapy for patients with hypoxaemia associated with COVID-19 in shared wards, emergency department cubicles or during inter-hospital patient transfer/retrieval. **EBR** [Taskforce]

**Alternate clinical presentations** CONDITIONAL RECOMMENDATION FOR

In patients with COVID-19 for whom NIV is appropriate for an alternate clinical presentation (e.g. concomitant COPD with type 2 respiratory failure and hypercapnoea, APO), ensure airborne and other infection control precautions are optimised. **EBR** [Taskforce]

## PRONE POSITIONING

Positioning the patient in a face-down (prone) position may help to open up (recruit) collapsed alveoli and improve oxygen levels in the blood. **Info** [Taskforce]

**Prone – supplemental O<sub>2</sub>** CONSENSUS RECOMMENDATION

For adults with COVID-19 and respiratory symptoms who are receiving any form of supplemental oxygen therapy and have not yet been intubated, consider prone positioning for at least 3 hours per day as tolerated. When positioning a patient in prone, ensure it is used with caution and accompanied by close monitoring of the patient. Use of prone positioning should not delay endotracheal intubation and mechanical ventilation in patients with COVID-19 who are deteriorating despite optimised less invasive respiratory therapies. **CBR** [Taskforce]

Vulnerable people who are treated outside the ICU, for example people who are older and living with frailty, cognitive impairment or unable to communicate, may particularly be at increased risk of harm from prone positioning. Despite the potential risks of awake prone positioning associated with frailty, there may be benefits for this group. The net clinical benefit for each individual patient should be considered on a case-by-case basis. **PP** [Taskforce]

## RESPIRATORY MANAGEMENT OF THE DETERIORATING PATIENT

**Early intubation/MV** CONSENSUS RECOMMENDATION

Do not delay endotracheal intubation and mechanical ventilation in patients with COVID-19 who are deteriorating despite optimised, less-invasive respiratory therapies. **CBR** [Taskforce]

Patients can deteriorate rapidly 5 to 10 days after onset of symptoms. **PP** [Taskforce]

The net clinical benefit for each patient should be considered on a case-by-case basis, as factors such as frailty, advanced illness or comorbidity may lessen the benefit and increase potential harms. **PP** [Taskforce]

Decisions around proceeding to more invasive forms of ventilation should be discussed with the patient or their substitute/medical treatment decision-maker. Consider the preferences and values of the patient and whether they have an advanced care directive or plan. **PP** [Taskforce]

## ADDITIONAL MEASURES

**Prone – mechanical ventilation** CONSENSUS RECOMMENDATION

For mechanically ventilated adults with COVID-19 and hypoxaemia despite optimising ventilation, consider prone positioning for more than 12 hours a day. **CBR** [Taskforce]

Current reports suggest prone ventilation is effective in improving hypoxia associated with COVID-19. This should be done in the context of a hospital guideline that includes suitable personal protective equipment (PPE) for staff, and that minimises the risk of adverse events, e.g. accidental extubation. **PP** [Taskforce]

**Recruitment manoeuvres** CONSENSUS RECOMMENDATION

For mechanically ventilated adults with COVID-19 and hypoxaemia despite optimising ventilation, consider using recruitment manoeuvres.

If recruitment manoeuvres are used, do not use staircase or stepwise (incremental PEEP) recruitment manoeuvres. **CBR** [Taskforce]

In mechanically ventilated patients with COVID-19 and respiratory failure, use empiric antibacterial agents when clinically indicated. Re-evaluate the duration of therapy and spectrum of coverage based on the microbiology results and the individual's clinical status. **PP** [Taskforce]

In mechanically ventilated patients with COVID-19 and ARDS, do not routinely use inhaled nitric oxide. **CBR** [Taskforce/SSC]

In mechanically ventilated patients with COVID-19 and ARDS who develop refractory hypoxaemia, consider inhaled nitric oxide or other inhaled pulmonary vasodilator as a rescue therapy. **PP** [Taskforce]

## TRACHEOSTOMY

In mechanically ventilated adults with COVID-19, consider performing a tracheostomy after 10 or more days as per standard practice, while optimising the environment for health care worker safety, including wearing appropriate PPE. **CBR** [Taskforce]

## EXTRACORPOREAL MEMBRANE OXYGENATION

**ECMO** CONDITIONAL RECOMMENDATION

Consider early referral to an ECMO centre for patients developing refractory respiratory failure in mechanically ventilated adults with COVID-19 (despite optimising ventilation, including prone positioning and neuromuscular blockers). **CBR** [Taskforce]

Due to the resource-intensive nature of ECMO and the need for experienced centres, healthcare workers and infrastructure, ECMO should only be considered in selected patients with COVID-19 and severe ARDS. **PP** [Taskforce]

## Sources

**AHPPC** – Australian Health Protection Principal Committee (AHPPC). Guidance on the use of personal protective equipment (PPE) in hospitals during the COVID-19 outbreak. Updated 19 June 2020

**SSC** – Surviving Sepsis Campaign: Guidelines on the Management of Critically Ill Adults with Coronavirus Disease 2019 (COVID-19)

**Taskforce** – Current guidance from the National COVID-19 Clinical Evidence Taskforce