As doctors we all have general responsibilities in relation to coronavirus and for these we should seek and act on national and local guidelines. We also have a specific responsibility to ensure that essential care continues with the minimum burden on the NHS. We must engage with those planning our local response. We may also need to work outside our specific areas of training and expertise and the General Medical Council (GMC) has already indicated its support for this in the exceptional circumstances we may face.

**ECMO for respiratory failure**
Respiratory ECMO is indicated for acute severe but potentially reversible respiratory failure. It is therefore expected that the service will experience increased demand in response to patients with COVID-19.

Given the more recent national and international evidence that suggests that severe respiratory failure from COVID-19 carries the same prognosis as other aetiologies, the ECMO criteria should be common to severe acute respiratory distress syndrome (ARDS) from all aetiologies including COVID-19 (Warren et al. 2020).

Referrals to the service should be made by adult intensive care units for patients who are critically ill who are receiving lung protective mechanical ventilation or for patients in whom lung protective ventilation is not possible because of the severity of hypoxaemia or hypercapnia.
Referral information
To refer a patient to the National ECMO service or to seek clinical advice on the management of severe acute respiratory failure, including those with COVID-19, please use the online ECMO referral form. This national referral system will help us coordinate the national response to the COVID-19 pandemic.

Referral criteria

Inclusion criteria for referral (in bold) and additional considerations for ECMO in all patients regardless of aetiology:

- Potentially reversible severe respiratory failure – for example, PaO$_2$/FiO$_2$ <6.7 kPa for ≥3 hours or PaO$_2$/FiO$_2$ <10 kPa for ≥6 hours (Combes et al. 2018)
- Murray Lung Injury Score ≥3
- Uncompensated hypercapnia with a pH ≤7.20 despite respiratory rate >35/min or due to life threatening airway disease – for example, asthma or airway trauma, air leak (Combes et al. 2018)
- Failed trial of ventilation in the prone position for ≥6 hours (unless contraindicated)
- Failed optimal respiratory management with lung protective ventilation after discussion with a national ECMO centre.

Exclusion criteria

- Refractory or established multiorgan failure
- Evidence of severe neurological injury
- Prolonged cardiac arrest (>15 minutes)

Additional considerations by the ECMO centres:

At least 2 ECMO centres must agree that it is appropriate to proceed to ECMO for patients meeting 1 of the following criteria:

- Indices of low potential to recover such as RESP Score ≤3
- Receiving invasive mechanical ventilation >7 days (Combes et al. 2018)

For the calculation of Respiratory ECMO Survival Prediction (RESP) score:

- If COVID-19, aetiology will be ‘viral pneumonia’
- High-flow nasal cannula (HFNC) will NOT count towards ventilated days
- If on continuous positive airway pressure (CPAP) or non-invasive ventilation (NIV) pre-intubation >1 day – these days will count towards mechanical ventilation days if – on average:
  - CPAP/NIV used >12 hours/day
  - PaO$_2$/FiO$_2$ <20 kPa with FiO$_2$ >60% (Bellani et al. 2017)
  - PaCO$_2$ <4 kPa or respiratory rate >25/min (Bellani et al. 2017); or PaCO$_2$ >6.5 kPa/increasing since CPAP/NIV (Bellani et al. 2017); or inspiratory tidal volume (if measured) >9.5 ml/kg predicted body weight (PBW; Carteaux et al. 2016)
References


Service providers

There are [5 commissioned centres in England for the provision of ECMO and 1 in Scotland](#), each working to a specified geographical area. However, in order to manage service demand, following assessment and triage, admission may take place at any of the designated centres.

- Guy’s and St Thomas’ NHS Foundation Trust
- Royal Papworth Hospital NHS Foundation Trust
- Royal Brompton and Harefield NHS Foundation Trust
- University Hospitals of Leicester NHS Trust
- Manchester University NHS Foundation Trust
- Aberdeen Royal Infirmary, NHS Grampian

(Note: additional centres have been identified to support the national network during extreme surge, if required; however, all referrals should continue to be made directly to the national portal)

Update information

**23 November 2020:** hyperlinks in this document were updated when the suite of guidance was moved from NHS England to NICE.

**25 June 2020:** version 2 published.