

Specialty guides for patient management during the coronavirus pandemic

Clinical guide for the management of critical care for adults with COVID-19 during the coronavirus pandemic

8 April 2020 Version 2

This guidance has been updated to reflect changes to the case definition for COVID-19 from 18 May 2020. Change highlighted in yellow.

This clinical guidance provides contemporary information on the care of critically ill adult patients with COVID-19 to practising clinicians at the bedside.

The COVID-19 pandemic is placing an extraordinary burden on critical care, which is being met through the creation of surge capacity within and beyond hospital walls. A large number of non-specialist healthcare providers will be supporting critical care specialists to provide care. Staff safety and wellbeing will be crucial in maintaining the resilience of critical care provision.

This guide summarises the clinical characteristics of COVID-19 and offers advice on:

- Antibiotics and corticosteroids
- Treatment of other conditions in the context of COVID-19.
- Clinical decision-making when resources may be constrained
- Management of respiratory failure
- Management of other organ failure
- Continuous positive airway pressure (CPAP) and non-invasive ventilation (NIV)
- Early intubation – indications and role.

The effectiveness of most interventions in the context of COVID-19 is currently uncertain. This guide is informed by up-to-date information about COVID-19 management as well as best available evidence from non-COVID-19 patients. High quality multi-centre clinical trials are currently underway with patients with COVID-19 and will inform future versions of this guidance.

COVID-19 related clinical trials are important to rapidly develop an evidence base for this new disease and should be supported if clinicians are in equipoise.

This document will be updated at regular intervals during the COVID-19 pandemic. Please always refer to the most up-to-date version available at www.england.nhs.uk/coronavirus/secondary-care/other-resources/specialty-guides/#adult-critical-care

1. Dealing with surge

Supporting critical care surge capacity will require different ways of working extending to:

- Location
 - Care of the critically ill being delivered in adapted areas within the hospital or purpose-built structures such as the NHS Nightingale facilities
 - Increased requirement for inter-hospital transfers within regions ('mutual aid' within critical care networks)
 - [People](#)
 - [Non-specialists](#) delivering critical care, at times in adapted locations
 - Individuals and teams working in personal protective equipment (PPE)
 - Equipment
 - Working with unfamiliar, rapidly procured and designed equipment (such as ventilators) and the associated training burden
 - Consumables
 - managing a greatly increased demand for materials such as [drugs](#), filters and [oxygen](#)
 - careful use, prudent allocation of resources, and learning from others' experiences will be important (See Section 4: Management of respiratory failure)
See: <https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/C0167-specialty-guide-surge-based-on-current-hospital-experience.pdf>
 - Decisions
-

working within the clinical and ethical constraints imposed by high demand and finite resources (See Section 3: Clinical decision-making).

Surge capacity will be met through:

- Expansion within the hospital into temporary critical care resources (eg theatres, recovery areas, wards)
- Transfer of equipment (eg ventilators) between hospitals, particularly between the independent sector and NHS under the leadership and management of regional networks
- Transfer of patients to another hospital within your critical care network (mutual aid)

Regional 'NHS Nightingale' facilities.

Safety and welfare of staff are essential if critical care provision is to remain resilient in the face of the demands of a sustained pandemic and should include:

- PPE guidance: [PHE guidance](#) *
- Sustainable [staffing patterns](#) and rotas
- Attention to staff physical [wellbeing](#), rest, diet and physical activity
- [Attention to staff psychological wellbeing, particularly in relation to concerns](#) about personal safety and responsibility (difficult clinical decision-making)

Attention to the stresses on [individuals working outside their usual scope of practice](#) (eg [non-specialists clinicians working with critical care patients](#)).

2. Clinical characteristics and specific treatments

SARS-CoV-2 infection causing COVID-19 may manifest as:

- Asymptomatic carriage
- Acute mild/moderate illness (80%) with:
 - Fever (>37.8 degrees C)
 - Cough
 - Shortness of breath
 - Sputum production
 - Non-specific: eg myalgia, malaise, anorexia, headache
 - Anosmia (a loss of or change in your normal sense of smell or taste) uncertain prevalence
- Acute severe (15%) /critical illness (5%):

- Two lung phenotypes have been described, probably occurring sequentially:
 - Atypical viral pneumonitis = hypoxaemia with relatively compliant lungs
 - Classic acute respiratory distress syndrome (ARDS) = stiff lungs
- Non-respiratory organ dysfunction:
 - renal failure
 - liver dysfunction
 - cardiac dysrhythmia (eg sinus tachycardia, AF, bradycardia)
- Hyper-inflammation syndromes may occur – management uncertain, seek advice from local SARF/ECMO network URL
- Less common presentations:
 - Diarrhea and GI symptoms
 - COVID encephalopathy
- Risk factors for symptomatic disease and progression to critical illness:
 - Age – over 50, substantial risk over 70
 - Male
 - Obesity
 - Comorbidities: cardiovascular disease, diabetes, chronic respiratory disease, hypertension, cancer, chronic kidney disease

Diagnosis

- History
 - Classical clinical picture (see acute mild/moderate illness above)
- Examination
 - Avoid use of stethoscope due to risk of viral contamination
 - Respiratory rate
 - Cyanosis
- RT-PCR
 - From lower respiratory tract samples if possible
 - Beware false negative upper airway sample if clinical picture is typical
- Diagnostic imaging
 - CXR: bilateral patchy shadowing = interstitial pneumonitis
 - CT Chest: not generally indicated to establish the diagnosis – may provide useful supporting information on pulmonary pathology if done for another reason
- Laboratory findings
 - Diagnostic utility:
 - Low lymphocyte count

- Normal Procalcitonin/BNP
- Creatinine Kinase - elevation = myositis / myocardial involvement
- Troponin - elevation = myocardial involvement
- Severity of illness markers:
 - High neutrophil-lymphocyte ratio
 - Low albumin
 - Elevated Troponin
 - Elevated D-dimers
 - Elevated Ferritin
- Check Lactate Dehydrogenase if hyperinflammation syndrome suspected
- C-Reactive Protein (CRP)
 - Uncertain value
 - Rising CRP may indicate bacterial infection or disease progression

Management

Supportive care is the mainstay of COVID-19 management. The World Health Organization (WHO) has produced interim guidance on [clinical management of suspected COVID-19 with severe acute respiratory infection](#).

Research for specific antiviral therapies and vaccines are underway, but none are currently recommended.

Anti-SARS-CoV-2 therapy should only be administered within the context of a nationally approved trial.

COVID-19 related clinical trials should be supported to rapidly develop an evidence base for this new disease.

- Routine antibiotics are not indicated for uncomplicated COVID-19.

Routine corticosteroids are **not** recommended. **However**, where patients require corticosteroids for other indications (either at replacement doses for known adrenal insufficiency or as a treatment for another underlying condition such as asthma or COPD), they should **not** be withheld.

Treatment of other conditions in the context of COVID-19:

- Careful attention to antimicrobial stewardship:
 - Antibiotics should be considered if there is suspected bacterial superinfection

- Consider empirical influenza treatment with oseltamivir in all patients until respiratory PCR result is available.
- Concerns have been raised about the impact that NSAIDs and ACE-inhibitors may have on the severity of COVID-19.
- Where patients are already taking these medications for other conditions, **continuing treatment** is recommended by national and international bodies, including the [Renal Association](#), the [European Society of Cardiology](#) and the [European Medicines Agency](#).
- Consider other possibilities in the differential diagnosis for patients with possible COVID-19.

Take care not to neglect treatment of exacerbation of any underlying conditions (eg heart failure, COPD, diabetes).

3. Clinical decision-making

- Intensive care decision-making should be consistent with normal ethical and legal frameworks.
- All patients should be treated respectfully and equally and should receive the best available care. Patients should not be treated differently because of anticipated future pressures: it is important to focus on current clinical demands and available resources.
- Assess what care is likely to provide benefit to the patient, taking into account the best available evidence on factors that predict this and applying it to the specific situation of the patient being treated.

Decision support tools developed in the context of COVID-19 are available ([NICE pathway](#)) and may help guide these discussions and decisions. As more evidence and experience of managing COVID-19 becomes available, these tools will become more valid and relevant for patients within the NHS.

Referral and admission to intensive care or palliative care

- **Treatment escalation plans (TEP)** should be documented and discussed with patients, and/or their relatives, at the first opportunity and be clearly documented. TEPs should take into account the person's values and goals of treatment.
- **Referral** for consideration of admission to ICU should be considered carefully by a senior clinician, using current guidance (eg NICE pathway) as an aid.
- The **decision to admit to intensive care** should be made by an intensivist. When an intensivist is not available, a senior physician with expert knowledge of intensive care interventions and outcomes should decide. This decision should be discussed

with the patient (or their next of kin) and the decision and discussion clearly documented by the referring or ICU team as appropriate.

Treatment decisions

- Good practice in critical care routinely involves continuous assessment of every individual patient's progress, the likelihood of a good outcome, and the adjustment of treatment plans in light of these issues.
- On admission to intensive care the patient's expectations and the goals of treatment should be reviewed.
- [All patients must have daily review by a physician and discussion with an expert in intensive care to assess whether the goals of treatment are being met and whether the outcomes expected at admission remain realistic.](#)
- Where treatment is limited or withdrawn there must be clear and complete documentation of the rationale for any decisions and documentation of discussions with the patient or their representative and any other clinical staff involved.

Where treatment is limited or withdrawn, the benefit of involving a palliative care team should be considered, especially if the patient is managed outside the intensive care unit.

4. Management of respiratory failure

Oxygen therapy

- Avoid hyperoxaemia in patients receiving supplemental oxygen.
- Generally, aim for SpO₂ 92-96%, although the target will be lower in some patient groups (eg chronic obstructive pulmonary disease (COPD)).
- An SpO₂ target of 90-93% is acceptable in patients with visible continuous pulse oximetry in an appropriately monitored care environment with trained staff to monitor for clinical deterioration.
- [High flow oxygen delivery devices place a strain on oxygen supplies with the risk that site supply failure may occur.](#) This can be difficult to predict, even if the pressure and total flow are known.

Eliminate waste by ensuring oxygen flowmeters and high-flow devices are switched off when not attached to patients.

High flow nasal oxygen

- High flow nasal oxygen or similar high flow devices should be avoided:
 - local maximum oxygen outlet delivery limitations preclude widespread use (see above)

- risk of environmental viral contamination is unknown but may be higher than invasive mechanical ventilation.

CPAP and NIV

- Please see the specialty guide for more details here:
www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/CLEARED_Specialty-guide_-_NIV-respiratory-support-and-coronavirus-v2-26-March-003.pdf
- Caution must be exercised with high flow CPAP devices due to concerns about oxygen utilisation (see above).
- PPE should be consistent with PHE guidance for an aerosol generating procedure.
http://bit.ly/PPE_Guide
- CPAP devices (via a non-venting face mask or helmet) may be trialled to assess whether invasive mechanical ventilation can be avoided in selected patients under the following circumstances:
 - Patients should have visible continuous pulse oximetry in an appropriately monitored care environment with trained staff to monitor for clinical deterioration.
 - Failure to respond to a CPAP trial (deterioration in gas exchange; high work of breathing) is an indication for early intubation and invasive mechanical ventilation in patients considered appropriate for escalation.
 - Low-flow CPAP devices using entrained oxygen may be suitable for patients with a lower oxygen requirement ($FiO_2 < 0.4$).
 - Some milder severity patients may improve symptomatically after short periods (1-4 hours) of CPAP with corresponding reductions in FiO_2 , respiratory rate and work of breathing to maintain adequate SpO_2 values.
- Patients who present as too critically unwell, or who do not respond clinically to a CPAP trial (deterioration in gas exchange, high work of breathing), and/or do not tolerate CPAP, should receive early intubation and invasive mechanical ventilation according to appropriateness of escalation.
- Patients may look comfortable on CPAP in the early phase of illness when lung compliance is normal. A high spontaneous minute ventilation, which may be an indicator of clinical deterioration or disease progression, may be injurious and delayed intubation in this group may be associated with a reduction in survival outcome.
- **For some patients, CPAP or NIV will form the appropriate ceiling of treatment. Identify these patients early to prevent inappropriate escalation to invasive support.**
- NIV (BiPAP) is not generally indicated in hypoxic respiratory failure but may be considered in certain patient groups with Type 2 respiratory failure (eg COPD).

- An appropriate antimicrobial filter should be located on the expiratory limb of any NIV or CPAP device.
- Due to a risk of environmental viral contamination, where possible deliver mask ventilation in an isolated environment (negative or neutral pressure room, switch off pressure in positive pressure room, or cohort in restricted access areas).
- Awake prone positioning may improve V/Q mismatch, oxygenation and work of breathing.
- The type and location of respiratory support following extubation (i.e. CPAP, high or lower flow O₂) may be informed by clinical assessment, repeat testing of COVID-19 status (where available), and balancing the risks of cross-infection with the benefits of different approaches.
- Consideration should be given to cohorting extubated patients according to COVID-19 status both within ICUs and in step-down units.

Intubation

- Follow intubation guidance from: <https://icmanaesthesiacoronavirus.org>

Intubation should be performed by a skilled operator wearing appropriate PPE for an aerosol-generating procedure. See PHE IPC guidance here: http://bit.ly/PPE_Guide

Development of Mobile Emergency Rapid Intubating Teams (MERIT) with appropriate portable equipment, PPE and protocols is advised.

Mechanical ventilation

- Ensure use of an antimicrobial filter within the circuit or placed on the expiratory limb or ventilator exhaust. **Note that filters represent an airflow obstruction risk when saturated and regular assessment and replacement is advised.**
- Heated humidifiers can cause [rapid saturation of in-line filters](#) and the combination should be used with caution.
- Use of dry circuits with HME filters can cause secretion build-up and obstruction of tracheal tubes. Regular nebulized salination ± mucolytics (in-line with respiratory circuit) may be useful but can also contribute to circuit obstruction through saturation of filters and salt crystal build-up within ventilator expiratory blocks.
- Use in-line suction systems where possible.
- **Issues specific to anaesthetic machines:**
 - In-line suction triggering anaesthesia ventilators to stop (beware)
 - Ensure CO₂ sampling is ‘ventilator side’ of the viral filter (separated from patient expired gas by a viral filter).
 - Heat and Moisture Exchange (HME) filters may become rapidly saturated with water vapour when used with anaesthetic machines with a circle system.

- Avoid inadvertent ventilator circuit disconnections by ensuring all connections are ‘tight’.
- Manual ventilation, or ‘hand-bagging’ should be avoided where possible, due to concerns about aerosol generation and infection risk.

Ensure the tracheal tube is clamped and ventilator paused/standby during any planned circuit disconnection, eg switching between ventilators, during proning/deproning manoeuvres, replacing the antimicrobial filter, or inserting a bronchoscope into the catheter mount.

Management of pneumonitis

- Compliance is often normal, and recruitment may not be required.
- PEEP <10 cmH₂O is often sufficient.
- Ensure lung protective ventilation including driving pressure <15 cmH₂O (driving pressure = plateau pressure – PEEP).
- Neuromuscular blockade is advised if ventilator dyssynchrony or high spontaneous minute ventilation.
- Consider pulmonary vasodilators (eg inhaled nitric oxide, nebulized epoprostenol) to improve V/Q mismatching where available.

Improvements in oxygenation can often be achieved by proning (see below).

Management of ARDS

- Compliance is low and recruitment is required.
- Follow established ARDS management guidelines including:
 - - lung protective ventilation
 - - conservative fluid management strategy
 - - prone positioning (see below)
- Consider neuromuscular blockade – bolus preferred to infusion
- Consider lung recruiting manoeuvres, such as PEEP escalation.
 - Lung Ultrasound: diffuse B-lines may predict PEEP responsiveness

If other strategies fail, consider referral for ECMO (see below)

Prone positioning

- Recent experience suggests a beneficial response to prone positioning in awake patients, those with pneumonitis and in ARDS.
- Utilising prone positioning to improve oxygenation is advised in patients failing conventional supine ventilation.
- Recommended 16 hours (longer may be acceptable) – multiple episodes may be valuable – (eg up to a week)

Development of a 'proning team' is advised to improve efficiency. The proning team may comprise staff from non-ICU backgrounds under supervision of a suitably skilled ICU nurse.

Tracheostomy

- Advice for care of patients currently with a tracheostomy is [available](#)
- Decision making in relation new tracheostomies needs to balance the risk of infection (aerosol spread of SARS-CoV-2) with the best management for the patient within the available resources.
- Tracheostomy may:
 - facilitate weaning from mechanical ventilation
 - allow reduced use of sedation, and consequently pressor, medication
 - enable safe management with lower staffing and equipment levels
 - **but** awake patients may be more difficult to manageStaff must be able to care for tracheostomized patients (eg ENT/MaxFax staff).

NIV machines and weaning

There may be a role for NIV/CPAP, including in patients who have had tracheostomies, to wean them from ventilator support (and the requirement for sedation). However, there is insufficient evidence from the UK experience to provide any guidance on this at this stage. We will update these guidelines as clinical experience grows.

Extracorporeal membrane oxygenation (ECMO)

- Follow established guidance and thresholds for referral to the ECMO network.
- Trials of PEEP recruitment, recruiting ventilator modes, and proning should be evaluated before consideration for extra-corporeal mechanical support.
- ECMO referral data will be communicated via a single platform at:
www.referapatient.org/refer-a-patient
- The ECMO network regional centres can also be contacted for advice and guidance.

For further information on ECMO, see NICE guidance at: www.nice.org.uk/guidance/ipg391

Aerosol-generating procedures (AGPs)

AGPs such as intubation and extubation, facemask ventilation, circuit disconnection, bronchoscopy, tracheostomy formation and some physiotherapy procedures will increase the risk of environmental viral contamination. Please see the PHE website for the full list and guidance on appropriate PPE: http://bit.ly/PPE_Guide

Nebulisers are not considered an AGP but, within critical care, use should be confined to within a closed ventilator circuit.

Corticosteroids

- Routine high-dose corticosteroid use in coronavirus is not advised due to risk of prolonged viral shedding, bacterial superinfection and worse outcomes

Selected use may be of benefit in hypotension resistant to high dose vasopressor therapy.

Aspergillus co-infections and COVID-19

- Aspergillus co-infections have been reported in patients with COVID-19.
- Intubation more than 7-days may be a risk factor.
- Frequency of co-infection not known.
- Potential contributing factors:
 - Immunosuppression, critical illness, use of high dose corticosteroids
- local environment that could lead to increased exposure to fungal pathogens.

Consider aspergillosis in patients with COVID-19 when:

- deterioration despite optimal supportive care
- other suspicious clinical or radiological features
- fungal investigations should be undertaken promptly (if suspected) and according to local protocols.

Biomarkers, if rapidly available, may assist in early diagnosis and therapy.

5. Management of non-respiratory organ failure

Cardiovascular

- ‘Palpitations’ and ‘chest tightness’ can be presenting features of COVID19 (www.nature.com/articles/s41569-020-0360-5)
- Both antecedent cardiovascular disease (CVD) (for example, hypertension, cardiomyopathy or coronary vascular disease; found in >30%) and raised cardiac troponin (TnT) (found in > 25%) influence mortality. Mortality (circa 7% in those with no CVD and normal TnT) is doubled in the presence of CVD (circa 14%), is further elevated if TnT is raised in the absence of CVD, and is elevated 10-fold (70%) if CVD is present and TnT elevated ([JAMA Cardiol.](https://doi.org/10.1001/jamacardio.2020.1017) 2020 Mar 27 : e201017. doi: [10.1001/jamacardio.2020.1017](https://doi.org/10.1001/jamacardio.2020.1017) [Epub ahead of print]).
- Raised TnT may occur via diverse mechanisms (ACE2, hypoxia/oxidative stress, cytokines, or microvascular damage).
- Myocarditis is diagnosed in some cases, although histological evidence is currently weak. A raised TnT alone is not sufficient for this diagnosis, and this remains a

diagnosis of exclusion. Treatment for myocarditis should not be initiated in the absence of biopsy-proven myocarditis.

- Tamponade can rarely occur. ECG and echocardiography may help with diagnosis of such states.
- Cardiac contractile failure ('heart failure') can occur, most commonly later in the disease course.
- Remember: acute coronary syndromes can still occur. Diagnosis can be difficult given that raised TnT is common. Echocardiography (regional wall motion abnormality) and ECG may help: seek expert cardiological advice.
- In cases of cardiac arrest, chest compressions may be commenced as PHE do not consider this an AGP. http://bit.ly/PPE_Guide

However, definitive airway management will generate aerosols and should not be performed until all staff are wearing appropriate PPE. The availability of "grab bags" and rehearsed resuscitation teams can help with the speed of response. Airway interventions must be carried out by very experienced staff

- In cases of significant hypotension or circulatory shock, standard circulatory assessment (fluid responsiveness, cardiac output assessment) and administration of an appropriate fluids and/or pressor (where appropriate) should occur.
- Balanced electrolyte solutions are preferred 0.9% normal saline and colloids.
- While fluid overload should be prevented and more conservative administration may help improve respiratory function, this should be carefully balanced against the risk of inducing acute renal impairment.

Norepinephrine (or vasopressin where norepinephrine is unavailable) appears to be a reasonable first-line pressor, pending circulatory assessment (above).

Renal

- AKI occurs in around 17% of patients admitted to critical care units with Coronavirus related organ failure.
- Care should be exercised in 'running patients too dry' in an effort to spare the lungs, as there are increased insensible fluid losses.
- Medical management of renal failure, including diuretics to maintain urine output, may be useful to delay the requirement for renal replacement therapy.
- Standard renal replacement therapies are appropriate, although (anecdotally) a hypercoagulable state may contribute to frequent filter failure, citrate filtration may be less affected.

If machines are in high demand, shorter cycles of diafiltration and moving machines between patients may help.

Thromboprophylaxis

A prothrombotic phenotype is common (high fibrinogen, D-dimer and prothrombin time, despite lower platelets).

- Pay great attention to thromboprophylaxis including non-pharmacological (intermittent pneumatic compression stockings, TEDS)

Consider pulmonary embolus if sudden deterioration in gas exchange.

Gut

Stool SARS-CoV-2 RNA is found even after respiratory tract clearance and is a potential source of infection (including amongst staff e.g. the plume of droplets released when a toilet is flushed). < 40% of patients suffer GI symptoms: diarrhoea (2- 35%), nausea (17%) or vomiting in (1.0-10%).

Feeding

- *Protein/Energy*: Use local targets. Adjust for Propofol (1.1kCal/ml) & citrate haemofiltration (2 L/h = 550 kcal).
- *GI Intolerance*: Beware QT prolongation (eg metoclopramide/erythromycin with hydroxychloroquine/amiodarone). Where needed, parenteral nutrition may be easier than post-pyloric tube placement.

Limited pump availability: Consider a) concentrated feed + higher rate +12-hour pump sharing (sanitize between patients) b) concurrent water + feed together where needed) syringe bolus feeding 6x/day d) Gravity feeding.

Gastroprotection

Despite lower platelet counts (common), patients appear prothrombotic. Use local gastroprotection practice. Consider once daily dosing until 48 hours after feed established where feasible.

Liver

About half may get raised ALT/AST/GGT/bilirubin levels - no specific intervention is advocated.

Skeletal muscle

- Skeletal Creatinine Kinase (CK) may be elevated as part of a hyper-inflammation syndrome.
- Routine CK measurement is recommended.
- When abnormal - confirm origin (compare with cardiac troponin levels/ do CK isoforms where indicated and readily available).

- ICU Acquired weakness (sarcopaenia) may be prevalent, impacting on weaning and rehabilitation. Once off sedation, perform daily Chelsea Critical Care Physical Assessment (CPAX) Score (www.wyccn.org/uploads/6/5/1/9/65199375/physt_637.pdf). Medical Research Council Sum Score (MRC-SS: p3 of www.blood.gov.au/system/files/Neurology-Assessment-Methods-for-the-Ig-Governance-public-page-2.pdf) to diagnose ICU-AW diagnosis, will aid stratification for rehabilitation. Mobilise according to local practice.

Delirium

A high incidence of delirium is expected.

- Use non-pharmacological interventions: ear plugs at night, eye pads to limit light exposure at night, orientation, sleep hygiene (including normalisation of day/night cycle), objective pain assessments and mobilisation.

Use of pharmacological agents may be associated with an increased risk of mortality, especially where long Q-T interval can occur (beware use with hydroxychloroquine and/or amiodarone/ and or prokinetics for instance)

ICU-acquired weakness

High incidence is of ICU-acquired weakness is expected given the ventilatory and proning requirements in the COVID population:

- Minimise use of neuromuscular blocking agents and cease use as soon as possible.
- Train non-critical care staff to support care with passive/active exercises where possible.
- Follow physiotherapy advice regarding splints and pillow splints to avoid foot drop.
- When physiologically stable, encourage early mobilisation and edge of the bed sitting, under physio guidance.

Support fatigue through sleep management, energy conservation, relaxation and meditation exercises.

6. Further guidance

Ethical guidance: supporting documents

COVID-19 rapid guideline: critical care in adults: <https://www.nice.org.uk/guidance/ng159>
[March 2020](#)

Oxygen supply: hospital level considerations

[MHRA statement on oxygen system supply resilience in hospitals](#)