

BTS Guidance: Respiratory support of patients on medical wards

16 April 2020

In the current crisis most patients admitted acutely unwell with COVID-19 are managed by physicians outside of ITU. This document aims to provide advice on the respiratory support for such patients. It is for physicians (respiratory and non-respiratory) and physiotherapists managing patients on medical wards. It includes advice on when to refer to ITU. It takes into account: oxygen flow capacity and ventilator capacity.

1. Phase One (ventilator beds and oxygen flow well within capacity)
2. Phase Two (demand on ventilator beds close to capacity, ample oxygen flow)
3. Phase Three (Hospital oxygen flow close to capacity)

Whether a hospital is in phase One, Two or Three is a local decision and will be a function of both time and geography.

Please read this document in association with the Phase One and Phase Two algorithms.

Phase One - see algorithm
(adequate oxygen flow and ventilator capacity)

If a patient cannot be adequately oxygenated on air or supplemental oxygen alone, i.e. needing $\geq 40\%$ to achieve saturations $\geq 94\%$ (see note below on COPD/chronic ventilatory failure) then:

1. In patients for whom it is appropriate, escalate to ITU. Ward-based CPAP/NIV is a poor alternative and may do nothing more than delay intubation.
2. In patients felt not suitable for escalation, CPAP can be trialled. In a proportion of patients this can achieve significantly better oxygenation than high flow oxygen alone. When seen, the response is usually quickly apparent – often immediately. Duration of treatment is variable but (limited) experience so far suggests a minimum of 4 days - often much longer, before patients can be weaned. Unlike experience with NIV in type 2 respiratory failure, prolonged, gradual weaning does not appear to be necessary. When patients are ready, they can be transitioned quite quickly back to supplemental oxygen, though some need extra support at night for a few days.

Phase Two - see algorithm
(When there is demand on ventilator capacity beyond what can be comfortably delivered though oxygen flow is adequate).

When ventilator use is close to capacity, ward based non-invasive respiratory support (CPAP/NIV) can be trialled to identify patients in whom this support is sufficient and who can therefore avoid intubation.

Some patients will respond. Response, when present, is often apparent quickly, sometimes immediately. In patients who would be suitable for escalation to invasive ventilation, if

adequate oxygenation is not achieved (saturation $\geq 94\%$), such trials should not be prolonged. A decision to escalate should be made within the hour.

Notes on COPD

In the planning for this crisis we had expected to see a large number of COVID exacerbations of COPD with profound type 2 respiratory failure. From (limited) experience so far, such presentations have been surprisingly few. Most COVID-19 positive patients admitted present with a low PaCO₂ - in some with quite a marked respiratory alkalosis - often representing a respiratory drive beyond even what might be expected from the degree of hypoxia.

Whilst we need to remain alert to the possibility of acute on chronic type 2 respiratory, in patients with a strong respiratory drive (low or low/normal PaCO₂) aim to achieve oxygen saturation $\geq 94\%$ as above. In patients with chronic respiratory disease (e.g COPD or OHS) when there is evidence of acute on chronic type 2 respiratory failure, treatment should be as per standard protocols: Titrate oxygen saturation to 88-92% and offer NIV based on an acidotic pH.

Phase Three

(hospital keen to control oxygen use)

Where a hospital is keen to control oxygen use the following should be implemented or considered.

Minimise any waste in using oxygen. This includes:

- Ensure that the lowest possible flow is given to maintain saturations in desired range.
- Escalate oxygen in the following order:
 - Nasal cannulae 2-4l/min
 - 35% venturi (8l/min)
 - non-rebreathe mask 8-15l - just using enough to keep the bag inflated which often does not require 15l
- Ensure that all unused oxygen is turned off
- Dying, unconscious patients often don't need oxygen and breathlessness can be better managed through other treatments

As above, if not already actioned locally then consider accepting a lower oxygen target range of 92%-96% or 90%-94% for all adults, including those with non-COVID19 conditions.* Ensure oxygen supply has been maximised and if there are different oxygen supplies for different areas of the hospital then site wards accordingly to utilise this.

Ensure a Standard Operating Procedure is in place for management of a loss of oxygen supply.

** Traditionally many hospitals have used target saturations $\geq 94\%$ but during COVID this has been reduced to $\geq 92\%$ and in some $\geq 90\%$ so please use local guidelines. See also [NHSE guidance on oxygen therapy](#)*

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Published documents:

Optimal use of oxygen therapy: NHS 9 April 2020

<https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/04/C0256-specialty-guide-oxygen-therapy-and-coronavirus-9-april-2020.pdf>

Use of High flow oxygen therapy devices: safety alert:

<https://www.ipem.ac.uk/Portals/0/Documents/Workforce%20intelligence/Covid19/NHSE12020%20001%20COVID-19%20oxygen%20supply%20ALERT.pdf?ver=2020-04-02-091750-110>

Clinical guide for the management of surge during the coronavirus pandemic: rapid learning NHS 12 April 2020

<https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/C0167-specialty-guide-surge-based-on-current-hospital-experience-v2.pdf>

Guidance for the role and use of non-invasive respiratory support in adult patients with COVID-19 (confirmed or suspected)

<https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/specialty-guide-NIV-respiratory-support-and-coronavirus-v3.pdf>

BTS GUIDANCE: RESPIRATORY SUPPORT OF PATIENTS ON MEDICAL WARDS

PHASE ONE PATHWAY

Proven or likely COVID-19

Notes:

1. * In COPD/Chronic Respiratory disease threshold of 92% may be appropriate (see notes¹)

2. CPAP(10-12 cm H₂O) or NIV (14-16/6-10) with entrained O₂ to achieve sats \geq 94%

Sats < 94%*
room air

Sats \geq 94%*
room air

Oxygen via Venturi
to achieve sats \geq
94%

Sats \geq 94% on
<40% O₂

Unable to achieve
sats \geq 94% on
< 40%

Appropriate for
escalation to ITU?

No

Yes

May go to non-resp
COVID ward
Continue to
monitor

To Respiratory
COVID ward
For trial of NIV or
CPAP

Call ITU

Consider discharge or
monitor further 6
hours

BTS GUIDANCE: RESPIRATORY SUPPORT OF PATIENTS ON MEDICAL WARDS

PHASE TWO PATHWAY

Proven or likely COVID-19

