

## Full Clinical Guideline – Oxygen use for adult patients within hospital

Reference no.:

### 1. Introduction

The administration of supplemental Oxygen is an essential element of appropriate management for a wide range of clinical conditions; however Oxygen is a drug and therefore requires prescribing in all but emergency situations. Failure to administer Oxygen appropriately can result in serious harm to the patient. The safe implementation of Oxygen therapy with appropriate monitoring is an integral component of the Health Care Professional's (HCP's) role.

In 2008 the British Thoracic Society (BTS) produced Guidelines for Acute Oxygen use in Adult Patients and in 2009 the NPSA issued the Rapid Response Report Oxygen Safety in Hospitals which requires Trusts to ensure Oxygen is prescribed in line with the BTS guidance. Following this, The BTS 2015 national Oxygen audit still found that 42% of hospital patients were administered Oxygen without a prescription. Even when a prescription was available, patients did not always receive what was specified on the prescription with significant numbers of patients recording Oxygen saturations either below or above the stated target range (O'Driscoll BR et al 2015). This could potentially lead to patient harm from either prolonged hypoxemia (Kent BD et al 2011) or hyperoxia (Austin MA et al 2010) in certain patient groups.

This has since been reviewed and hence this guideline is updated in accordance with the latest BTS Guideline for Oxygen use in healthcare settings (O'Driscoll BR et al 2017).

### 2. Aim and Purpose

The aim of this guideline is to ensure that all patients who require supplementary Oxygen receive therapy that is appropriate to their clinical condition and in line with national guidance (O'Driscoll BR et al 2017).

### 3. Abbreviations

BTS	British Thoracic Society
COPD	Chronic Obstructive Pulmonary Disease
FiO <sub>2</sub>	Delivery of fractionated Oxygen to patient (0.21 to 1.00)
HCP	Health Care Professional
NEWS	National Early Warning Score
PaO <sub>2</sub>	Partial pressure of Oxygen, measure by arterial blood gas
SpO <sub>2</sub>	Oxygen saturations as measured by pulse oximeter

### 4. Key Principles:

- Oxygen is administered for the treatment of hypoxia
- Oxygen is a drug and requires prescription
- All patients attending emergency department and/or admitted to an inpatient area should have target Oxygen saturation prescribed
- The Oxygen delivery device and flow administered are changed to keep the patients' SpO<sub>2</sub> within the prescribed target range
- Target Oxygen saturation prescription is integrated into the patient monitoring chart
- In cardiac arrest, critical illness and peri-arrest situations Oxygen should be delivered via an appropriate oxygen delivery system e.g. bag / valve / mask or non-rebreathe mask for self-ventilating patients as per ALS guidelines
- In patients with suspected sepsis, it is acceptable to maintain a target Oxygen saturation of 94-98%, and target Oxygen saturations of 88-92% for patients at risk of hypercapnia.
- Patients admitted to hospital on Derby and Burton acute sites should wear a wrist band stating their Oxygen target saturation

### 5. Oxygen prescribing and clinical indications

Target SpO<sub>2</sub> should be prescribed at the earliest opportunity for all adult inpatients and should be prescribed in anticipation of needing Oxygen, even if Oxygen is not required

at that time. This ensures that the correct NEWS template can be selected for the patient and review escalated appropriately in the event of any deterioration. This is in line with best practice outlined in the 2017 BTS national guidelines (O'Driscoll BR et al 2017).

Lack of prescription should not delay commencing Oxygen therapy but the patient must be reviewed by a doctor or appropriately qualified non-medical prescriber at the earliest opportunity and the required Target SpO<sub>2</sub> prescribed.

Oxygen should be administered to patients to a prescribed target SpO<sub>2</sub>. Acutely unwell patients should achieve Oxygen saturations between 94% and 98%. Those at risk of hypercapnic respiratory failure should receive controlled Oxygen aiming for saturations of 88% - 92%. The goal of Oxygen therapy is to achieve adequate tissue Oxygenation using the lowest possible percentage of Oxygen. Oxygen is therefore increased or decreased according to SpO<sub>2</sub> to aim to achieve the prescribed target SpO<sub>2</sub>.

### **5.1 Target SpO<sub>2</sub> 94% - 98%**

For most acutely ill patients without COPD or other conditions listed below, target SpO<sub>2</sub> should be prescribed at 94-98%.

### **5.2 Target SpO<sub>2</sub> 88% - 92%**

A target SpO<sub>2</sub> 88-92% should be prescribed for patients who are at risk of hypercapnic respiratory failure (pCO<sub>2</sub> > 6.1), e.g.

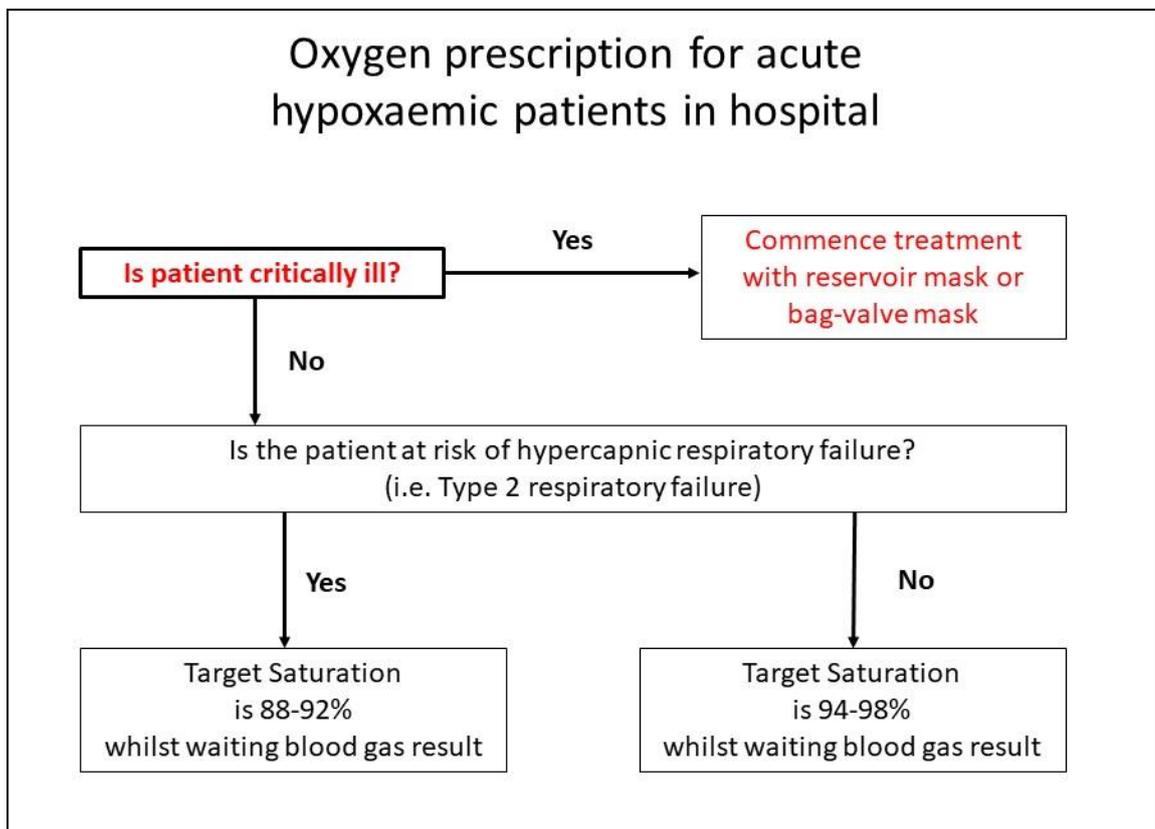
- chronic lung disease e.g. COPD
- chest wall deformity
- morbid obesity due to possibility of hypoventilation syndrome
- neuro-muscular disorders
- Suspected COPD in patients over 50 years old with a long history of smoking and chronic breathlessness on minor exertion such as walking on level ground (O'Driscoll 2017).

- Where acute hypercapnic respiratory failure is evident, attention is directed towards the non-invasive ventilation policy in the trust.

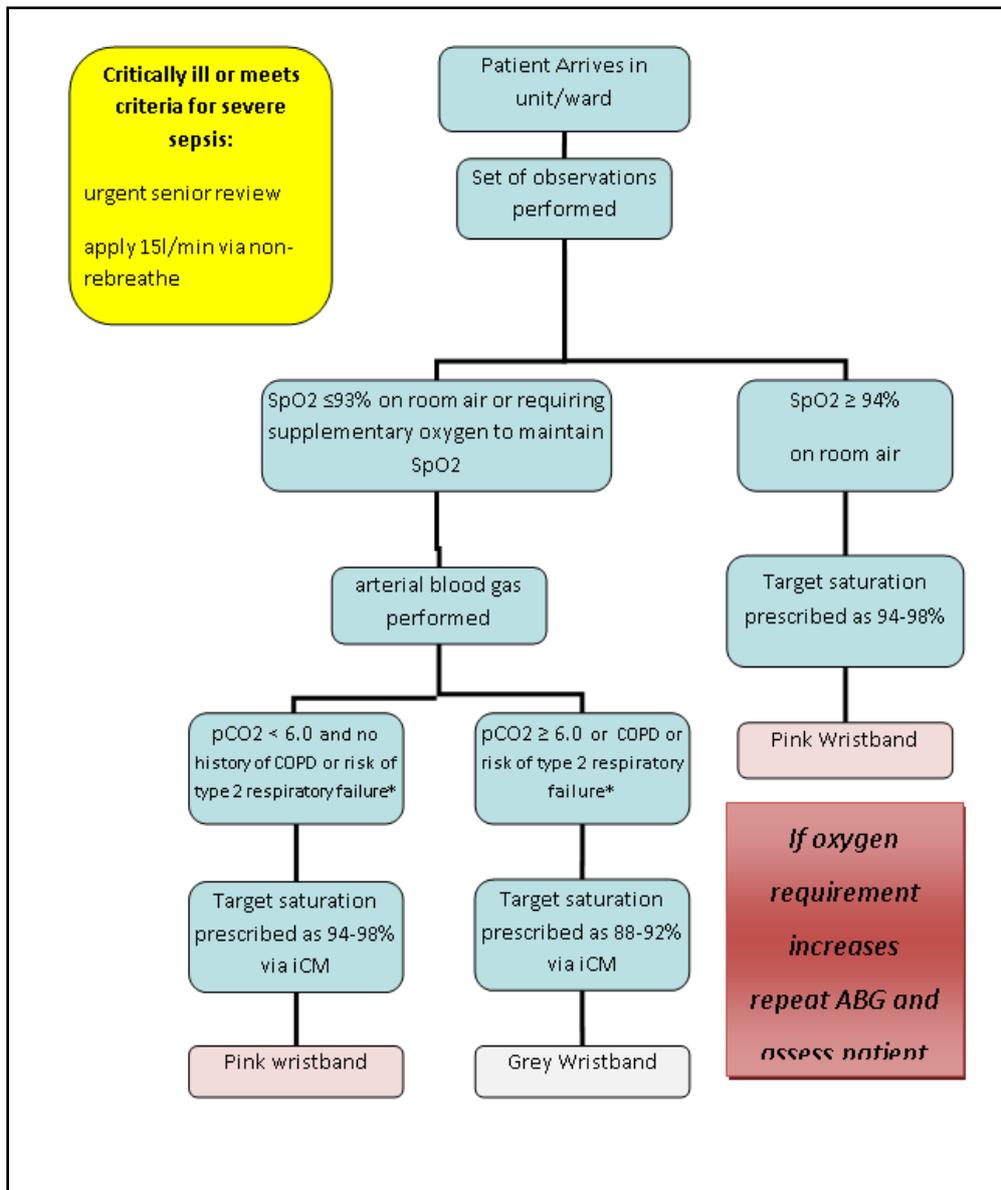
### 5.3 Bespoke Target Oxygen Saturation

The use of bespoke Oxygen saturation ranges can be prescribed by a medical practitioner. Bespoke target saturations can be related to adult patients with Sars COV-2 (COVID) infection. See COVID section in this guideline. Where other bespoke target saturations are required in non-COVID adult inpatients, the decision will be guided by a senior medical practitioner such as a medical consultant or registrar.

### 5.4 Simple algorithm for setting immediate target Oxygen saturations on acute admission to hospital for acutely hypoxaemic patients



## 5.5 Setting target Oxygen saturation and when to use arterial blood gas



\*risk factors for type 2 respiratory failure include COPD, obesity, neuromuscular disease, chest wall deformities including spinal deformity

## 5.6 Special circumstances

### Emergency situations

In an acute emergency situation such as peri-arrest and/or critically ill patients, an Oxygen prescription **is not** required. Oxygen should be delivered to these patients immediately; initially in the form of high concentration Oxygen via an Oxygen reservoir (non-rebreathe mask) or bag/valve/mask manual ventilation circuit, then titrated to

target SpO<sub>2</sub> as appropriate (Resuscitation Council UK 2015). Once the emergency situation has been managed, an Oxygen prescription setting target saturations should be prescribed at the earliest opportunity.

Patients that are diagnosed or suspected to have COPD should have Oxygen titrated to target SpO<sub>2</sub> 88% - 92% with Oxygen supplementation via venturi devices if possible. Arterial blood gas sampling should be performed at the earliest opportunity (Resuscitation Council UK 2015).

### **5.7 How to prescribe target saturations**

Oxygen should be prescribed on the local hospital electronic prescribing system using the target saturation based approach. Once this target Oxygen saturation prescription is in place, then it should be checked and electronically signed for on drug round four times a day. The delivery and flow rate for Oxygen to the patient should be checked by registered nurse at each drug round. An appropriate coloured and sized Oxygen saturation wristband should be applied to the patient.

In areas where an electronic prescribing system is not available, then the prescription of Oxygen should be completed on the appropriate paper prescription chart.

In all cases, it is recommended that the target Oxygen saturation range should be clearly stated in the medical plan in the medical notes.

The prescription also informs the use of the correct NEWS 2 template – this is selected on the electronic observation system and allows the patients saturations to be checked at a frequency appropriate to their NEWS score. Oxygen should be prescribed by means of use of target SpO<sub>2</sub> 94% - 98% or 88% - 92% (or other oxygen saturation range) on the electronic prescribing system.

**NEWS2 Template:**

Physiological parameter	Score						
	3	2	1	0	1	2	3
Respiration rate (per minute)	≤8		9–11	12–20		21–24	≥25
SpO <sub>2</sub> Scale 1 (%)	≤91	92–93	94–95	≥96			
SpO <sub>2</sub> Scale 2 (%)	≤83	84–85	86–87	88–92 ≥93 on air	93–94 on oxygen	95–96 on oxygen	≥97 on oxygen
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)	≤90	91–100	101–110	111–219			≥220
Pulse (per minute)	≤40		41–50	51–90	91–110	111–130	≥131
Consciousness				Alert			CVPU
Temperature (°C)	≤35.0		35.1–36.0	36.1–38.0	38.1–39.0	≥39.1	

Patients who have been prescribed a target saturation between **94% and 98%** should be on **SpO<sub>2</sub> scale 1** on NEWS 2 template.

Patients who have been prescribed a target saturation between **88% and 92%** should be on SpO<sub>2</sub> scale 2 on NEWS 2 template.

Other specified target saturations should be discussed with the senior clinician making the Oxygen prescription as to which scale should apply to the patient.

## **6. Administering and titrating of Oxygen**

### **6.1 Steps to safe delivery of Oxygen**

The Oxygen delivery device and flow administered are changed to keep the SpO<sub>2</sub> within the prescribed target range

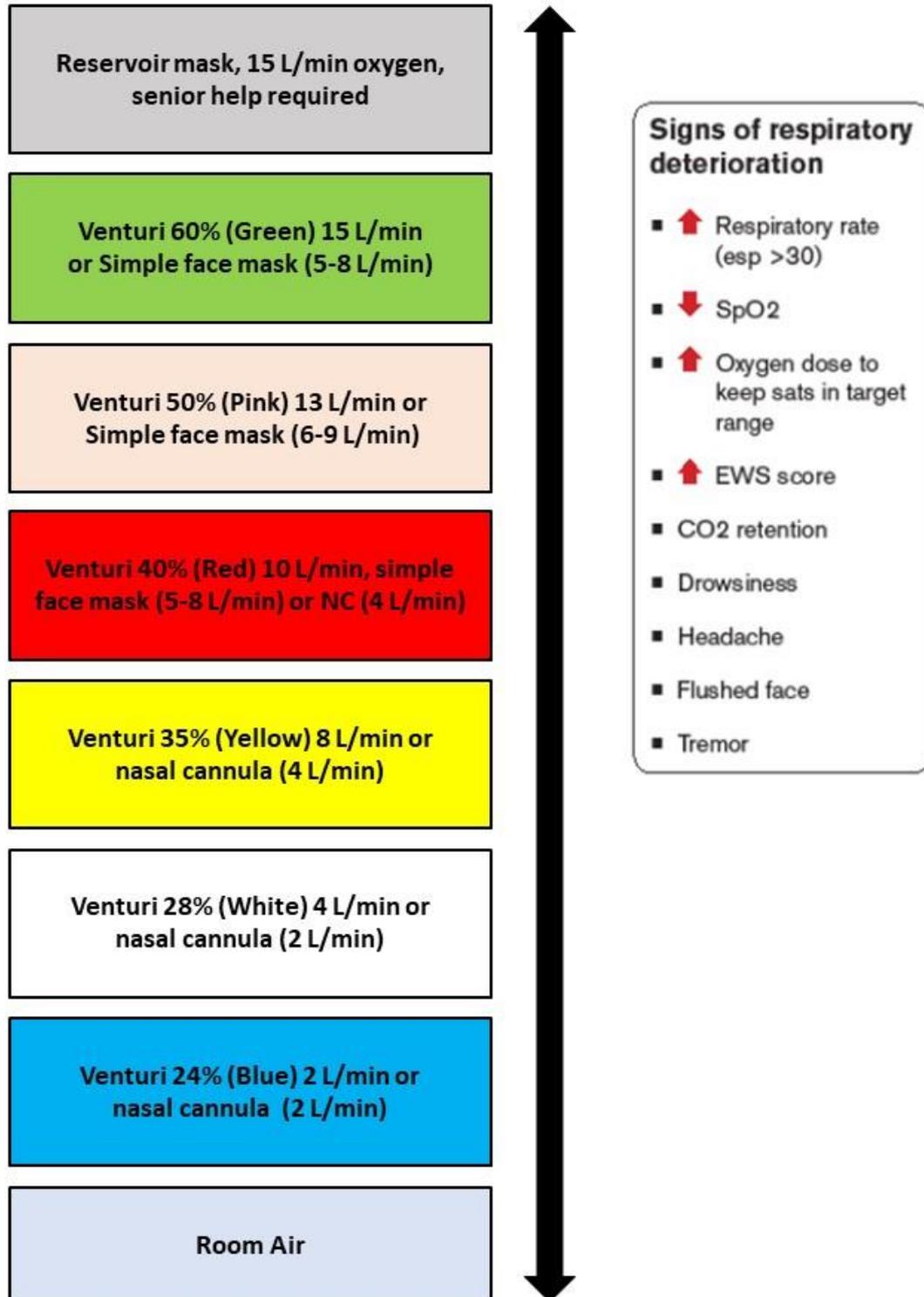
<b>ACTION</b>	<b>RATIONALE</b>
1. Ensure patency of airway	To promote effective Oxygenation
2. Ensure appropriate delivery system used	The type of delivery system used will depend on the needs and comfort of the patient. It is the nurse's role to assess the patient and use the prescribed system. Most stable patients prefer nasal cannula to masks.
3. Ensure Oxygen is prescribed correctly and the record is maintained.	Designated nurses to administer Oxygen. If Oxygen needs to be increased to maintain target saturations, the patients Doctor must be informed.
4. Ensure that the appropriate Oxygen is being given as indicated on the prescription chart.	If nasal cannula or reservoir masks are being used, check the flow rate of oxygen is appropriate for the delivery device being used
5. Inform Patient / carer of the combustibility of Oxygen.	Oxygen supports combustion; therefore there is always a danger of fire when Oxygen is being used.
6. Show & explain the Oxygen delivery system to the patient. Give the patient information sheets about Oxygen therapy	To obtain consent & co-operation
7. Assemble the Oxygen delivery system carefully.	Attach Oxygen delivery system to Oxygen source.

	<p>Attach Oxygen delivery system to patient according to manufacturer's instructions.</p> <p>Turn on Oxygen flow in accordance to deliver device and manufacturer's instructions. Then titrate oxygen according to target SpO<sub>2</sub></p>
<p>8. Ensure patient has either a drink or a mouthwash within reach. Or is provided with regular mouthcare if unable to self-care.</p>	<p>To prevent drying of the oral mucosa unless patient is nil by mouth.</p>
<p>9. Clean Oxygen mask and replace as required as per Hospital infection Control Policy. Discard complete systems after use according to waste disposal guidelines.</p>	<p>To minimise risk of infection.</p>

## 6.2 Titration of Oxygen

## Oxygen Delivery

Titrate oxygen up or down to maintain target oxygen saturation as prescribed.  
Any concerns or signs of respiratory deterioration or increase in oxygen demand ask for medical review, if SpO<sub>2</sub> fall is greater than 4% than this requires urgent clinical evaluation.



## **7. Monitoring Oxygen therapy**

### **7.1 Methods of assessing Oxygen Requirements**

Assessment and monitoring of Oxygen to assess hypoxaemia can be done in the following ways:

- Clinical presence of cyanosis on patient examination. This is often hard to recognise, and is often absent if patient is anaemic.
- Measurement of partial pressure of Oxygen ( $\text{PaO}_2$ ) by performing arterial blood gas. This requires arterial puncture with a needle.
- Measurement of partial pressure of Oxygen ( $\text{PaO}_2$ ) by performing capillary blood gas. Less invasive, can be taken from ear lobe.
- Measuring Oxygen saturations ( $\text{SpO}_2$ ). This can be easily measured by pulse oximeter.

### **7.2 Monitoring of target Oxygen saturation range**

Patients' Target Oxygen saturation prescription is displayed on Patientrack™, the electronic early warning score patient monitoring system. The patient's Oxygen saturation should be recorded on the electronic or bedside observation chart, noting the delivery device and flow/concentration of the Oxygen therapy.

All patients on Oxygen therapy should have regular pulse oximetry measurements, unless the patient is on a palliative pathway where it may not be required.

The frequency of oximetry measurements will depend on the condition being treated and the patients' early warning score. The NEWS 2 template (i.e. Scale 1 or Scale 2) selected on the electronic early warning score tracking system should reflect the target saturation prescription at those sites where this system is in use.

Oxygen therapy should be increased if the measured Oxygen saturation is below the desired target range and decreased if the measured Oxygen saturation is above the

desired target range and eventually discontinued as the patient's clinical condition improves (See above Titration of Oxygen).

Medical review of the patient should be requested if the amount of Oxygen being delivered is increased to keep them within their target range or there are signs of respiratory deterioration (see above).

## 8. Weaning off Oxygen

Oxygen should be reduced when the set target SpO<sub>2</sub> is exceeded. SpO<sub>2</sub> should be monitored for 5-10 minutes after Oxygen is reduced to ensure they do not drop SpO<sub>2</sub> to below target. Oxygen is considered to have been fully weaned when the patient target SpO<sub>2</sub> is maintained on air and other vital signs are not altered after one hour.

If a patient is found to be severely hypercapnic (raised CO<sub>2</sub> on arterial blood gas) it is important not to stop the Oxygen abruptly as this may cause the patient to become acutely hypoxic on withdrawal of Oxygen (Rebound hypoxaemia). A slow, controlled and carefully monitored weaning of Oxygen is recommended in this scenario.

## 9. Special considerations

### 9.1 Air outlets

Air outlets are located adjacent to Oxygen outlets in some clinical areas. These air outlets are easily mistaken for Oxygen in emergency situations and staff working in these areas should be familiar and follow the SOP developed for their use.



**Important: Following root cause analysis of Oxygen related never events, the following action has been taken in regards to Oxygen and air outlets:**

- Air outlets have been capped except in areas within Emergency Department, Intensive Care Units and High Dependency Areas
- Where air is required to drive nebulised therapies. This will be done via dedicated nebuliser machines that will be found in the clinical area or Medical Equipment Library

Examples of capping devices:



## 9.2 Humidification of Oxygen

Humidified Oxygen should be prescribed and administered using the target saturation based approach. Only warm heated humidification systems using sterile water for inhalation should be used.

Indications:

- Tracheostomy
- Retained secretions or at risk of retained secretions
- Patient comfort. Mouth breathers may have drying effects of Oxygen over time
- Requiring high concentrations and flow rates to maintain target saturation SpO<sub>2</sub>
- Any patient anticipated to require Oxygen at >4L/min for more than 12 hours

## Humidification devices

Humidification devices such as MR810 or Aerodyne are indicated in patients that:

- Are anticipated to require Oxygen for a period of greater than 12 hours via face mask
- Are struggling to expectorate secretions
- Are requiring high flow (e.g. via non-rebreathe mask) or % of Oxygen to maintain target SpO<sub>2</sub> and the SpO<sub>2</sub> is maintained at 10L/min

These patients may also require chest physiotherapy and nebulised saline 2-4 hourly.

An example of a humidification device is below.



### High flow humidification devices

Examples of a high flow humidification device include Optiflo or Airvo (Fisher & Paykel).

An example of a high flow humidification device



Patients that may benefit from following referral and assessment by Critical Care Outreach or Respiratory Nurse Specialist:

- Tracheostomy patients

- Patients requiring more than 45% Oxygen
- Patients with thick, tenacious secretions
- Patients that are tachypneic

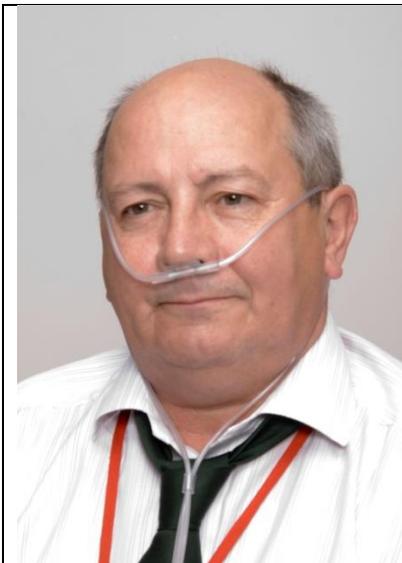
NB: Patients receiving Oxygen via a non-rebreathe mask should have the Oxygen weaned down as soon as stable to within their target SpO<sub>2</sub>.

If at 10L/min via non-rebreathe mask the target SpO<sub>2</sub> is achieved, then a trial on face mask and humidified Oxygen via heated wire circuit (Fisher & Paykel MR810) should commence.

If SPO<sub>2</sub> is not maintained on 40-45% humidified Oxygen, continue with non-rebreathe mask and refer to Critical Care Outreach (CCOT), Clinical Site Practitioner (CSP) or Respiratory Nurse Specialist (RNS) for alternative methods of humidification that can deliver higher Oxygen rates.

## 10. Equipment used in the Delivery of Oxygen

### Nasal Cannula



- Recommended in the Guideline as suitable for most patients with both type I and II respiratory failure.
- Set the flow rate to achieve desired target Oxygen saturations.
- 1-6L/min gives approximate 24-50% FiO<sub>2</sub>.
- FiO<sub>2</sub> depends on Oxygen flow rate and patient's minute volume and inspiratory flow and pattern of breathing.
- Comfortable and easily tolerated.
- Preferred by patient, able to speak and eat without removing.



- Cannula are often preferred to masks by most patients. They have the advantage of not interfering with feeding or talking.
- Ensure Tubing is not too long. This can cause inaccuracies in Oxygen delivery, and result in sore nasal mucosa from pressure or friction from tubing. There is also a risk of falls and ligature risk to patient with excessive length tubing.
- Observe the patients' ears for signs of pressure damage and use cannula that are designed with soft, flexible tubing over the ears or specifically designed ear guards to reduce this risk.
- **It is not advisable to assume what percentage Oxygen (FiO<sub>2</sub>) the patient is receiving.** It is important to detect changes in patients' condition. Flow rate should be documented in litres/minute (L/min).

### Simple Face Mask



- Used for medium Oxygen concentration delivery and has variable performance.
- Used for patients with type I respiratory failure.
- Delivers variable O<sub>2</sub> concentration between 35% & 60%. Not accurate.
- Low cost product.
- **Flow 5-10 L/min.**  
***Flow must be at least 5 L/min to avoid CO<sub>2</sub> build up and resistance to breathing***

### Fixed Performance Mask (Venturi mask and valve)



- The most accurate method of giving Oxygen therapy.
- Aim to deliver constant Oxygen concentration within and between breaths.
- 24-40% Venturi Masks operate accurately  
A 60% Venturi mask gives ~50% FiO<sub>2</sub>.
- This is a high performance Oxygen mask designed to deliver a specified Oxygen concentration.
- Venturi devices come in different colours which delivery different Oxygen concentrations:

Blue = 24%

White = 28%

Yellow = 35%

Red = 40%

Pink = 50%

Green = 60%

### Reservoir Face-Mask (non-rebreathe mask)



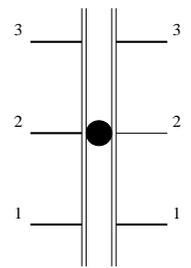
- In non-re-breathing systems, the Oxygen may be stored in the reservoir bag during exhalation by means of a one-way valve. High concentrations of Oxygen 80-90% can be achieved.
- **NOT to be used for CO<sub>2</sub> retaining patients except in life-threatening emergencies such as cardiac arrest or major trauma.**
- Inadequate flow rates may result in administration of inadequate Oxygen concentration to the patient.

### Tracheostomy mask



- This is a variable performance device for patients with tracheostomy or tracheotomy.
- This should be used with heated wire humidification circuit to avoid drying of the remaining tracheal and bronchial mucosa.
- The Oxygen concentration delivered will be influenced by the Oxygen flow rate (litres per minute) used and the patient's tidal volume and breathing rate.
- Use cautiously at low flow rates in CO<sub>2</sub> retaining patients as there may be no alternative.

## Oxygen Flow Meter

	<ul style="list-style-type: none"> <li>• May be wall-mounted or on a cylinder.</li> <li>• Purpose is to ensure that the patient receives the correct amount of Oxygen.</li> <li>• e.g. Correct setting for 2 l/min.</li> </ul>  <ul style="list-style-type: none"> <li>• <b>Caution: air outlets may be mistaken for Oxygen outlets.</b></li> </ul>
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## Nebulised Therapy and Oxygen

Patients should have nebulisers driven by a compressed air nebulised machine whilst supplemental Oxygen is continued via nasal cannula to maintain the target Oxygen saturation.

However patients requiring 35% or greater Oxygen therapy may have their nebulised therapy driven by Oxygen at a flow rate of greater than 6 litres/minute to maintain target SpO<sub>2</sub>.

Patients being treated for exacerbation of asthma may have nebulised drugs driven by Oxygen.

## Oxygen Saturation wristbands

	<ul style="list-style-type: none"> <li>• Oxygen saturation wristbands are used for bedside identification of a patients target saturation by staff, carers and patients.</li> <li>• They improve titration of Oxygen.</li> <li>• Patients at risk of hypercapnic respiratory failure are encouraged to continue to wear after discharge.</li> <li>• Pink Wristband SpO<sub>2</sub> range 94-98%, Grey Wristband SpO<sub>2</sub> range 88-92%, Purple wristband are for COVID Adult non-hypercapnic SpO<sub>2</sub> range 92-94% OR other bespoke target saturation range.</li> </ul>
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## Titration of Oxygen using Nasal Cannula, Venturi Masks and Reservoir Masks

### – Comparison table

Venturi 24% (blue) 2 l/min	Or Nasal cannulae 1L
Venturi 28% (White) 4 l/min	Or Nasal cannulae 2L
Venturi 35% (Yellow) 8 l/min	Or Nasal cannulae 4L
Venturi 40% (Red) 10 l/min	Nasal cannulae / simple face mask 5-6 L/min
Venturi 50% (Pink) 13 l/min	Simple face mask 6-8 L/min
Venturi 60% (Green) 15 l/min	Simple face mask 7-10 L/min
<p><b>Reservoir mask at 15L oxygen flow</b>  <b>– Seek medical Advice</b></p> <p><b>If reservoir mask required</b>  <b>seek senior medical input immediately</b></p>	

## **11. Specialist Areas and Exclusions from Guideline**

Critical care patients must have Oxygen prescribed on the critical care drug chart according to their condition by critical care medical team.

Patients transferring from Critical Care to the wards must have a prescription for their Oxygen therapy utilising the target saturation scheme.

On attendance to the Outpatient Department, patients on home Oxygen should be transferred onto the same flow rate and device they are already receiving.

This guideline excludes the prescribing and management of long term Oxygen therapy in adults.

This guideline excludes the management of Oxygen in patients under the age of 16 years.

## **12. Transfer and escort of patients receiving Oxygen**

Patients who are transferred from one area to another must have clear documentation of their ongoing Oxygen requirements and documentation of their Oxygen saturation.

During patient transfer, Oxygen must be continued via an appropriate portable device connected and disconnected by a registered health care professional responsible for that patient.

Patients receiving 3 litres/minute or more Oxygen (or equivalent) requiring transfer from one clinical area to another must be accompanied by a registered nurse. In cases where transfer or escort is by an unregistered member of staff the registered health care professional takes responsibility for ensuring Oxygen is continued appropriately.

In all cases the following good practice points should be followed

- A full set of early warning score observation should be done within 15 minutes of transfer requirement
- The portable oxygen cylinder should be checked to ensure there is adequate supply of oxygen for the entirety of journey (there and back)
- The staff member accompanying patient must have the competency of connecting and disconnecting oxygen from cylinder to wall supply if required
- Any sick or deteriorating patient must be escorted by a registered nurse as a minimum, irrespective of the flow rate required and with the correct monitoring equipment

An escort is required when a patient is transferred from the Emergency Department for an investigation or transfer to a ward. It is essential that adequate Oxygen is available to meet the patient's individual requirements throughout the transfer period. Where an inter-ward transfer occurs, pre-existing humidification devices may be transferred with the patient, ensuring they are appropriately labelled with circuit expiry dates. The registered nurse is accountable if delegating the transfer to an unregistered colleague; however the unregistered member of staff has a responsibility to only undertake the task if they are competent to do so.

Please refer to trust's Observations and Escalation for Adult Inpatients – Full Clinical Guideline for more information.

### **13. Infection control and skin care**

All Oxygen delivery disposables are single patient use and are labelled as such by the manufacturer.

Humidification equipment must be decontaminated between each patient with Trust approved medical equipment disinfection wipes.

Nebuliser disposables should be washed under running water and air dried between each use and kept at the patient's bedside in a clean and dry container.

At all times healthcare staff should comply with the Trust's Infection Control Policy (2010).

Attention must be paid to pressure areas to the ears and face where masks and straps contact the skin and these areas checked and documented upon at regular intervals.

### **14. COVID Guidelines for Oxygen**

Please refer to trust Respiratory Guidelines for management of COVID pneumonia.

This is a summary of main practice points for Oxygen guidelines for patients admitted to hospital with SARS Cov-2 (COVID) **pneumonia**. All inpatients with suspected or confirmed Sars Cov-2 (COVID) infection should be managed in a RED clinical area. Oxygen masks and tubing used by a patient with confirmed or suspected COVID infection should be used by the designated patient only and be discarded after use.

Only patients with **suspected or confirmed COVID pneumonia** should have alteration of Oxygen SpO<sub>2</sub> target saturations on prescription.

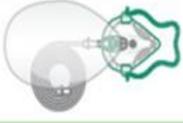
- Prescribe Oxygen to the following new target saturation ranges on electronic or paper charts for COVID pneumonia patients
  - **92-94%** in **MOST** adult inpatients or
  - **88-92%** in those at risk of CO<sub>2</sub> retention
- Titrate Oxygen to keep patients within the target range and attempt to wean down oxygen at each observation round
- If Oxygen saturation levels are 92% or greater on air, supplementary Oxygen is **NOT** required
- Use a purple wrist band for patients prescribed 92-94%
- Use Temporary Modified Patientrack Early Warning Score if patient Oxygen Saturation falls between 92-94% (See Figure 14.1)

**14.1 Figure below showing modified Early Warning Score on Patientrack and conversion of Venturi Mask to Simple Face mask.**

# COVID - 19

## COVID ADULT RED AREAS

**Non-rebreathe mask**  
(10-15L/min)



**Facemask**  
(4-10L/min)



**Nasal cannula**  
(0.5-6L/min)  
(patient can wear surgical facemask in addition to improve infection control)



Oxygen Flow Rate and FiO<sub>2</sub> Table

Device	Flow Rate (L/min)	%O <sub>2</sub> Delivered
Nasal Cannula	1	24
	2	28
	3	32
	4	36
	5	40
	6	44

Avoid venturi devices if possible  
(these require high O<sub>2</sub> flow rates  
so waste more oxygen)

### NEWS Target SpO<sub>2</sub> 92-94% (temporary regime) scoring

News	3	2	1	0	1	2
Oxygen saturations	<88	88-89	90-91	92-96	97 (on O <sub>2</sub> )	≥ 98 (on O <sub>2</sub> )

## 15. References

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Kent BD, Mitchell PD, McNicholas WT. Hypoxemia in patients with COPD: cause, effects, and disease progression. *Int J Chron Obstruct Pulmon Dis*. 2011;6:199-208.

O'Driscoll BR. British Thoracic Society Emergency Oxygen Audit Report 2015 [Available from: <https://www.brit-thoracic.org.uk/document-library/audit-and-quality-improvement/audit-reports/bts-emergency-Oxygen-audit-report-2015/>].

O'Driscoll BR, Howard LS, Earis J, Mak V, British Thoracic Society Emergency Oxygen Guideline G, Group BTSEOGD. BTS guideline for Oxygen use in adults in healthcare and emergency settings. *Thorax*. 2017;72(Suppl 1):ii1-ii90.

Other Trust policies that relate to this guideline:

- [Medical Devices - Management - Trust Policy and Procedure](#)
- [Medical Devices Competency and Training Requirements Connected with - Trust Policy and Procedure](#)
- [Medical Gases Policy 2018 UHDB-NHSFT Combined Derby-Burton Policy](#)
- [Medicines Management \(Medicines Codes\) - Trust Policy and Procedure](#)
- [Guideline on use of oxygen in adult inpatients during the COVID19 pandemic \(opac-retrieve-file.pl \(koha-ptfs.co.uk\)\)](#)
- [Observations and Escalation for Adult Inpatients – Full Clinical Guideline \(opac-retrieve-file.pl \(koha-ptfs.co.uk\)\)](#)

## **16. Documentation Controls**

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Consultation with:	Oxygen Safety Group
Approved By:	<i>Oxygen Safety Group – 12 August 2021</i> Surgery Division – Feb 2022
Review Date:	June 2024

Key Contact:	Joanna Wright
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## **17. Appendices**

### **Appendix A**

#### **Pulse Oximetry**

- Pulse oximetry is best used on warm well perfused fingers
- Remove nail varnish from the finger nail before attaching probe
- Position probe securely, but not too tightly. Ensuring light diodes shine on nail bed
- Usually the probe fits with wire uppermost on finger
- The Oxygen saturations must always be interpreted in context of patient's clinical state and prescribed saturation targets
- Shivering or tremor will interrupt the light flow, and may give inaccurate readings
- Cardiac arrhythmias such as Atrial Fibrillation will affect pulse flow and may give inaccurate readings, an arterial blood gas should be considered
- If the patient is peripherally shut down (eg: acute illness) an accurate reading may be difficult to obtain, an arterial blood gas should be considered
- Strong lighting may interrupt the light signal in the probe
- Pulse Oximetry does not measure carbon dioxide levels
- Pulse Oximetry is not reliable in carbon monoxide poisoning