Worcestershire Acute Hospitals NHS Trust

GUIDELINE FOR THE PRESCRIBING, MONITORING AND ADMINISTRATION OF OXYGEN IN ADULTS

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

Introduction

The guideline covers prescribing; monitoring and administration of oxygen for all adult inpatients cared for in general ward areas (refer to page 5 for exclusions).

This guideline is for use by the following staff groups :

All qualified health care professionals involved with the prescribing, monitoring and administration of oxygen for adult inpatients cared for in general ward areas (refer to page 5 for exclusions). Training will be provided via ESR and supported by the local respiratory team if needed.

Lead Clinician(s)

Jane newport	Respiratory Lead Practitioner
Clare Hooper	Respiratory Clinical Lead
Approved by Medicines Safety Committee on:	12th July 2023
Approved by Clinical Governance Group on:	6th July 2021
Review Date: This is the most current document and is to be used until a revised version is available:	12th July 2026

Key amendments to this guideline

Date	Amendment	Approved by:
June 04	Guideline approved by Clinical Effective Committee	
November 09	Guideline reviewed by Clinical leads with major amendments made – change of document name	Medicines Safety Committee
6th March 2013	Guideline extended to enable Sarah Austin to review and acquire approval	Sarah Austin
12th June 2013	Reviewed. National Guidelines unchanged.	Sarah Austin
14th January 2014	Major review. National Guidelines unchanged, but local audit identified significant problems with oxygen administration: • Policy reduced in size to encourage people to read it. • Hyperlinks to source document used to reduce size of appendices • Local problems with oxygen/air administration specifically identified and addressed • Examples of how to prescribe oxygen included	Medicines Safety Committee
31st March 2016	Document extended for 12 months as per TMC paper approved on 22nd July 2015	TMC
31st July 2018	Comprehensive review of document based on latest BTS guideline. Addition of section on assessment of oxygen for discharge. Addition of NEWS 2 as the patient assessment and monitoring tool Up-date on fire safety Up-date on oxygen "house keeping" including carriage and storage of cylinders New guidelines on use of Air Ports to avoid accidental delivery of air instead of oxygen	Respiratory Committee Medical Gas Committee
2nd September 2019	Final version V4.2 with above changes	Medicines Safety Committee
9th October 2019	Presented at CCG – surgical view that the policy is unachievable – to go back to respiratory department for changes Further comments from other departments to go to Sarah Austin	Central Governance Group
13th November 2019	Agreement that surgical section can be added under advice from anaesthetics	Respiratory Directorate Meeting
26th November 2019	Agreement that there is no requirement for routine ABG when oxygen used during patients' stay in theatre. No comment regarding oxygen management on surgical ward	Discussion Dr E Mitchell
29th April 2021	New Trustwide oxygen training package via ESR- covering relevant NPSA and local actions from Sis. Addition of need for driving gas prescription for nebulisers	Jane Newport
28th June 2021	Changes to Nebuliser and air section 10b and section 13 and need to use compressor box rather than air dials due to NPSA.	Mike Hallissey
6th July 2021	Document approved for three years	Clinical Governance Group

8th March 2023	Changes to policy following incident with oxygen in bathroom on ward areas- new sections added Addition of section regarding patients on established home oxygen and use of cylinders in wards. Changes to Palliative oxygen prescription Changes to respiratory HCA and PTA oxygen handling, additional competencies	Jane Newport/ Claire Hooper
12th July 2023	Approved at MSC- amendment to be made when Discretionary Medicine Policy as will replace the Emergency Oxygen PGD.	Medicines Safety Committee

GUIDELINE FOR THE PRESCRIBING, MONITORING AND ADMINISTRATION OF OXYGEN IN ADULTS

Introduction

The administration of supplemental oxygen is an essential element of clinical 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 Healthcare Professional's role.

Contents

Supporting Documents

Supporting Document 1 Equality Impact Assessment
Supporting Document 2 Financial Risk Assessment

1) Aim

Oxygen therapy is given to prevent cellular hypoxia, caused by hypoxaemia (low P_aO_2), and thus prevention of potentially irreversible damage to vital organs.

The aim of oxygen therapy is to maintain a patient's oxygen saturations at a normal or near normal level, with the exception of those who have the potential to develop hypercapnic (type 2) respiratory failure or those receiving terminal palliative care, (BTS, 2017).

Oxygen should be prescribed according to a target saturation range. This system aims to achieve a specified outcome, rather than specifying the oxygen delivery method alone.

Those who administer oxygen therapy must monitor the patient and keep within the target saturation range.

Oxygen therapy does not treat the cause of hypoxia. The underlying cause must be investigated and treated.

2) Normal Oxygen Saturations

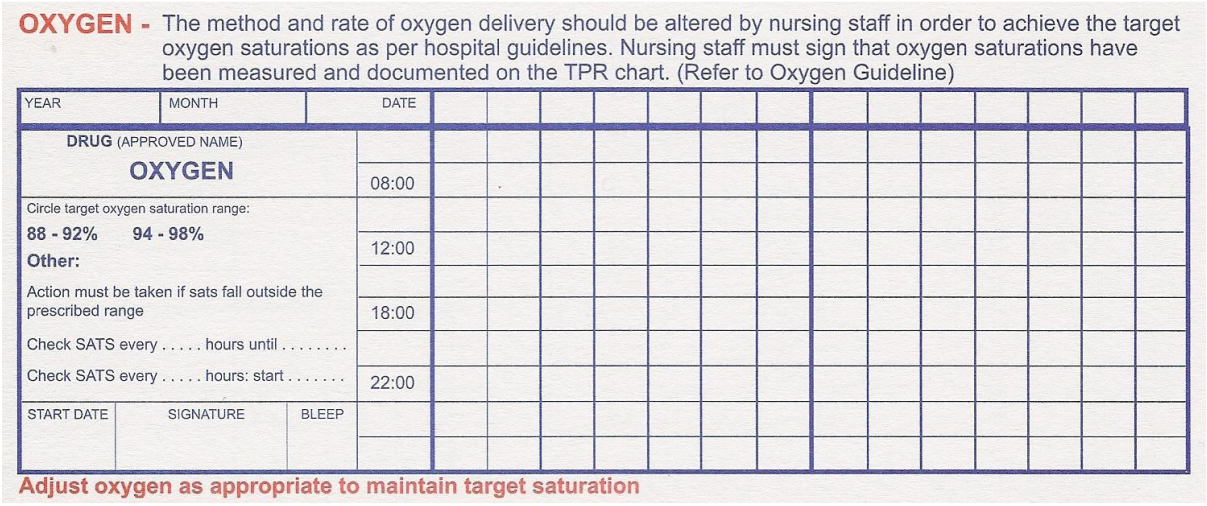
In adults less than 70 years of age at rest at sea level 96% - 98% when awake.
Aged 70 and above at rest at sea level greater than 94% when awake.
Patients of all ages may have transient dips in saturation during sleep.

3) Prescribing Oxygen

The national recommendations for the administration of oxygen in the hospital setting were published in a key document, "BTS Guideline for Oxygen Use in Adults in Healthcare and Emergency Settings", published by the British Thoracic Society in 2017. This was a collaborative document and had input from the colleges representing a range of medical specialties, nursing, ambulance services and the resuscitation council. This document can be accessed here *. The driving principle of the document is that oxygen is a drug and it must therefore be prescribed.

It is recommended that, for the majority of patients, oxygen should be prescribed to maintain their peripheral oxygen saturations within a specific range. Guidance on identifying appropriate oxygen saturations (S_pO_2) for patients is provided for the medical staff and other prescribers is provided in detail in the national guidelines (page i3 of this document)

An oxygen section on the Trust's drug chart has been designed to assist prescription and administration.



OXYGEN - The method and rate of oxygen delivery should be altered by nursing staff in order to achieve the target oxygen saturations as per hospital guidelines. Nursing staff must sign that oxygen saturations have been measured and documented on the TPR chart. (Refer to Oxygen Guideline)

YEAR | MONTH | DATE

DRUG (APPROVED NAME)

OXYGEN

08:00

Circle target oxygen saturation range:

88 - 92% **94 - 98%**

Other:

12:00

Action must be taken if sats fall outside the prescribed range

18:00

Check SATS every . . . . . hours until . . . . . .

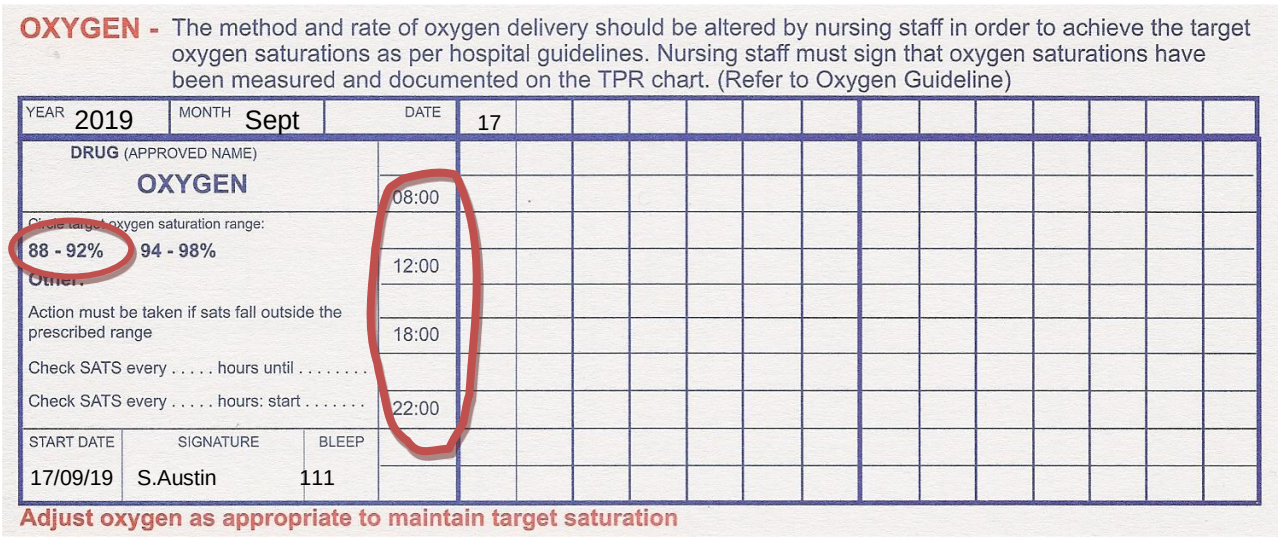
Check SATS every . . . . . hours: start . . . . . .

22:00

START DATE | SIGNATURE | BLEEP

Adjust oxygen as appropriate to maintain target saturation

For most acutely unwell patients oxygen should be prescribed to achieve a target saturation of 94-98% or, for those at risk of Type 2 Respiratory Failure (where the patient either currently or previously retains carbon dioxide) at 88-92%. To meet locally identified safety needs, patients who are over 65, who have COPD (evidenced by the use of inhalers) and are not hypercapnoeic, should have saturations maintained ≤ 94% (only relevant if they require supplementary oxygen). Blood gas analysis is required to evaluate degree and type of respiratory failure. The decision regarding the clinically appropriate target saturation range will be used to identify which patient assessment and monitoring pathway will be used on the NEWS 2 chart.



OXYGEN - The method and rate of oxygen delivery should be altered by nursing staff in order to achieve the target oxygen saturations as per hospital guidelines. Nursing staff must sign that oxygen saturations have been measured and documented on the TPR chart. (Refer to Oxygen Guideline)

YEAR 2019 | MONTH Sept | DATE 17

DRUG (APPROVED NAME)

OXYGEN

08:00

Circle target oxygen saturation range:

88 - 92% **94 - 98%**

Other:

12:00

Action must be taken if sats fall outside the prescribed range

18:00

Check SATS every . . . . . hours until . . . . . .

Check SATS every . . . . . hours: start . . . . . .

22:00

START DATE | SIGNATURE | BLEEP

17/09/19 | S.Austin | 111

Adjust oxygen as appropriate to maintain target saturation

There is space for a free hand oxygen prescription, if this is clinically appropriate for the patient, e.g. post operatively where oxygen is required at a specific dose for a specific amount of time.

OXYGEN - The method and rate of oxygen delivery should be altered by nursing staff in order to achieve the target oxygen saturations as per hospital guidelines. Nursing staff must sign that oxygen saturations have been measured and documented on the TPR chart. (Refer to Oxygen Guideline)

YEAR 2019	MONTH Sept	DATE 17

DRUG (APPROVED NAME)
OXYGEN

Circle target oxygen saturation range:
88 - 92% **94 - 98%**
Other: 2 l/min N/specs for 24 hours post op
Action must be taken if sats fall outside the prescribed range
Check SATS every . . . . . hours until . . . . . .
Check SATS every . . . . . hours: start . . . . . .

08:00	12:00 14.30	18:00	22:00

START DATE	SIGNATURE	BLEEP
17/09/19	S Austin	111

Adjust oxygen as appropriate to maintain target saturation

4) Administering Oxygen

Unless it is an emergency situation, oxygen must be administered by qualified and appropriately trained health care staff, i.e. doctor, RN, RM, RSCN or physiotherapist in accordance with the Trust's Medicines Policy

ACTION	RATIONALE
Ensure oxygen is prescribed on prescription chart.	Oxygen should be regarded as a drug and should be prescribed. BTS National guidelines (2017). British National Formulary (2008).
Ensure patency of airway	To promote effective oxygenation
Assess the patient and use the most appropriate oxygen delivery system, (see appendix 1).	The type of delivery system used will depend on the needs and comfort the patient.
Show and explain the oxygen delivery system to the patient.	To obtain consent and cooperation
Inform patient and or relative/ carer of the combustibility of oxygen	Oxygen supports combustion and the fire risk must be minimised
Assemble the oxygen delivery system and connect to the oxygen supply.	To ensure oxygen is given correctly
Attach oxygen delivery system to patient in accordance with manufacturer's instructions.	For oxygen to be administered to patient.
Turn on oxygen flow in accordance with the prescription and manufacturers instruction.	To administer correct dose of oxygen.
The delivery device may be changed in stable patients according to patient preference or comfort	Medical review is not needed when changing delivery device, where the patient's oxygen saturations stay in the prescribed range.
Label all equipment with the patient's name. Masks should be washed daily and replaced when visibly soiled. Nasal specs should be changed every three days (daily for those with MRSA) or when visibly soiled.	Equipment is for single patient use. To minimise risk of infection.
Ensure patient has either a drink or a mouthwash within reach.	To prevent drying of the oral mucosa.

5) Monitoring Oxygen

ACTION	RATIONALE
All patients should have their oxygen saturation observed for at least five minutes after starting oxygen therapy.	To identify if oxygen therapy is maintaining the target saturation or if an increase or decrease in oxygen therapy is required
Thereafter, the frequency of patient monitoring will depend on the condition being treated, their NEWS 2 score and the stability of the patient. For patients on oxygen S_pO_2 measurements should be done a minimum of four times a day. This should occur alongside a wider assessment of the patient including breathing rate, heart rate, ease of breathing, cyanosis and NEWS 2 Blood gas analysis should be repeated an hour after commencing oxygen therapy to re-evaluate their pH and carbon dioxide levels	To monitor changes in the patient's condition and maintain their safety. Patients requiring supplementary oxygen have a form of respiratory failure and should be monitored regularly. S_pO_2 cannot be used as a "stand alone" assessment of respiratory function. Oxygen saturations do not provide information on these parameters.
Critically ill patients should have their oxygen saturations monitored continuously.	Ensure patient safety in the critically ill patient.
The oxygen dose should be recorded alongside the oxygen saturation on the bedside observation chart.	S_pO_2 recording cannot be interpreted unless the patient's oxygen dose is known To allow trends in oxygen therapy and saturation levels to be identified.
If the patient falls outside of the target saturation range, oxygen therapy must be adjusted accordingly. The saturation should be monitored continuously for at least 5 minutes after any increase or decrease in oxygen dose to ensure that the patient achieves the desired target.	To maintain the saturation in the desired range
At each "medicines round" the qualified nurse must check the patient's oxygen saturations to ensure they are within the prescribed range and then sign the medicines chart accordingly	To ensure a formal clinical record is maintained.
As the patient's clinical condition improves their need for supplementary oxygen will decrease and the dose should be reduced accordingly.	The patient should be weaned off oxygen, as their condition allows.
Where the patient's clinical condition improves, but they continue to need supplementary oxygen due to low saturation levels, the patient should be referred to the Respiratory Nursing Team for consideration of home oxygen (Appendix 3)	Some patients have chronic hypoxaemia, which needs to be treated at home.

6) Oxygen Saturation levels above target range specified.

ACTION	RATIONALE
Unless specifically prescribed otherwise, the oxygen dose must be reduced.	To maintain the saturation in the desired range. SpO2 > 98% at rest is above the normal physiological range
Monitor the patient's response to the dose change by re-checking the SpO2	To ensure the dose change was appropriate
For most patients, once they have been stabilised following any acute episode, weaning oxygen towards the lower end of the prescribed oxygen saturation range should form a normal part of the oxygen weaning process	The majority of patients should have an improving oxygen saturation as part of their recovery

7) Oxygen Saturation levels below target range specified

ACTION	RATIONALE
Check all elements of oxygen delivery system for faults or errors.	Equipment faults should be excluded.
Increase the oxygen dose	To keep the saturation in the desired range
Any sudden fall in oxygen saturation should lead to urgent clinical evaluation of the patient (including NEWS 2 score) with actions taken in accordance with the Policy on the recognition and management of the deteriorating patient	Falling oxygen saturations are one of the indicators of patient deterioration. Where a patient requires an increase in their oxygen, the cause of their increasing oxygen need must be formally assessed.
Monitor the patient's response to the dose change by re-checking the SpO2	To ensure the dose change was appropriate
In people who are at risk of carbon dioxide retention, repeat arterial or capillary blood gas analysis half to one hour after the dose oxygen change.	To assess the patients response to oxygen increase, and ensure that PaCO2 has not risen to an unacceptable level, or pH dropped to an unacceptable level Arterial blood gas sampling is painful and should only be done when the results will affect clinical decision making.

8) Exclusions and Exceptions

a) Emergency situations

In emergency situations an oxygen prescription is not required:

All patients who have had a cardiac or respiratory arrest should have the maximum possible oxygen dose provided along with basic/advanced life support.

All peri-arrest and critically ill patients should be given oxygen at 15 l/m via a reservoir mask (delivering approximately 80% oxygen) whilst awaiting immediate medical review.
Once the patient is spontaneously breathing with a spontaneous circulation and a reliable saturation reading, the oxygen dose should be adjusted according to the target saturations for the patient. Patients with COPD and other risk factors for hypercapnia who develop critical illness should have the same initial target saturations as other critically ill patients pending the results of urgent blood gas analysis. These patients may need controlled oxygen therapy or supported ventilation if there is severe hypoxaemia and/or hypercapnia with respiratory acidosis

Any qualified nurse/ health professional can commence oxygen therapy in an emergency situation. Qualified nurses should follow the relevant Patient Group Direction and refer to Policy on the recognition and management of the deteriorating patient

A subsequent written record must be made of what oxygen therapy has been given to every patient alongside the recording of all other emergency treatment.

b) Specialist Areas

This policy is for use in all wards and departments treating adult in-patients, with the exception of patients who require invasive ventilation, e.g. in Intensive or Critical Care, or in theatres.

Where the medical team in charge of the patient feel that the principles of this policy do not apply, the clinical reason for the deviation must be clearly documented in the patient's notes.

c) End of life care

For patients receiving end of life care, oxygen is only usually indicated for patients whose saturation levels run below 90% on air, or for those whose breathlessness is not managed by fan therapy, anxiolytics or opiate medication. Saturation monitoring is rarely appropriate for patients receiving oxygen as part of their end of life management (in which case, the prescriber documents 'target saturations not indicated' on the drug chart and inpatient case notes).

d) Specific clinical situations

Carbon monoxide poisoning: this affects pulse oximetry readings, rendering them inaccurate. Oxygen should be given on the basis of capillary or arterial blood gas analysis. The oxygen device and flow rate must be prescribed on the drugs chart.

Pneumothorax: oxygen may increase the rate of resolution of pneumothorax in patients for whom a chest drain is not indicated. The oxygen device and flow rate must be prescribed on the drugs chart.

9) Contra-Indications

There are no absolute contraindications to oxygen therapy if indications are judged to be present. Supplemental oxygen should be administered with caution in patients suffering from paraquat poisoning, and with acid inhalation or previous bleomycin lung injury. The goal of oxygen therapy

here is to achieve adequate tissue oxygenation using the lowest possible F_iO_2.
The lower oxygen saturation target range (88% - 92%) should be used for these patients.

10) Cautions

a) Fire hazard

Oxygen is part of the "fire triangle". Oxygen equipment must not be allowed to come into contact with flames or sparks and all connections must be clean and free of any grease or oil. Do not hand cream and ensure that alcohol hand gel has fully evaporated prior to adjusting oxygen cylinders or oxygen flow meters.

Oxygen interacts with oil and can cause chemical burns if creams and ointments are used in the nose or on the face. Do not use Vaseline or other high oil based products for patients using oxygen. Where creams are clinically required for patients, liaise with pharmacy regarding the treatment option with the lowest possible oil content. Remember that shampoo, hair conditioner and make up can contain oil.

Oxygen cylinders and flow meters must be switched off when not in use.

Be aware that leaving oxygen masks or nasal specs with active oxygen flow going through them in contact with beds or chairs rather than with a patient, increases the flammability of the furniture.

Oxygen cylinders in wards and departments must be stored in Trust approved mobile oxygen storage cages, which can be wheeled to a place of safety (i.e. behind a fire door or ideally out of the ward) in case of fire.

In the case of confirmed fire on the ward, the nurse in charge must assess whether or not the flames are affecting a bed head. If they are then the departmental oxygen supply must be shut off immediately by ward staff. The departmental oxygen control valve is usually sited at the ward entrance and is a glass fronted white box. Break the glass and turn the valve to shut off the oxygen. Staff should then evacuate all occupants of the ward to safety, re-establishing portable oxygen supplies to patients at the earliest opportunity dictated by their clinical need.

The Trust's Advanced Life Support policy is designed to minimise the risk of fire during emergency procedures, and staff are up-dated on this at their yearly mandatory training.

Patients who are having supplementary oxygen and who chose to leave the ward areas to go outside to smoke a cigarette must not use oxygen while they smoke as it infuses their clothes making them highly flammable.

b) Accidental delivery of air instead of oxygen

Some ward areas have piped air available as well as piped oxygen.

Air dials and flow meters must not be used on wards. Compressor boxes should be used if air is needed to drive nebulisers.

All air terminal units must have a blanking plate insitu.

c) Oxygen administration and carbon dioxide retention

In patients with chronic carbon dioxide retention, incorrect oxygen administration has the potential to cause further increases in carbon dioxide and respiratory acidosis, (type 2 respiratory failure). This may occur in patients with COPD, neuromuscular disorders, morbid obesity or musculoskeletal disorders.

For patients who have current or previously documented Type 2 Respiratory Failure (T2RF), oxygen should be prescribed in the lower saturation rate (88 – 92%). Patients without current or previous CO2 retention, but who are at risk of Type 2 Respiratory Failure (T2RF) should have blood gas analysis to check their carbon dioxide levels and pH prior to starting oxygen therapy at the standard prescription (94 – 98%). They must have blood gas analysis repeated an hour after starting treatment. Where T2RF is confirmed, oxygen should be re-prescribed in the lower saturation range.

d) Contaminated oxygen cylinders

As with all other hospital equipment, oxygen cylinders and oxygen flow meters need to be kept clean in accordance with the Trust's Cleaning Responsibility Framework (section 5a).

If an oxygen cylinder becomes contaminated with body fluids, please contact Energie, who will provide the appropriate bag to isolate the cylinder, prior to its return to BOC for cleaning.

11) Transfer and Transportation Of Patients Receiving Oxygen

Where oxygen cylinders are required for patient transfer between wards and departments, the cylinder must be carried in a Trust approved cage, attached to the wheel chair or bed.

Patients requiring oxygen while being transferred from one area to another must have clear documentation of their oxygen dose and documentation of their oxygen saturation. This information should be included on the "White Boards" where these are being used for patient hand over.

Patients requiring oxygen therapy whilst being transferred from one area to another should be accompanied by a trained member of the nursing staff wherever possible. If this does not occur, clear instructions must be provided for personnel involved in the transfer of the patient, which must include delivery device and flow rate.

Connecting and Reconnecting Oxygen

a. Physio assistants and Respiratory ward HCA's following enhanced training and competencies can change oxygen from wall to cylinder and back to wall BUT will need a qualified RN or Physio to sign the drug chart within 5 minutes – appendix 4
b. In all other areas a qualified member of staff must connect and reconnect the oxygen tubing between wall oxygen and cylinder.

12) Use of Oxygen therapy within Toilets/ Bathrooms

Any patient who is on 40% oxygen via a venturi mask or above OR 8L or more via wide bore nasal specs should not be taken to the bathroom, all hygiene needs to be met at bedside whilst connected to piped wall oxygen.

Patients on 28%-35% venturi masks OR 4LO2 via nasal specs who are on a downward wean can go to the bathroom with continuous supervision once there to ensure clinical safety of patient and supply of oxygen is adequate.

If patients refuse to use commode at bedside/ wash at bedside and on more than 40% O2 then the nurse needs to perform a mental capacity assessment to ascertain that the patient understands the risks of mobilising on such large amounts of oxygen has a risk of death. This should then be documented fully in the patient notes. The patient should then be fully supervised for duration of time in bathroom and back up cylinders readily available in the bathroom.

A simplified flow chart is in Appendix 5.

Oxygen cylinders on the ward are usually the CD size. Appendix 6 indicates the approximate time indicated by the dial. The time is variable based upon the flow rate being delivered. Cylinders should not be used with less than ¼ dial showing.

13) Home oxygen patients and Use of oxygen cylinders whilst in hospital

If patients are normally on AOT they can manage their own oxygen **IF** they are on no more than 1LO2/min more than their normal prescription dose.
A new cylinder should be used at the start of each day. The cylinder should be checked every 3 hours AND at every drug round to ensure enough supply within cylinder. Bottle should be changed once ¾ empty.

14) Peri-Operative And Post Operatively

The usual departmental procedure for prescribing oxygen therapy in endoscopy and theatres should be adhered to during the procedure and during the immediate recovery phase, with the supervising clinician taking responsibility.

If post-operative oxygen therapy is to be continued after transfer to the wards, it should be prescribed using the target saturation scheme outlined in this guideline. Target saturations of 94 – 98% are appropriate for most patients post-operatively, with saturations of 88 – 92% recommended for those at risk of hypercapnic respiratory failure.

Once on the ward, unless specified otherwise, the normal oxygen weaning process applies. The oxygen dose should be reduced, guided by the patient saturation readings, towards the lower end of the prescribed oxygen saturation range.

15) Nebulised Therapy And Oxygen

In accordance with the Trust's medicines policy, patient's requiring nebulised medication must have both the drug and the driving gas for the nebuliser prescribed.

Usually this prescription should indicate that patients at risk of type 2 respiratory failure (e.g COPD) should have their nebuliser driven by a compressor box, while those with type 1 failure (e.g. asthma, COVID pneumonia) should have oxygen as their driving gas.

Patients must not be allowed to become hypoxic during nebulisation and, where necessary, supplementary oxygen should be given concurrently by nasal prongs to maintain their oxygen saturation within their specified target range.

For full details regarding nebulisers please refer to Clinical Policy for Use of Nebulisers

16) Humidification

Humidification may be required for some patient groups, especially for those with a tracheostomy and for those with hypersecretory lung disease.

Where humidifiers are used there is a risk that the water/saline used may become contaminated with bacteria. Consequently, only closed systems should be used.

Bubble through humidification has not been shown to be of clinical benefit and there is a risk of infection. Consequently, only nebulisation humidification systems should be used.

Humidification equipment and circuits should be replaced every 48 hours. Care must be taken to remove any condensate from humidification tubing which can also be an infection risk.

17) Oxygen for discharge

For most patients, once the cause of their hypoxaemia has been identified and treated, their need for supplementary oxygen will resolve. Oxygen should only be considered for discharge where:

1. The patient is already on home oxygen. Please be aware that there are several different types of home oxygen including:

    a. LTOT – long term oxygen therapy. Given for 15 – 24 hours per day. Where this is the case, the medical team should aim to wean the patient to their usual LTOT dose. If their usual oxygen dose is safe at the point of discharge, then the patient can be discharged home without onward referral. If the patient needs a different oxygen dose, the Respiratory Nurse Specialist team must be contacted (Appendix 3)

    b. AOT – ambulatory oxygen. For use only when walking, washing and dressing or other activity. Not for use at rest. These patients should only be discharged home if they have been safely weaned off resting oxygen. These patients will only have a limited supply of small oxygen cylinders which will be inadequate for continuous oxygen delivery.

    c. NOT – nocturnal oxygen therapy. Usually only indicated in patients with heart failure, with nocturnal hypoxia. These patients should only be discharged when they are safely off oxygen during the day and back to their usual night time dose when asleep.

2. The patient is being discharged for end of life palliative care, with a SpO2 of less than 90% on air. Under these circumstances, the palliative care team can arrange for the patient's oxygen to be installed if prescribed amount is less than 2L/min. Oxygen assessment via blood gas analysis is not usually necessary.

3. The cause of hypoxia is known, has been fully treated with maximal medical treatment, is of a chronic nature unlikely to resolve AND

    a. Arterial blood gases demonstrate that the patient's PaO2 is less than 7.3Kpa AND
    b. Any hypercapnia is fully managed with input from the respiratory medical teams if needed AND
    c. A full risk assessment, including the patient's smoking habits, the smoking habits of other household members, open fires, use of candles, falls risk, any mental health concerns including the use of alcohol or recreational drugs, is documented.

Unless the patient falls under the remit of the palliative care teams, patients being considered for discharge oxygen must be referred to the Respiratory Nurse Specialist (RNS) Teams for formal

oxygen assessment, (Appendix 3). Assessment and oxygen installation takes a minimum of 5 ½ hours. Ideally, the RNS teams need a working days' notice of patients needing discharge oxygen.

The RNS team will be responsible for ensuring that the patient has been correctly assessed. They will decide whether the patient needs oxygen at the point of discharge based on the BTS Guidelines for Home Oxygen Use in Adults (2015), or whether the patient is better assessed as an out-patient. The person arranging for home oxygen will discuss with the patient and their family or nominated representative:

1. The role of oxygen in the patient's management
2. Potential hazards including fire and carbon dioxide retention (providing "red cards" to alert those at risk of carbon dioxide retention), including completion of the Initial Home Oxygen Risk Mitigation Form (IHORM).
3. How oxygen is installed
4. Reimbursement towards electrical costs
5. Data protection, including completion of the relevant Home Oxygen Consent Form (HOCF)

The person arranging the oxygen will also:

- Liaise with the patient and their family regarding date and time of installation of the equipment
- Complete the relevant oxygen order, alert the home oxygen team (HOSAR) of the patient's discharge and ensure that oxygen follow up is arranged.
- Supply written information for the patient regarding the use of home oxygen.

Where no family or friends are available to provide access to the patient's home for the engineer to install oxygen while the patient is in hospital, then the clinical team caring for the patient must decide whether the patient is clinically safe to go home without oxygen being installed, and await urgent oxygen equipment delivery once they have arrived home. For many patients, this will be feasible, but ward teams must assure themselves that the patient can comfortably manage prolonged periods of time off oxygen, on the ward, before a patient is considered for this discharge option.

If this is not deemed to be safe, the Respiratory Nurses will contact the Regional Nurse Adviser for the community oxygen equipment provider, to arrange for a delivery of oxygen to be made to the patient while they are still in hospital. This oxygen supply must accompany the patient home, for their use, while awaiting for urgent oxygen equipment delivery once they have arrived home. This process is likely to require the assistance and approval of the patient transport service, and may affect the skill level of the crews escorting the patient home. Patient transport must therefore be involved in the planning process where this discharge route is being considered. This process will take an extended time to arrange, and this need to be taken into account when planning the patient's discharge home.

Ward staff must be aware that ward oxygen equipment IS NOT COMPATABLE with home oxygen equipment. Patients must not be sent home with ward equipment unless they are being discharged via ambulance, in which case ward staff MUST ensure that the ambulance crews are told to swap the patient to their home nasal specs or masks before they leave the patient's premises.

Once the order for oxygen has been placed then the new HOOF form must be uploaded to CLIP under correspondence along with the ABG completed on the prescribed dose of oxygen- unless palliative order.

18) Implementation

All healthcare professionals involved in prescribing or administering oxygen should have appropriate training. This will be via ESR.

19) Monitoring Tool

The trust hospital will participate in the national oxygen audits organised by the BTS. This should include audit if the prescription chart and observation chart against the standards set below.

This audit falls within the remit of the Specialist Medical Division – Department of Respiratory Medicine

STANDARDS	%	Clinical Exceptions
Oxygen is prescribed on the inpatient oxygen prescription for all patients receiving oxygen therapy.	90%	
Oxygen administration is recorded on the inpatient oxygen prescription for all patients receiving oxygen therapy	90%	
Oxygen saturation and oxygen dose are recorded on the observation chart.	90%	
Oxygen therapy is increased or weaned in accordance with the guideline.	90%	
Discharge ABG completed on prescribed dose of oxygen	90%	EOL patients will be excluded.
Completed HOOF uploaded to CLIP	90%	

20) References

- British Thoracic Society Emergency Oxygen Guideline Development Group. **BTS Guideline for Oxygen Use in Adults in Healthcare and Emergency Settings** Thorax 2017; 72: Supplement 1: Pages i1 – i90.

- British Thoracic Society Home Oxygen Guideline Group **BTS Guidelines for Home Oxygen Use in Adults** Thorax 2015; 70: Supplement 1: i1 – i52

- NPSA Rapid Response Report. Oxygen safety in hospitals. September 2009.

21) Contribution List

Key individuals involved in developing the document 2018 (2004, 2009, 2013)

Name	Designation
Sarah Austin	Respiratory Nurse Specialist, WRH
Jane Newport	Lead Practitioner for Respiratory
(Sharon Ellson)	(Professional Development, WRH)
(Dr S P O'Hickey)	Respiratory Consultant, WRH
(Lynn Dale)	Respiratory Nurse Practitioner, AH
(Rachael Leese)	Lead Respiratory Pharmacist, AH

Circulated to the following individuals for comments (2004, 2009)

Name	Designation
(Prof R A Lewis)	Respiratory Consultant, WRH
(Dr S Vathenan)	Respiratory Consultant, AH

(Dr G Summers)	Respiratory Consultant, KGH
(Dr D Brocklebank)	Respiratory Consultant, AH
(Irene Bunn)	Respiratory Nurse Specialist, KGH
(Tracey Lucas)	Respiratory Nurse Specialist, AH
(Gina Williams)	Respiratory Nurse Specialist, AH
(Cynthia Cudal)	Respiratory Nurse Specialist, AH
(Lindsay Smith)	Specialist Respiratory Pharmacist, WRH
(Dr S Greystone)	Consultant Anaesthetist, WRH
(Sally McNally)	Specialist Respiratory Physiotherapist, WRH
(Emma Welch)	Manager Laurel 2 – Respiratory Ward WRH
(Marsha Jones)	Manager Ward 5 – Respiratory Ward AH
(Dr I Levitt)	A&E Consultant
(Dr I Du Rand)	Respiratory Consultant WRH
Emma Hurst	Respiratory Nurse WRH
Nancy Howard	Respiratory Nurse WRH
Amy O'Hare	Respiratory Nurse AH
Jane Newport	Matron – Countywide Respiratory Lead
Dr Clare Hooper	Respiratory Consultant
Dr Sarah Deacon	Respiratory Consultant
Dr Simon Lloyd-Owen	Respiratory Consultant
Dr S Greystone	Trust Safety Lead
Paul Graham	Trust Health and Safety Manager
Fred Roden	Fire Safety Manager and Authorising Engineer (Fire)

Circulated to the following CD's/Heads of dept for comments from their directorates / departments 2018 (2004, 2009)

Name	Directorate / Department
(Dianne Thomlinson)	Infection Control Team
(Heather Gentry)	Infection Control Team
(Julian Berlet)	Anaesthetic Consultant
(Ruth Mullett)	Critical Care Outreach
(Alison Smith)	Principal Pharmacist Medicines Safety
Home Oxygen – Assessment and Review Team	Via Team Meeting
Iain Johnston	Infection Control
Rachel Montgomery	Pharmacy
Alison Spencer	Critical Care Outreach Team

Circulated to the chair of the following committee's/groups for comments (2009)

Name	Committee / group
Steve Graystone	Medicines Safety Committee

Appendix 1

Oxygen delivery systems

DEVICE	DESCRIPTION
Oxygen Flow Meter 	In this Trust, this device is used to delivering oxygen from a wall mounted oxygen port. This style of device must never be used for delivering air from a wall mounted air port. The oxygen flow is adjusted by switching on the oxygen using the white and dial, and reading the oxygen dose being delivered using the graduated markings on the side of the device. The graduated markings should be read against the middle of the floating ball. A low flow oxygen meter must be used for oxygen flow rates less than 1 l/min
Air Flow Dial 	Many ward areas have piped air available as well as piped oxygen. This creates a risk that the patient could have air administered instead of oxygen. Air dials should no longer be used in ward areas. Air complressor boxes should be used to drive nebulisers. Staff must be aware of the difference between the air flow dial and the oxygen flow meter.
Nasal Cannulae 	Nasal cannulae consist of pair of tubes about 2cm long, each projecting into the nostril and stemming from a tube which passes over the ears and under the chin, to hold it in place. Usually used to deliver oxygen flows of 4 l/min or less. One cannot predict the percentage oxygen (F_IO_2) delivered via nasal cannulae. This is not important if the patient is in the correct target oxygen saturation range. Often more comfortable than a mask and they allow the patient to eat, drink and cough easily Overlong nasal specs can be uncomfortable, and may cause pressure or friction. The ends of the nasal specs can be trimmed if they are too long. Check for pressure sore development behind the ears.

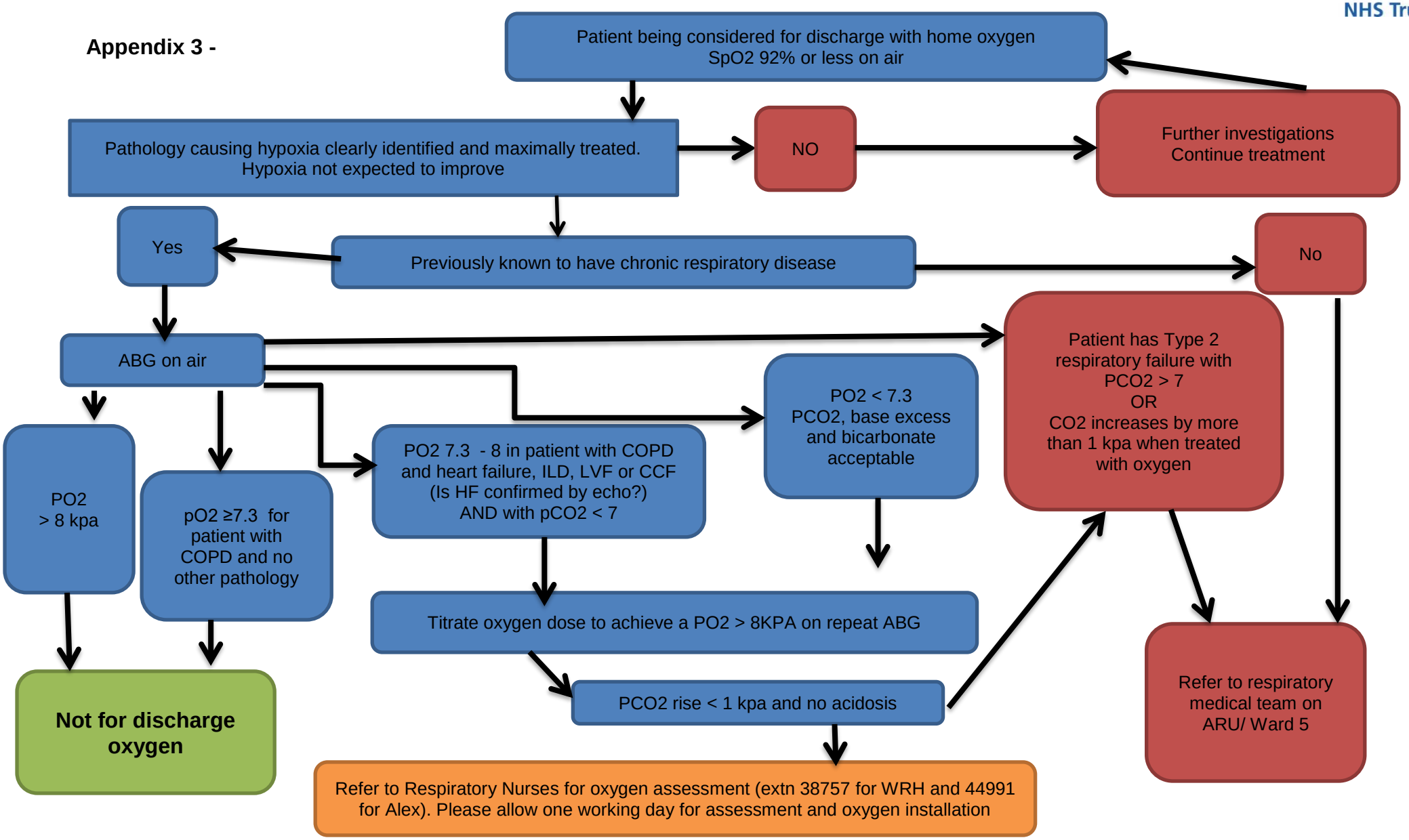
Medium Concentration Mask 	A simple mask with an elastic strap that goes behind the patient's head, to hold the mask in place. Used to deliver oxygen at 5 – 10 l/min. One cannot predict the percentage oxygen (F_IO_2) delivered via this mask and it is not appropriate for use with patients in Type 2 Respiratory Failure Adjust the tension of the elastic strap to ensure a good fit. Remove mask and swap to nasal specs when eating. Mask will require regular cleaning if the patient has a productive cough.
Non-rebreathe Mask 	This mask has an oxygen reservoir bag that increases the amount of oxygen available for the patient to breathe. It is used in an emergency situation where the patient has suddenly deteriorated (but is still breathing). Use a flow rate of 15 l/min oxygen or more. The mask must fit tightly for it to work properly. The reservoir bag should deflate by about a third when the patient breathes in. If there is no movement of the reservoir bag then adjust the mask fitting. In some circumstances, the health care professional may need to hold the mask in position when it is first being used, to ensure a good fit. This mask is not licenced for on-going use, and must be specifically prescribed if it is being used outside of an emergency situation.
Venturi Mask  	This mask is the only one where the F_IO_2 can be regulated. It is appropriate for use where the patient is in type 2 respiratory failure. Different attachments can be fitted to the mask to deliver controlled oxygen. Oxygen attachments can deliver either: 24% (blue) 28% (white) 31% (orange) 35% (yellow) 40% (red) 60% (green) The oxygen flow rate needed for each of these options is embossed on each attachment. This type of oxygen delivery system needs to be prescribed in free hand on the Trust's medicines chart.

Appendix 2

Glossary

Hypercapnia	Carbon dioxide levels in the blood are higher than the normal range (Usually over 6.1 kpa)
Hypoxaemia	Abnormally low oxygen levels in the blood (usually said to be an arterial oxygen tension less than 8 kpa)
Hypoxia	Abnormally low oxygen levels in the tissues
P_aO_2	The amount of oxygen in the blood, obtained by arterial blood gas analysis. The unit of measurement is in kilopascals (kpa).
P_aCO_2	The amount of carbon dioxide in the blood, obtained by arterial blood gas analysis. The unit of measurement is in kpa
S_pO_2	Peripheral oxygen saturations, obtained by pulse oximetry
Type I Respiratory Failure	Low oxygen (less than 8 kpa) with a normal or low carbon dioxide level. People with type I respiratory failure can usually tolerate oxygen well.
Type 2 Respiratory Failure	Normal or low oxygen with a high carbon dioxide level (above 6.1 kpa). People with type 2 respiratory failure are often at risk of worsening problems unless they are given controlled doses of oxygen.

Appendix 3 -


Patient being considered for discharge with home oxygen
SpO2 92% or less on air
Pathology causing hypoxia clearly identified and maximally treated.
Hypoxia not expected to improve
NO
Further investigations
Continue treatment
Yes
Previously known to have chronic respiratory disease
No
ABG on air
Patient has Type 2 respiratory failure with PCO2 > 7
OR
CO2 increases by more than 1 kpa when treated with oxygen
PO2 < 7.3
PCO2, base excess and bicarbonate acceptable
PO2
> 8 kpa
pO2 ≥7.3 for patient with COPD and no other pathology
PO2 7.3 - 8 in patient with COPD and heart failure, ILD, LVF or CCF
(Is HF confirmed by echo?)
AND with pCO2 < 7
Titrate oxygen dose to achieve a PO2 > 8KPA on repeat ABG
PCO2 rise < 1 kpa and no acidosis
Refer to respiratory medical team on ARU/ Ward 5
Not for discharge oxygen
Refer to Respiratory Nurses for oxygen assessment (extn 38757 for WRH and 44991 for Alex). Please allow one working day for assessment and oxygen installation

Appendix 4

Physiotherapy Assistants / Respiratory ward HCA Enhanced Oxygen Competencies

Staff members must have completed enhanced competency sign off from either qualified nurses or physiotherapists prior to using oxygen cylinders and oxygen flow meters on the wards.

Competency Indicator		Self-Assessment Signature	Assessor Name & Signature
1	To have passed the oxygen ESR module		
2	Demonstrate how to accurately administer oxygen via a cylinder including opening value and flow meter		
3	Demonstrate how to switch between piped and cylinder oxygen delivery		
4	Be able to calculate how long a cylinder will last at a given rate		
5	Identify ways in which oxygen may be unintentionally interrupted/ stopped and the risk posed		
6	Competent with storing, moving, and handling of cylinders		
7	Be able to recognise when patients' respiratory status has changed i.e., dyspnoea, cyanosis		
8	Understand how oxygen is prescribed and recorded including target saturations, delivery method and flow		
9	Competent in oxygen saturation measurement devices		
10	Demonstrate accurate recording of oxygen saturations, respiratory rate and delivery device in notes		
11	Awareness of up-to-date oxygen policy		

Following completion of all competencies

I _____ have completed the enhanced oxygen competencies. It is my responsibility to maintain my knowledge and skills regarding oxygen management. If learning areas are identified, it is my responsibility to find further training.

The competencies should be reviewed annually at PDR

Signed: _____

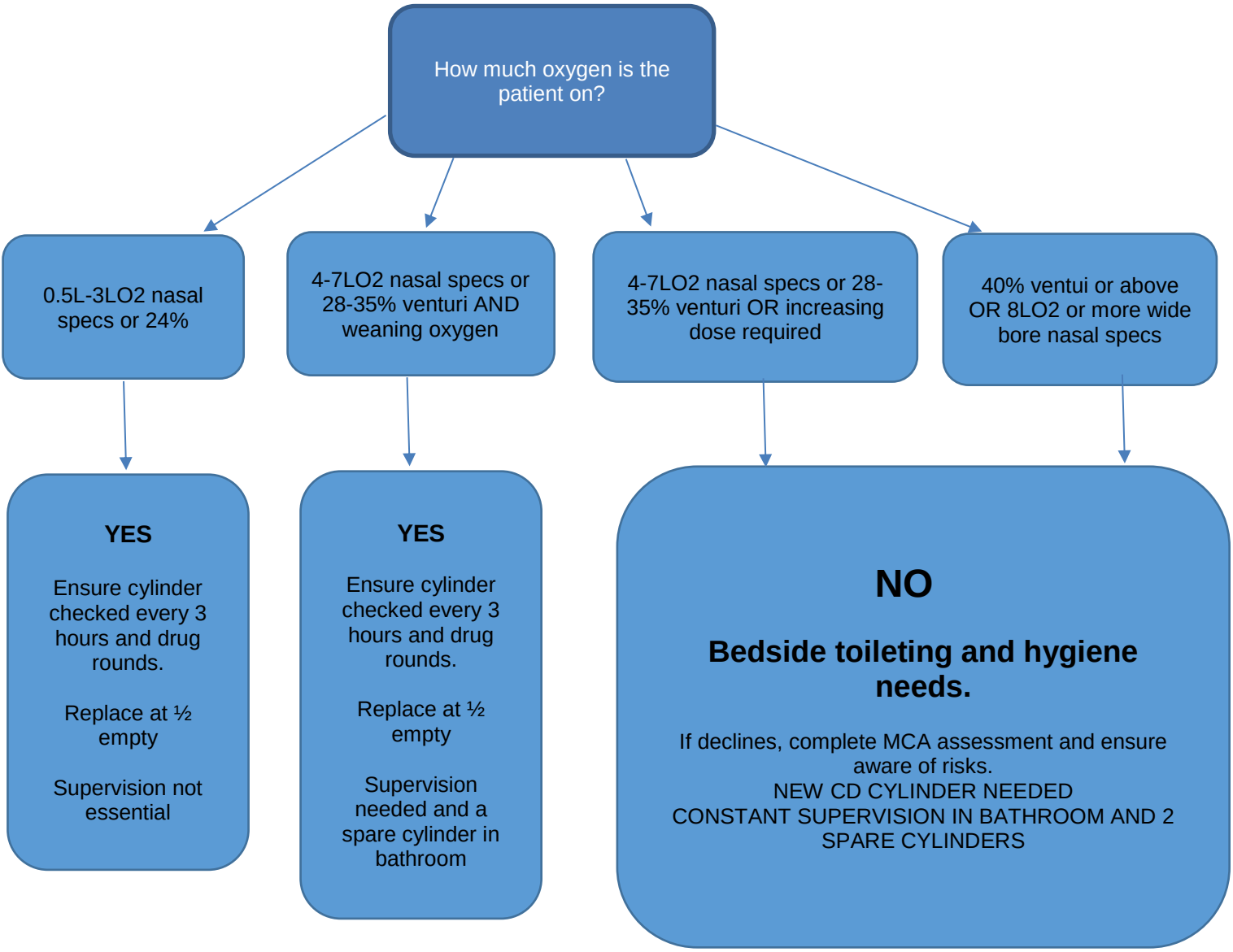
Name: _____

Date: _____

Enhanced Oxygen Competencies.docx

Appendix 5:

CAN YOUR PATIENT SAFELY USE THE BATHROOM?



Appendix 6

How long does the oxygen cylinder last?

Venturi values will deplete the cylinder quicker the nasal specs due to the flow rate

Oxygen cylinder data

Cylinder data summary

Size	Gauge contents Flowrate (ltr/min)	Full (100%) (hr.min)	Full (100%) (mins)	Half (50%) (hr.min)	Half (50%) (mins)	Low (25%) (hr.min)	Low (25%) (mins)
CD oxygen (product code 101-CD)	15	0.30	30	0.15	15	0.07	7
Nominal contents: 460 litres	10	0.46	46	0.23	23	0.11	11
Nominal cylinder pressure: 230 bar	6	1.16	76	0.38	38	0.19	19
Water capacity: 2.0 litres	4	1.55	115	0.57	57	0.28	28
Nominal weight: 3.5 kg	2	3.50	230	1.55	115	0.57	57
	1	7.40	460	3.50	230	1.55	115

Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and included as an appendix to key document when submitted to the appropriate committee for consideration and approval.

Please complete assessment form on next page;

Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form
Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP		Herefordshire Council		Herefordshire CCG	
Worcestershire Acute Hospitals NHS Trust	X	Worcestershire County Council		Worcestershire CCGs	
Worcestershire Health and Care NHS Trust		Wye Valley NHS Trust		Other (please state)	

Name of Lead for Activity	**Jane Newport**

Details of individuals completing this assessment	**Name**	**Job title**	**e-mail contact**
	Mike Hallissey	**Chief Medical Officer**	**mikehallissey@nhs.net**
	Kira Beasley	**Business Manager to CMO**	**Kira.beasley@nhs.net**
	Jane Newport	**Respiratory Lead Practitioner**	**j.newport@nhs.net**
Date assessment completed	**29/07/2021** **19/08/2021**		

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	**Title: Guideline for the prescribing, monitoring and administration of oxygen in adults.**			
What is the aim, purpose and/or intended outcomes of this Activity?	This document provides clinical guidance and best practice guidance for the use of oxygen within Worcestershire Acute NHS Trust. To ensure all staff are aware of how to prescribe, monitor and administer oxygen to patients within WAHT			
Who will be affected by the development & implementation of this activity?	❑ ☒ ❑ ❑	Service User Patient Carers Visitors	☒ ❑ ❑ ❑	Staff Communities Other _____
Is this:	☒ Review of an existing activity			

	❑ New activity ❑ Planning to withdraw or reduce a service, activity or presence?
What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic information for patients / services / staff groups affected, complaints etc.	Following a review, the clinical guidance has been updated. This document supports the implementation of the Clinical Policy for the use of Nebulisers. This guidance has also been updated following a national patient safety alert (NPSA) Reviewed published evidence regarding oxygen prescription, administration and monitorings. Based on British Thoracic society guideline
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	The guidance was developed by the Respiratory Consultant team. The guidance has been reviewed and approved through the Trust Clinical Governance Group.
Summary of relevant findings	Due to the NPSA the findings of discussions to implement the use of mechanical nebulisers has been agreed. Change to oxygen training package Change to nebuliser and air section- need to use compressor box

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale**. Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Age	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.
Disability	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.
Gender Reassignment	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.
Marriage & Civil Partnerships	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.
Pregnancy & Maternity	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Race including Traveling Communities	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.
Religion & Belief	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.
Sex	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.
Sexual Orientation	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless; Social/Economic deprivation, travelling communities etc.)	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.
Health Inequalities (any preventable, unfair & unjust differences in health status between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)	X			The use of mechanical nebulisers will allow all patients to receive the same, high quality standard of care. Reducing the possibility of the serious incident reoccurring.

Section 4

What actions will you take to mitigate any potential negative impacts?	Risk identified	Actions required to reduce / eliminate negative impact	Who will lead on the action?	Timeframe
		.		

How will you monitor these actions?	
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)	**EIA will be routinely reviewed with the policy in 2024.**

Section 5 - Please read and agree to the following Equality Statement

1. Equality Statement

1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation
1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.
1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	Jane Newport
Date signed	16/03/2023
Comments:	
Signature of person the Leader Person for this activity	
Date signed	
Comments:	

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	No
2.	Does the implementation of this document require additional revenue	No
3.	Does the implementation of this document require additional manpower	Yes We do not have the staff available to supervise this policy. However it is a national standard and MUST be met on the grounds of patient safety
4.	Does the implementation of this document release any manpower costs through a change in practice	No
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	No
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval