Liverpool Women's NHS Foundation Trust

ADULT OXYGEN GUIDELINE

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Contents

Quick Reference Guide

1. Oxygen is a drug and therefore requires prescribing in all but emergency situations

2. In the emergency situation oxygen prescription is not required. Oxygen should be given to the patient immediately without a formal prescription or drug order but documented later in the patient's record.

3. Oxygen will be prescribed according to a target saturation range. The system of prescribing target saturation aims to achieve a specified outcome, rather than specifying the oxygen delivery method alone

4. Oxygen should be prescribed to achieve a target saturation of 94-98% for most acutely unwell patients or 88 –92% for those at risk of hypercapnic respiratory failure. (two sets on Meditech should be available; standard and hypercapnic sets)

5. The patient's oxygen saturation and oxygen delivery system should be recorded on the MEWS, MEOWS chart or equivalent.

6. Oxygen therapy should be increased if the saturation is below the desired range and decreased if the saturation is above the desired range (and eventually discontinued as the patient recovers). Patients need medical review to prevent escalating oxygen concentration to correct low SpO2 without addressing the underlying problem.

7. Patients requiring oxygen therapy whilst being transferred from one area to another should be accompanied by a trained member of nursing staff wherever possible. Problems have occurred when cylinders have run out of oxygen during transfers. Clinical areas should have designated staff to check sufficient full cylinders are available. Problems have also occurred when patients were not monitored properly.

8. When nebulised therapy is administered to patients at risk of hypercapnic respiratory failure (see section 8.1), it should be driven by compressed air. If necessary, as decided by the doctor, supplementary oxygen should be given concurrently by nasal prongs at 1-4 litres per minute to maintain an oxygen saturation of 88-92%.

Problems have occurred when oxygen masks were connected to air outlets instead of oxygen outlets. NPSA recommends avoiding air wall outlets where possible.

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 Healthcare Professional's role.

2 PURPOSE

The aim of this Guideline is to ensure that:

- All patients who require supplementary oxygen therapy receive therapy that is appropriate to their clinical condition and in line with national guidance (BTS Guideline; Thorax, 2008).
- Oxygen will be prescribed according to a target saturation range. The system of prescribing target saturation aims to achieve a specified outcome, rather than specifying the oxygen delivery method alone.
- Those who administer oxygen therapy will monitor the patient and keep within the target saturation range

3 SCOPE

This Guideline is for use within all wards and departments in LWH caring for adult patients.

This Guideline does not cover neonates**.** A separate Guideline or addition will be written

4 DEFINITIONS

PaO_2 – Partial pressure of oxygen

FiO_2 – Fractional concentration of inspired oxygen

CO2 – Carbon dioxide

BTS – British Thoracic Society

EWS – Early Warning Score

O2 – Oxygen

ABG – arterial blood gases

CaO2 – oxygen content of blood

COPD – Chronic Obstructive Pulmonary Disease

PCO2 – carbon dioxide tension

PaCO2 – arterial carbon dioxide tension

PACO2 – alveolar carbon dioxide tension

PaO2 – arterial oxygen tension

PACO2 – alveolar oxygen tension

PO2 – oxygen tension

SaO2 – arterial oxygen saturation

SpO2 – arterial oxygen saturation measured by pulse oximetry

5 NORMAL OXYGEN SATURATIONS

- In adults less than 70 years of age when awake at rest and at sea level: 96% - 98%.

- Aged 70 and above when awake at rest and at sea level: greater than 94%.

NB: Patients of all ages may have transient dips of saturation to 84% during sleep.

6 INDICATIONS

The rationale for oxygen therapy is prevention of cellular hypoxia, caused by hypoxaemia (low PaO_2), and thus prevention of potentially irreversible damage to vital organs.

Therefore the most common reasons for oxygen therapy to be initiated are:

- *Acute hypoxaemia* (e.g. pneumonia, shock, asthma, heart failure, pulmonary embolus)

- *Ischaemia* (e.g. myocardial infarction, but only if associated with hypoxaemia- abnormally high levels may be harmful to patients with ischaemic heart disease and stroke).

- *Abnormalities in quality or type of haemoglobin* (e.g. acute gastrointestinal blood loss or carbon monoxide poisoning).

Other indications include:

- *Pneumothorax* – Oxygen may increase the rate of resolution of pneumothorax in patients for whom a chest drain is not indicated.

- Post operative state (general anaesthesia can lead to decrease in functional residual capacity with in the lungs (especially following thoracic or abdominal surgery) resulting in hypoxaemia (Ferguson 1999). There is some evidence to suggest a decreased incidence of postoperative wound infections with short-term oxygen therapy following bowel surgery.

7 CONTRA-INDICATIONS

• There are no absolute contraindications to oxygen therapy if indications are judged to be present. The goal of oxygen therapy is to achieve adequate tissue oxygenation using the lowest possible FiO2.

8 CAUTIONS

8.1 Oxygen administration and carbon dioxide retention

In patients with chronic carbon dioxide (CO_2) retention, oxygen administration may cause further increases in carbon dioxide and respiratory acidosis. This may occur in patients with COPD, neuromuscular disorders, morbid obesity or musculoskeletal disorders. There are several factors, which lead to the rise in CO_2 with oxygen therapy in patients with hypercapnic respiratory failure, and details are in the BTS.

9 Other precautions/ Hazards/ Complications of oxygen therapy

- Drying of nasal and pharyngeal mucosa
- Oxygen toxicity
- Absorption atelectasis
- Skin irritation
- Fire hazard
- Potentially inadequate flow resulting in lower FiO_2 than intended due to high inspiratory demand or inappropriate oxygen delivery device or equipment faults

10 PROCESS

10.1 Prescribing, administering and monitoring oxygen

a) Identifying appropriate target saturations
Oxygen should be prescribed to achieve a target saturation of 94-98% for most acutely unwell patients or 88-92% for those at risk of hypercapnic respiratory failure.

b) Prescribing oxygen on the drug chart
Oxygen should be prescribed on Meditech as either standard or hypercapnic set and the appropriate target saturation should be documented on the chart.

c) Administering oxygen
Once the target saturation has been identified and prescribed, the healthcare professional choses the most appropriate delivery system to reach and maintain the prescribed saturation target.
Personnel who may administer oxygen are shown in the oxygen PGD.

d) Monitoring and recording oxygen

- All patients should have their oxygen saturation observed for at least 5 minutes after starting oxygen therapy. The patient's oxygen saturation and oxygen delivery system should be recorded on the bedside observation chart alongside other physiological variables.

- All patients on oxygen therapy should have regular pulse oximetry measurements as NEWS2 or equivalent policy. The frequency of oximetry measurements will depend on the condition being treated and the stability of the patient. Critically ill patients should have their oxygen saturations monitored continuously and recorded on the MEWS chart. Patients with mild breathlessness due to a stable condition will need less frequent monitoring.

- Oxygen therapy should be increased if the saturation is below the desired range and decreased if the saturation is above the desired range (and eventually discontinued as the patient recovers).

- Any sudden fall in oxygen saturation should be referred to the doctor and lead to clinical evaluation of the patient and in some cases, measurement of blood gases.

10.2 Emergency situations

- **In the emergency situation oxygen prescription is not required**. Oxygen should be given to the patient immediately without a formal prescription or drug order but documented later in the patient's record.

- All peri-arrest and critically ill patients should be given 100% oxygen (15 l/min reservoir mask) whilst awaiting immediate medical review. 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 results after which these patients may need controlled oxygen therapy or supported ventilation if there is severe hypoxaemia and/or hypercapnia with respiratory acidosis.

- All patients who have had a cardiac or respiratory arrest should have 100% oxygen provided along with basic/advanced life support.

- 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.

- Any qualified nurse/midwife/health professional can commence oxygen therapy in an emergency situation as indicated in the management of the acutely unwell patient.

10.3 Exclusions

- This guideline excludes neonates. Please see separate neonatal guidelines.

- Patients receiving oxygen as part of palliative care or patients on the end of life care pathway (in which case, the prescriber should document in notes 'target saturations not indicated').

- Peri-operatively and up to 2 hrs. post operatively. Oxygen in these situations should be provided even if not yet prescribed.

11 TRANSFER AND TRANSPORTATION OF PATIENTS RECEIVING OXYGEN THERAPY

Patients requiring oxygen therapy whilst being transferred from one area to another should be accompanied by a trained member of nursing staff wherever possible. There must be sufficient oxygen available for the transfer and the cylinder checked before setting off. If this does not occur, clear instructions must be provided for personnel involved in the transfer of the patient.

12 PERI-OPERATIVE AND IMMEDIATELY POST OPERATIVELY

The usual procedure for delivering oxygen therapy in these areas should be adhered to. If a patient is transferred back to the ward on oxygen therapy the need for ongoing oxygen therapy should be reviewed as soon as possible. If oxygen therapy is to be continued, it should be prescribed using the target saturation scheme.

13 NEBULISED THERAPY AND OXYGEN

When nebulised therapy is administered to patients at risk of hypercapnic respiratory failure (see section 8.1), it should be driven by compressed air. If necessary as decided by the doctor, supplementary oxygen should be given concurrently by nasal prongs at 1-4 litres per minute to maintain an oxygen saturation of 88-92% or other specified target range documented in the notes.

14 HUMIDIFICATION

Humidification may be beneficial for some patient groups requiring high flow rates or longer term periods especially if sputum retention is a clinical problem.

15 TRAINING REQUIREMENTS, MONITORING COMPLIANCE WITH, AND THE EFFECTIVENESS OF PROCEDURAL DOCUMENTS

All nurses, midwives, nursing assistants and other healthcare professionals involved in prescribing or administrating oxygen should be taught on the oxygen Guideline.

All doctors should be taught about the oxygen Guideline. Teaching aids are available on the BTS website. Audits will be performed in all clinical areas. Audit proforma are available on the BTS website. The hospital will participate in the national audits organised by the BTS.

16 REFERENCES AND ASSOCIATED DOCUMENTATION

- O'Driscoll B R, Howard L S, Davison A G. BTS guideline for emergency oxygen use in adult patients. Thorax 2008; 63: Supplement VI.
- Summary guideline for prescribing oxygen emergency oxygen in hospital.

Available on BTS website: www.brit-thoracic.org.uk/emergencyoxygen/

- Summary of prescription, administration and discontinuation of oxygen therapy.

Available on BTS website: www.brit-thoracic.org.uk/emergencyoxygen/

17 Associated Documents

Oxygen SOP

18 Consultation and Ratification Process

Consulted and Ratified within Anaesthetic department meeting

19 Intranet Classification

Tags (separated by ;)	O2; oxygen

20 Version Control Sheet

Version	Date	Author	Status	Comment
8.0	Mar 18	Consultant anaesthetist	Archived	Reviewed and updated
9.0	Apr 21	Consultant anaesthetist	Current	Reviewed
10.0	27/6/24	Consultant anaesthetist	Current	Expired link removed. Frequency of observations aligned with other policies.