**OXYGEN - SAFE ADMINISTRATION AND SUPPLY PROCEDURE**

The key messages the reader should note about this document are:

1. When and how to use prescribed oxygen and oxygen in emergencies.
2. How to maintain a supply of oxygen safely
3. How to prescribe, monitor and administer oxygen safely
4. Risks associated with using oxygen in clinical settings

**DOCUMENT SUMMARY SHEET**

ALL sections of this form must be completed.

|  |  |
| --- | --- |
| Document title | Oxygen - safe administration and supply procedure |
| **Document Reference Number** | C-0035 |
| **Key searchable words** | *Oxygen*  *Oximetry*  *Oximeter*  *Cylinder*  *Venturi masks*  *Nasal cannula*  *Non-rebreathe mask* |
| **Executive Team member responsible (title)** | Medical Director |
| **Document author (name and title)** | Richard Dealhoy, Lead Resuscitation Officer  Kevin Stevenson, Acting Lead Resus Officer |
| **Approved by (Committee/Group)** | Approved via email by Tom Mullen, Clinical Director; Sophie Roberts, Clinical Director; Gail Galvin, Professional Lead for Nursing; and Gareth Flanders, Operational Manager. |
| **Date approved** | 27/03/2020 |
| **Ratified by** | Policy and Procedures Committee |
| **Date ratified** | 28/03/2020 |
| **Review date** | 28/03/2023 |
| **Frequency of review** | *At least every three years* |

**Amendment detail**

|  |  |  |
| --- | --- | --- |
| **Version** | **Amendment** | **Reason** |
| 2 | 1.LPFT becomes LYPFT.  2.Governance is now via Effective Care Committee  3.ILS providers are taught to set up oxygen. Teaching others to set up oxygen is now the responsibility of clinical managers. | 1.Trust merger has occurred.  2. Resuscitation Committee no longer exists.  3.Re-defining of the Essential Life Support curriculum. |
| 3 | 4.Reformatted.  5. Addition of Visual A-E Assessment.  6.Addition of duty of candour responsibilities. | 4.New standard template at LYPFT.  5. In response to the Patient Safety Alert: NHS/PSA/W/2015/011.  Duty of candour needs on all procedural documents. |
| 4 | Policy revised several changes made   1. Reformatted 2. Changes to saturation levels 3. Humidification of oxygen not recommended except for trachtostomy patients 4. Flow chart numbering corrected | Policy reviewed renewed  New standard template at LYPFT.  To follow British Thoracic (2017) guidelines  BTS (2017) guidelines |

|  |  |  |  |
| --- | --- | --- | --- |
| **CONTENTS** | | | |
| **Section** | **Description** | | **Page** |
| 1 | The content of the procedural document | | 5 |
|  | 1.1 | Flow chart of procedure | 5 |
|  | 1.2 | Description of procedure/process | 6 |
| 2 | Indications to consider Oxygen Therapy | | 6 |
| 3 | Contra-indications to Oxygen Therapy | | 6 |
| 4 | Prescribing and Administration of Oxygen Therapy | | 7 |
|  | 4.1 | Administration | 7 |
|  | 4.2 | Flow Rate | 8 |
|  | 4.3 | Concentration and Devices | 8 |
| 5 | Monitoring of Oxygen Therapy | | 9 |
|  | 5.1 | Respiratory Rate | 9 |
|  | 5.2 | Pulse Oximetry | 10 |
| 6 | Storage and Fire Safety | | 11 |
|  | 6.1 | Handling Cylinders | 12 |
| 7 | Infection Prevention and Control | | 12 |
| 8 | Training | | 13 |
|  | 8.1 | General training recommendations | 13 |
| 9 | Procurement | | 14 |
| Appendices | included as relevant (include Appendices or a link to the relevant documents on staffnet) | | 15 |

**1.** **THE PROCEDURE**

**1.1 Flow chart of procedure for non-emergency oxygen therapy**

**1.2 Description of Procedure/Process**

Oxygen is a drug and should be treated like any other drug. It must be prescribed on the 24 hourly oxygen prescription and monitoring chart with the required administration device; flow rate; concentration and target saturation level identified.

Hypoxaemia for the purpose of this document can be defined as oxygen saturation of < 95%. The exceptions to this are those patients who have been previously identified by medical staff as requiring fixed, low concentration oxygen. It must be remembered that oxygen saturation monitoring provides no indication of carbon dioxide levels and that careful monitoring of patients receiving oxygen therapy is essential.

Medical staff must ensure that any patients at risk of carbon dioxide retention\* are sent immediately to an acute medical setting such as an Emergency Department to enable closer, frequent monitoring and blood gas analysis. It is recommended that medical staff seek advice from the respiratory physicians, respiratory nurse specialist or emergency medical staff if they are unsure how to best manage or prescribe for a patient who requires or may require oxygen therapy.

In an emergency all patients for whom target saturation has not been identified must be given sufficient oxygen to keep saturations at 94% or above until the arrival of an ambulance.

\*Carbon Dioxide retention will apply to extremely few patients within LYPFT.

**2 Indications to consider Oxygen Therapy**

BTS (2017) guidelines are very clear, O2 therapy is for hypoxaemic patient and this clearly links to RC UK (2015) guidelines which state administration of oxygen should be “guided by pulse oximetry”.

**3 Contra-indications to Oxygen Therapy**

* Patients who have been identified by medical staff as being sensitive to high concentrations of oxygen
* Patients for whom instructions not to administer oxygen have been given.

**4 Prescribing and Administration of Oxygen Therapy**

Only medical staff can prescribe oxygen, and each prescription should contain the following information and be written on the 24 hourly oxygen prescription and monitoring chart (Appendix B).

• Indicate whether oxygen therapy is to be continuous or as required.

• Indicate the target saturation level that should be aimed for. E.g. 85–92% or 94–98%.

• Indicate the delivery system and for that system a flow rate or concentration.

* Venturi system 24% 28% 35% 40% 60%
* Nasal Cannula 1L 2L 3L 4L (or Dr to complete flow rate)
* Medium Concentration/simple face mask 5L 6L 7L 8L 9L 10L
* Non re-breathe oxygen mask: this is always at 15 litres per minute

Humidification is not required for the delivery of low-flow oxygen (mask or nasal cannulae) or for the short-term use of high-flow oxygen. It is not therefore required in emergency care.

• The prescribing doctor must sign the order and print their name.

• The date and start time must be added to the prescription.

• Prescriptions for routine oxygen therapy must be reviewed and when necessary revised by medical staff at intervals which must be specified in the clinical notes by the prescriber or lead clinician. Each revision must include all the same information as the original prescription.

**4.1 Administration**

Nursing staff administering oxygen must comply with [MM0004 section 2.2.17.0 Administration of Medicines](http://staffnet2/Policies-procedures#Default=%7B%22k%22%3A%22%22%2C%22r%22%3A%5B%7B%22n%22%3A%22RefinableString21%22%2C%22t%22%3A%5B%22%5C%22%C7%82%C7%824d4d2d30303034%5C%22%22%5D%2C%22o%22%3A%22OR%22%2C%22k%22%3Afalse%2C%22m%22%3Anull%7D%5D%7D). 

The administrator must add the date, time and their initials/signature to evidence when the therapy commenced.

Any changes in saturation levels that lead to a change in prescription must also be documented in the clinical notes.

• In an emergency situation oxygen should be given to the patient immediately without the need for a prescription.The lack of prescription should never preclude oxygen administration. However, a written record must subsequently be made of what oxygen has been given in the same detail as any other oxygen prescription.

• When a nebulizer is prescribed the prescription must state if it is to be given with oxygen to drive the process with a flow rate of 6-8 litres.

4.**2 Flow Rate**

The oxygen administration device usually dictates the flow rate required either to drive the device to produce a fixed oxygen concentration or to increase the concentration by increasing flow rate. High flows are required for emergency treatment, for example in pre and post cardio-respiratory arrest. Venturi masks can provide flow rates of low to medium concentrations of oxygen. However if specialist equipment or long term high flow rate oxygen are required the patient cannot be managed at LYPFT and must be moved to a higher level of physical care immediately.

**4.3 Concentration and Devices**

There are variable concentration devices – the approximate concentration is dependent upon oxygen flow, tidal volume and respiratory rate.

Listed below are the main types of equipment with their key considerations or characteristics:

|  |  |
| --- | --- |
| Nasal Cannula | Concentration 24-35%  Flow 1-4L/min  Consider humidification  Comfortable  Good in stable patients |
| MC Mask | Concentrations 40-60% - consider humidification  Flow 5-10L/min (CO2 re-breathing occurs if the flow <5L/min)  Short term |
| Non-re-breathing oxygen mask | Concentration 60-90%  Flow 15L/min (keep reservoir inflated)  Short term until recovery or ambulance arrival |
| Venturi mask | Concentration 24%, 28%, 35%, 40%, 60% (colour coded)  Patients requiring a high flow |

Humidification should be used in all patients whose upper respiratory tract is bypassed (i.e. tracheostomy).

**5 Monitoring of Oxygen Therapy**

**5.1 Respiratory rate**

Respiratory rate should be monitored to help determine the baseline respiratory status of patients. All patients on admission or on commencement with a day service must have respiratory rate recorded as part of their physical health assessment.

Respiratory rate can:

• Identify respiratory disease.

• Identify other complications such as infection, shock, etc.

• Monitors fluctuations and potential deterioration.

• Identifies pattern and character of breathing.

**Procedure**

* Ensure you have a clear view of the patients’ ribcage.
* Ensure you can see a clock or watch with a second hand.
* Inspiration and expiration counts as one full cycle.
* Count the patients respiratory rate (number of full cycles) for one full minute.
* During or after counting the rate, assess the character of breathing.

Remember normal breathing is easy, unnoticeable, smooth and quiet. Signs of difficulty breathing are shallow breathing, noisy breathing, wheezing, and the inability to speak clearly and in full sentences.

Lifting the shoulders and use of accessory muscles on inspiration are signs of respiratory distress.

Central cyanosis (blueness to lips/face and oral mucosa) is a late and serious sign and must be recognised and acted upon immediately.

Document the respiratory rate as a number on the Modified Early Warning Score (MEWS)\* and observation chart and other respiratory observations in the nursing notes. Report any deterioration or other obvious unexpected changes to medical staff and the senior nurse on duty.

*\*MEWS is a track and trigger system explained in* [*LYPFT Resuscitation Procedure (CM-0036)*](http://staffnet2/searchcentre/Pages/policies.aspx?k=resuscitation#Default=%7B%22k%22%3A%22oxygen%20prescription%22%2C%22r%22%3A%5B%7B%22n%22%3A%22RefinableString21%22%2C%22t%22%3A%5B%22%5C%22%C7%82%C7%82432d30303336%5C%22%22%5D%2C%22o%22%3A%22OR%22%2C%22k%22%3Afalse%2C%22m%22%3Anull%7D%5D%7D)

**5.2 Pulse Oximetry**

Pulse oximetry is commonly done using a fingertip pulse oximeter though other sensors can be used. Readings are undertaken to determine a baseline oxygen saturation level for the patient, to monitor fluctuations, potential deterioration and to assess response to treatments.

Finger probes should never be clipped/attached on service users ears as the reading will be very inaccurate. Only ear clips which are designed for the pulse oximetry device should be used. Oximetry gives information regarding oxygen saturation, not patient ventilation or levels of carbon dioxide.

There are some factors that will complicate the interpretation of pulse oximetry readings:

* Poor peripheral blood flow – less blood available for comparison of oxygenated and deoxygenated blood.
* Cardiac arrhythmias – some can cause the pulse rate reading to be incorrect due to strength or speed of the pulse.
* Carboxyhaemoglobin – oximetry cannot differentiate between carboxyhaemaglobin and oxyhaemaglobin (tobacco smokers).
* Nail varnish - can cause the colour sensors of some oximeters confusion in identifying colour accurately enough for the necessary comparison.

**Procedure**

* Explain procedure to patient and gain consent.
* Apply probe to finger – this is a simple sprung peg like device which grips the finger tip.
* Read digital results – allow a few seconds for this to stabilise.
* Document saturation indicated (many oximeters provide the pulse rate at the same time but this is not as reliable as manual pulse readings which remains the preferred method).
* Respond immediately to a drop in saturation if below the target saturation.

If oxygen saturation and or respiratory rate and pattern does not respond or patient deteriorates expert help must be sought immediately by calling 9-999 for an emergency ambulance and where available calling local medical staff and ILS providers using emergency calling systems for that area.

At LYPFT medical staff, Registered Nurses (RMN, RN LD, RGN), Occupational Therapists (OT) and Physiotherapists can administer oxygen to adult patients in their care or on the LYPFT premises in an emergency without prescription.

Routine oxygen should be administered by RN’s or medical staff only.

Electric nebulisers should be used to administer broncho-dilators which removes the requirement to have any other gas cylinders available other. This will reduce the risk of confusion between cylinders and gases.

In an emergency nebulisers may need to be given with oxygen and these masks must be available on all inpatient and day units

**6 Storage and Fire Safety**

In an oxygen enriched atmosphere, materials not normally considered to be flammable may become flammable; flammable materials ignite and burn more vigorously. Clothing may become saturated with oxygen and become an increased fire risk; when returned to normal ambient air, clothing takes about five minutes to be free of the gas enrichment. Blankets and similar articles should be turned over several times in normal ambient air following suspected oxygen enrichment.

Within clinical areas oxygen cylinders must be:

• Kept in a room having a fire door which must be self-closing or kept locked shut when not in use.

• ZX cylinders must be kept and transported in the ZX specific trollies. CD cylinders can be free standing.

• Stored away from other combustible items.

• Not have oils, petroleum jelly or any grease stored anywhere near them as in the presence of high pressure oxygen they are liable to spontaneously ignite even in minute quantities.

• Be handled using clean hands or gloves specially when assembling oxygen equipment, e.g. making connections. (Hand cream is also highly combustible in the presence of pressurise oxygen)



This warning sign must be placed on the door to any room where oxygen cylinders are stored.

**6.1 Handling cylinders**

In order to comply with current manual handling regulations, it is advisable that when handling medical gas cylinders, the following precautions are followed:

• It is good practice for porters to wear safety shoes and gloves when moving cylinders.

• Cylinders should only be moved with a trolley designed for appropriately sized cylinders.

• Never roll cylinders along the ground as this may cause the valve to open accidentally. It will also damage the cylinder label and paintwork.

• Cylinders should be handled with care, never knocked violently or allowed to fall over.

• Where possible place cylinders near to an exit so that they can be removed quickly in an emergency. They must not, however, block the exit.

• Never paint or obscure any markings or labels on cylinders

• Never apply any unauthorised labels or markings to cylinders, unless advised by the supplier to identify faulty or incident cylinders.

• Empty cylinders can be identified by the absence of the grey ring pull seal which comes with the recommended cylinders and the contents meter showing empty.

• Empty cylinders should be removed as soon as possible. This is achieved by contacting the supplier and arranging an exchange which is usually available within 2-3 days.

• When cylinders are stored they must be checked as present and fit for use each day and recorded on the Grab Bag check list which can be found on Staffnet and which is updated in January each year.

• The storage and handling recommendations in this procedure are not exhaustive and recognised gas cylinder safety training must be provided by the organisation, or the organisation must have evidence of training from the contracted support service providing storage and or movement of oxygen cylinders. Training must be current and relevant.

**7 Infection Prevention and Control**

All oxygen administration devices (masks and nasal cannula) and tubing are for single patient use. Each device may be used repeatedly for the same patient but must be disposed of when no longer required by that patient.

Patients on long-term therapy should have their devices changed as frequently as advised by the infection prevention and control team and or the respiratory specialists.

Bubble bottles must not be used for humidification as there is no proven benefit and there is a risk of cross infection.

**8 Training**

Staff attending Immediate Life Support (Resuscitation Council UK) courses will be taught emergency oxygen administration; this will include assessing the need for oxygen, setting up the oxygen cylinder, non re-breathe oxygen mask and bag valve mask device. The oxygen cylinders used in training will be the same as those in use in clinical settings.

Clinical managers are responsible for ensuring all other staff who may have cause to use oxygen are taught how to store, check and set up cylinders with administration devices ready for use.

•Oxygen saturation monitoring, prescriptions and administration methods for routine oxygen must be clearly communicated by the prescribing doctor to the nursing staff caring for the service user and use the 24 hr. Prescription and Monitoring Chart.

For ancillary staff under the Health and Safety at Work Act 1974 and HTMO2 guidelines, it is the responsibility of employers to train their employees on the recommended safeguards relating to the handling of medical gases to ensure they understand and employ safe practices. It is the responsibility of each Care Group to ensure that ancillary staff and PFI partners are trained at induction in the safe storage and transport of oxygen cylinders if it is possible they will be involved in this work. These risks are reduced by oxygen being kept in small quantities in each clinical area that needs it and suppliers delivering directly to each area. All training must comply with the appropriate ratified Trust documents and standards.

**8.1 General training recommendations**

An oxygen champion should be identified as recommended by the British Thoracic Society to:

• Facilitate training for clinical staff in oxygen use.

• Disseminate supportive educational materials.

• Standardise documentation for the prescription and monitoring of emergency oxygen.

• Reduce confusion around oxygen use in emergency situations.

**9 Procurement**

All oxygen must be supplied to the Trust via supplies through the authorised contractor. Each area risk assessed as needing to keep an oxygen supply must keep ZX cylinders with trolley wheels. (There may be exceptions to the cylinder size for areas needing to take cylinders up and down stairs; in these instances a C/D cylinder is recommended).

Cylinders and valves must meet the Transportable Pressure Equipment Directive (TPED) and be marked accordingly. The supplying company must inspect every cylinder each time it is filled to ensure cylinder safety.

**Appendices**

* 24 hr. Prescription and Monitoring Chart 
* [*LYPFT Resuscitation Procedure (CM-0036*)](http://staffnet/Topics/Policies%20and%20Procedures/Document%20Library/Forms/DispForm.aspx?ID=1208&Source=http%3A%2F%2Fstaffnet%2FTopics%2FPolicies%2520and%2520Procedures%2FPages%2Fdefault%2Easpx%3FRootFolder%3D%252fTopics%252fPolicies%2520and%2520Procedures%252fDocument%2520Library%252fClinical%26FolderCTID%3D%26View%3D%257bAABADDF9%252d2E90%252d4B41%252dBD01%252d52584E379748%257d&RootFolder=%2fTopics%2fPolicies%20and%20Procedures%2fDocument%20Library%2fClinical)
* [MM0004 section 2.2.17.0 Administration of Medicines](http://staffnet/Topics/Policies%20and%20Procedures/Pages/default.aspx?RootFolder=%2fTopics%2fPolicies%20and%20Procedures%2fDocument%20Library%2fMedicines%20Management&FolderCTID=&View=%7bAABADDF9%2d2E90%2d4B41%2dBD01%2d52584E379748%7d)

**PART B**

**1 IDENTIFICATION OF STAKEHOLDERS**

|  |  |
| --- | --- |
| **Stakeholders** | **Level of Involvement** |
| Lead Director  (Medical Director) | Will be responsible for ensuring approval and ratification of the procedure and supporting its effective implementation in the Trust. |
| Oxygen Champion (Trust Lead Resuscitation Officer) | Will provide advice and information on the purchase and use of oxygen, administration devices and oximeters, they will ensure oxygen therapy and use is included in Immediate Life Support Courses. The Lead Resuscitation Officer will monitor the readiness of oxygen provision as part of the Resuscitation Audit & Drill process |
| Pharmacy Staff | Will monitor oxygen prescriptions for compliance with the procedure. This monitoring will be fed back to the Effective Care Committee annually. |
| Physical Health Optimisation Group | Will review the annual report from Pharmacy on effective prescribing and administration of oxygen and compliance with this procedure.  Will contribute to the contents of this procedure during the consultation period |
| Medicines Optimisation Group | Will contribute to the content of the procedure during consultation. |
| Policy & procedures comittee | Will ratify the procedural document |
| Medical Director and Clinical Directors | Will be responsible for ensuring dissemination of and compliance with this procedure in their area of responsibility. |
| Matrons and clinical managers | Will be responsible for ensuring the availability and functionality of oxygen and oximeters is checked daily and that all clinical staff receive training in oxygen storage and safe use. It is the responsibility of staff in areas that keep oxygen to teach staff not attending ILS about this procedure and oxygen safety. |
| All Clinical Staff | Are responsible for co-operating with the implementation of this procedure as part of their normal duties and responsibilities.  Staff in clinical areas with oxygen must check and sign each day as part of their emergency “Grab Bag” checks that:  Oxygen cylinders have trolleys with wheels  At least one cylinder is full  The cylinders are ready for use in an emergency  Clinical staff will ensure that oxygen cylinders are kept securely and all cylinders can be located. |
| Procurement | Will ensure a suitable supplier is maintained and that all regulations regarding provision, storage and transport of gases is complied with by the supplier. |

**2 REFERENCES, EVIDENCE BASE**

**Resources**

National Patient Safety Agency, NPSA/2009/RRR/006 Oxygen Safety in Hospitals

British Thoracic Society, Guidelines for Emergency Oxygen Use in Adult Patients: Executive Summary (May 2017)

Resuscitation Council UK Immediate Life Support Manual (2015)

**3 ASSOCIATED DOCUMENTATION (if relevant)**

**4 STANDARDS/KEY PERFORMANCE INDICATORS (if relevant)**

**5 EQUALITY IMPACT**

The Trust has a duty under the Equality Act 2010 to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity and foster good relations between people from different groups. Consideration must be given to any potential impacts that the application of this policy/procedure  might have on these requirements and on the nine protected groups identified by the Act (age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion and belief, gender and sexual orientation).

Declaration: The potential impacts on the application of this policy/procedure have been fully considered for all nine protected groups. Through this process I have identified  any potential negative impacts for any of the nine protected groups.

Print name: Kevin Stevenson

Job title: Acting Lead Resusciation Officer

Date: 24/3/20

If any potential negative impacts are identified the Diversity Team must be contacted for advice and guidance: email; [diversity.lypft@nhs.net](mailto:diversity.lypft@nhs.net).

**CHECKLIST**

To be completed and attached to any draft version of a procedural document when submitted to the appropriate group/committee to support its consideration and approval/ratification of the procedural document.

This checklist is part of the working papers.

|  | **Title of document being newly created / reviewed:** | **Yes / No/** |
| --- | --- | --- |
| **1.** | **Title** |  |
|  | Is the title clear and unambiguous? | *Yes* |
|  | Is the procedural document in the correct format and style? | *Yes* |
| **2.** | **Development Process** |  |
|  | Is there evidence of reasonable attempts to ensure relevant expertise has been used? | *Yes* |
| **3.** | **Content** |  |
|  | Is the Purpose of the document clear? | *Yes* |
| **5.** | **Approval** |  |
|  | Does the document identify which committee/group will approve it? | *Yes* |
| **6.** | **Equality Impact Assessment** |  |
|  | Has the declaration been completed? | *Yes* |
| **7.** | **Review Date** |  |
|  | Is the review date identified? | *Yes* |
|  | Is the frequency of review identified and acceptable? | *Yes* |
| **8.** | **Overall Responsibility for the Document** |  |
|  | Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document? | *Yes* |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of the Chair of the Committee / Group approving** | | | |
| If you are assured this document meets requirements and that it will provide an essential element in ensuring a safe and effective workforce, please sign and date below and forward to the chair of the committee/group where it will be ratified. | | | |
| Name | *n/a* | Date | *27/03/2020* |
| **Name of the chair of the Group/Committee ratifying** | | | |
| If you are assured that the group or committee approving this procedural document have fulfilled its obligation please sign and date it and return to the procedural document author who will ensure the document is disseminated and uploaded onto Staffnet. | | | |
| Name | *Cath Hill* | Date | *28/03/2020* |