

Oxygen Policy and Procedure

Approved by:

Date of approval:

Originator: **Medical Director**

AIM AND SCOPE OF PROCEDURE

Oxygen therapy requires the use of oxygen cylinders, oxygen concentrators, or oxygen piped from a remote source. After consideration the pros and cons of each of these options, Katharine House Hospice has opted to use oxygen cylinders, although it will use a patient's own oxygen concentrator if this is brought in from their home. This policy describes the limited indications for oxygen therapy at the hospice and the associated risks. The subsequent procedures describe the ordering, delivery, handling and storage procedures that ensure that safety and a full audit trail is maintained.

All clinical staff must be familiar with this policy and procedure, as must any other staff member involved in organisational risk management or who plays any role in the procurement, storage or disposal of oxygen cylinders.

RELATED POLICIES

Medicines management policy and procedure
Fire safety procedures
Staff Clothing Policy

STAFF RESPONSIBILITIES

Medical Director	The overall use of medical gases in the hospice
Senior Nurse	Ordering of medical gases in the hospice
All Nursing Staff	Storage of the gas cylinders Moving of cylinders within the hospice Changing of cylinders
Handyman(when available)	The moving of cylinders within the hospice

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Policy

The questionable benefits of oxygen therapy in the hospice setting

Human life is dependent upon aerobic metabolism and this requires a constant supply of oxygen to the body tissues. 98% the oxygen in arterial blood are attached to haemoglobin and 2% are dissolved in plasma. Breathing oxygen-enriched air can provide modest increases in the amount of oxygen carried in the blood, which in some cases can be therapeutically helpful.

Oxygen therapy is often given to breathless patients. However, there are many causes of breathlessness and not all breathless patients have an oxygen deficit in their circulation. For example, in a study of 51 hospice patients with breathlessness, only 17 had an oxygen deficit in the blood.

The mere fact that breathless patients are given a gas by a facemask to help them breathe can provide some symptomatic benefit. It has been demonstrated that many hospice patients with breathlessness derive as much symptomatic benefit from piped air as they do from piped oxygen. In many cases, oxygen therapy might be an expensive placebo therapy in the hospice setting.

The hazards of oxygen therapy

The main stimulus to continue breathing in some patients with severe Chronic Obstructive Pulmonary Disease is a build up of carbon dioxide in the blood. Oxygen therapy can potentially remove this excess carbon dioxide and kill these patients.

Air comprises 21% oxygen. It is this oxygen that allows fire to burn. Because oxygen is colourless, odourless and tasteless, a dangerous build-up of oxygen in the atmosphere is potentially undetectable. If the proportion of oxygen in the air increases to just 24%, many items (including hair and clothing) combust much more easily; the flames are hotter; and the fire is much harder to put out. At least one palliative care patient in the United Kingdom has died as a direct result of the extensive facial burns sustained by smoking whilst using an oxygen mask.

The jet leaving an oxygen cylinder is 100% oxygen, and the friction associated with its release can heat it up. In this environment, oil, grease and a range of other substances can spontaneously combust, potentially resulting in a serious explosion.

The main risks associated with oxygen use in the hospice setting are:

1. Administration of oxygen to a patient for whom such therapy is contraindicated.
2. Smoking whilst using an oxygen mask.
3. Inadvertent oxygen enrichment of a confined space, either through insufficient ventilation or through inadvertent oxygen leakage.
4. Explosion risks when cleaning the outlet of an oxygen cylinder.

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Procedure

The safe handling of oxygen cylinders

- All gas cylinders must be handled safely from the perspective of both the handler(s) and the gas. They must be moved slowly and gently, in line with the moving and handling guidance for heavy objects. They must be stored in an upright position at all times and only transported on the custom-built trolleys. When not on a trolley they must be chained upright against a wall in the oxygen shed. Staff must wear shoes with toe protection when handling cylinders, in accordance with the Staff Clothing Policy. The cylinders must be kept dry, clean, and free from grease and dusts.
- Katharine House Hospice uses Oxygen HX cylinders supplied by BOC. These are black with a plain white neck, and are clearly marked as containing oxygen. They have an advanced valve system that abolishes the need for them to have an external regulator or for the cylinders to be primed before use. When full, an Oxygen HX cylinder weighs about 17kg and contains about 2300 litres of oxygen, enough to last for 19 hours at a flow rate of 2 litres/minute or 2.5 hours at their maximum flow rate of 15 litres per minute.
- Each time an oxygen cylinder is required for clinical use by a particular patient, its colour, labelling, general condition and expiry date must always be checked before use, even if it has been used before.
- There must be no smoking or naked flames within the vicinity of oxygen cylinders. Patients must be informed that they and their visitors must not smoke in the vicinity of the oxygen cylinder, in addition to the placement of the sign on the cylinder as described in the section on “The Clinical Use of Oxygen Cylinders”.

The safe storage of oxygen cylinders

- There is a designated shed for the storage of oxygen cylinders outside the laundry. It must be kept clean and orderly, and it must be kept locked at all times when not in use. Domestic staff must clean it once every month. No smoking is allowed in the vicinity of the gas storage area or in proximity to any gas cylinder. There are numerous hazard warning signs on the shed itself and there is a “No Smoking” notice outside the laundry. The key for the oxygen shed is kept with the mortuary keys, which are held on the Inpatient Unit.
- The only time it is permissible for unused oxygen HX cylinders to be stored anywhere other than in the oxygen shed is when a patient is receiving oxygen therapy on the hospice premises. At such times a maximum of two cylinders per patient on oxygen therapy can be stored in the mortuary, chained to the wall in an upright position, one or both of which may be full. It is also acceptable to have one oxygen cylinder secured to an oxygen trolley in the mortuary, so long as it is stored with its handle facing the wall to minimise the risk of it being knocked over. These measures are primarily intended to prevent nurses from having to go to the designated oxygen shed during the night. Any empty cylinders must be put

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in the oxygen shed in the morning. By using the storage facility in the mortuary, there is no need to ever store more than one oxygen cylinder in the treatment room. Whenever there are no inpatients on oxygen therapy, there should be no oxygen cylinders stored in the mortuary.

- The hospice stores a minimum of twelve full Oxygen HX cylinders. The fullness of a cylinder can be verified by the reading on its inbuilt pressure gauge, which shows the correct reading whether or not the cylinder is in use. For safety reasons, it is imperative that full oxygen cylinders are stored upright and chained to the wall of the oxygen shed.
- All oxygen cylinders must be kept clean, free from grease and away from potential fire hazards. Any damaged cylinders must not be used, but returned to BOC next time they visit the hospice. In particular, a dirty outlet nozzle must not be cleaned by releasing oxygen out of the cylinder in order to blow the dirt off, as this represents a serious explosion risk. Nursing staff must ensure that all gas cylinders are correctly labelled with the name of the gas, both when putting them into the shed and again before administering them to patients.
- Empty Oxygen HX cylinders are identified by the reading on their inbuilt pressure gauge, which shows the correct reading whether or not the cylinders are in use. For safety reasons, it is imperative that they are stored upright and chained to the wall of the shed.

The ordering and supply of oxygen cylinders

- A minimum of twelve oxygen HX cylinders are stored in the oxygen shed. The number of full oxygen cylinders is checked at least once each week by the nursing team. At the same time, it is checked that all cylinders are undamaged and properly retained, and that the shed is clean and secure. Stock levels can be higher and stock checks must be more frequent when oxygen cylinders are in heavy use.
- The nurse in charge orders more oxygen cylinders when stocks fall below the threshold level. This can be done during normal office hours on Mondays to Fridays (excluding Bank Holidays).
- BOC is our sole contracted supplier of oxygen to the hospice (Telephone: 0800-111333, contract number: 2007239). No other supplier must be used.
- A nurse or trained member of the business team must check the delivery on arrival. This includes counting the number of cylinders that have been delivered, confirming that they are all oxygen cylinders and within date, and verifying that they are all in good condition. After checking the delivery, the shed is unlocked so that the delivered cylinders can be put in it and the empty cylinders taken away. The receipt is then delivered to the accounts department, either directly or by placing it in the message book on the ward.
- Emergency orders of oxygen cylinders over the weekend are more expensive. Therefore, staff are requested to ensure that stock levels are maintained to avoid the need for this.

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The safe clinical use of oxygen cylinders

- Oxygen must only be used for clinical purposes, *and only when such therapy has been prescribed on the patient's drug chart.*
- If a newly-admitted patient needs oxygen therapy, then they must be seen by a doctor at the earliest opportunity so that it can be prescribed. As an interim measure, patients who have routinely used oxygen at home can continue to use it at their normal flow rate without a prescription for the first two hours of their admission, by which time a prescription must have been written. Patients whose oxygen therapy was only initiated in an ambulance en-route to the hospice must not continue this therapy in the hospice without a medical review and a valid prescription.
- Any part-used oxygen cylinders in the hospice must be finished before starting a new cylinder. It is acceptable for a cylinder that has been used by one patient to be used by another patient when the first patient has no obvious future potential need for oxygen therapy, although the associated tubing and mask/nasal cannulae must be new for each patient.
- Whenever an oxygen cylinder is required for clinical use, the nurse preparing it places a laminated sign around the neck of the cylinder that states: "There is a significant risk of fire injury when oxygen is used near lit tobacco or naked flames. Please do not smoke whilst using this oxygen and please do not take this cylinder into the smoking room."
- Oxygen therapy could be required by patients in all care settings within the hospice. Sometimes patients bring their own supply with them when they visit the hospital. Whenever an outpatient with their own oxygen cylinder attends for the whole day, we change them over to one of our own cylinders. This is to ensure that their own supply will be sufficient to get them home again at the end of the day.
- Whenever an inpatient comes in with their own oxygen cylinder, we change them over to one of our own cylinders upon arrival and ask the family to take the patient's own cylinder home again.
- Sometimes a patient will bring their own oxygen concentrator in with them and request to continue using this during the admission. We are happy for them to do this, but the team must then pay necessary attention to the factors detailed in the section on "the use of a patient's own oxygen concentrator".

The preparation of a new Oxygen HX Cylinder for clinical use

1. Make sure your hands are dry, clean and free of grease or powders. This includes wiping your hands free of surplus hand cream.
2. After checking that the oxygen cylinder is black with a plain white neck, labelled as containing oxygen, in good condition and within its expiry date, load it into the customised trolley for oxygen cylinders.
3. Attach the appropriate tubing and mask/nasal cannulae (as indicated by the prescription) to the Schraeder outlet of the cylinder.

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4. Ensure that the flow rate regulator on the top of the cylinder is set to 0 litres/minute and then use the handwheel on the side of the valve to open it ready for use.
5. When ready to administer oxygen to the patient, use the flow rate regulator on the top of the cylinder to regulate the flow rate of oxygen out of the cylinder to that specified in the prescription.

The storage of part-used Oxygen HX cylinder

1. If no patient in the hospice requires oxygen therapy at the time that a part-used oxygen cylinder is removed from the bedside of a patient, it can either be stored in the treatment room as the single cylinders allowed there or it must be returned to the oxygen shed for storage in an upright position, chained to the wall.
2. When storing a part-used oxygen cylinder in the treatment room or oxygen shed, it must always be stored with the handwheel valve closed and the flow rate regulator set to 0 litres/minute.
3. Any such cylinder must be used up before starting a new Oxygen HX cylinder. In order to easily identify such cylinders in the oxygen shed, a label reading "Part-Used Cylinder" must be placed around its neck.

The transportation of single oxygen cylinders in private cars

1. BOC has advised us that there are no specific regulations covering the carriage of medical gases in small cylinders in private vehicles. However, they recommend that people transporting medical gases in private cars display a Transport Emergency Card (TREM card) in their vehicle, and the hospice has a small supply of these cards for use by volunteers. There is no requirement to display an oxygen label on the back bumper of the car, although people can do so if they wish. It is probably wise to advise your motor insurance company if you periodically transport oxygen cylinders in your car.
2. With regard to the magnitude of the risk associated with transporting oxygen cylinders in private cars, BOC indicated that:
 - a. It is acceptable for a patient to use an oxygen cylinder whilst the car is being driven. It does not present an explosion risk, but the car should be adequately ventilated.
 - b. If oxygen cylinders are strapped in to a seat with a seatbelt then they should not be subject to any impact pressure that is likely to make them explode.
 - c. The valve of an oxygen cylinder contains some plastic components that would melt and fail in the event of the cylinder being exposed to fire. This valve failure would ensure that the oxygen is released from the cylinder in a safe way.
3. In view of this advice, Katharine house Hospice will ensure that all volunteer drivers:
 - a. Are issued with their own copy of the hospice's Oxygen Policy and Procedure
 - b. Are and remain prepared to carry oxygen cylinders each time their driving licence and car insurance is checked by the hospice (i.e. at induction and at the annual check).
 - c. Have advised their insurers that they might occasionally transport single oxygen cylinders for medical use by a passenger in their car.

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The use of a patient's own oxygen concentrator

- Some patients on constant long-term oxygen therapy have oxygen concentrators at home. These pieces of specialist equipment are supplied and well maintained by a central company, the details of which are found on the outside of each machine. It may provide such patients with greater confidence to continue using their own oxygen concentrators in the hospice rather than using our oxygen cylinders, which they sometimes perceive as having the risk of running out in the middle of the night whilst they are asleep.
- As we know that these pieces of equipment are well-maintained, we are happy for them to be used on our premises. However, they must be PAT tested at the earliest opportunity.
- Oxygen concentrators must not be located in a confined or poorly ventilated space or in a location where the electricity supply cable could come into contact with water. They must also be positioned in a location that does not disturb other patients by virtue of their noise or heat. Lastly, all associated cables must be routed (and possibly covered) in such a way as to minimise the risk of tripping over them.

REFERENCES

National Minimum Standards, Hospice Standard H12.6

Health and Safety Executive. Take care with oxygen.
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