East London NHS
NHS Foundation Trust

POLICY AND PROCEDURE FOR THE SAFE USE OF MEDICAL GASES

Title:	Policy and Procedure for the Safe Use of Medical Gases
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Summary:	The purpose of this policy is to describe the measures ELFT considers necessary to ensure the safe use of medical gases and reduce any risks associated with each gas.
Associated Documents:	Medicines Policy Incident Reporting Policy Infection Control Guidelines
Target Audience:	All staff in ELFT who handle medical gases, this includes nurses, allied health professionals and porters.
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Author's Name:	Shameem Mir, Chief Pharmacist Manpreet Saini, Community Health Newham Directorate Pharmacist
Sponsor's Name:	Dr Kevin Cleary, Medical Director
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1.0	July 2011	Shameem Mir	Final	
2.0	November 2014	Manpreet Saini	Final	Updated to include the training that staff at East Ham Care Centre undertake Updated to include and make reference to fire protocol Updated in light of NHS Protect Circular S/G/06/2014-15 'Guidance on the security and storage of medical gas cylinders'.

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PURPOSE

The purpose of this policy is to describe the measures East London NHS Foundation Trust (ELFT) considers necessary to ensure the safe use of medical gases and reduce any risks associated with each gas.

SCOPE

This Policy and Procedure covers the use of medical gases in in-patient and Community Hospitals, Community Clinics and other departments where ELFT staff are providing care to patients.

It also gives advice to ELFT Staff, who are involved in the care of patients in their own homes, on the safe use of medical gases. It does not cover the supply of medical gases to these patients.

This Policy and Procedure does not cover the administration equipment associated with use of medical gases.

RESPONSIBILITIES/DUTIES

Managers

Managers are required to ensure that:

- This policy is available to all staff who handle medical gases
- Risks assessments are undertaken for using medical gases
- Appropriate standing operating procedures are written for using medical gases
- Appropriate equipment is available to promote the safe use medical gases
- Staff receive training in the safe use of medical gases
- Incidences and accidents related to the use of medical gases are reported appropriately via the Trust DATIX system.

Staff Working with Medical Gases

All staff who handle or use medical gases must:

- Comply with this policy
- Follow all information, instruction and training provided
- Use equipment safely and appropriately
- Take an active role in promoting safety both to the recipients of gas therapy and other members of staff
- Report all incidents, accidents or “near misses” using DATIX

1.0 Introduction

Medical gases are licensed medical products that are used for a variety of purposes in caring for patients. They are provided by contracted suppliers in the form of small cylinders, large cylinders that are used in a manifold room for piped gas systems, liquid cylinders (liquid oxygen) or a cryogenic cylinder in the case of liquid nitrogen. All personnel working with medical gases must be suitably trained before they can handle and/or administer these gases to patients.

2.0 Training

Under the Health and Safety at Work Act 1974 it is the responsibility of employers to train their employees on the recommended safeguards relating to products and equipment used at work. With regards to medical gases training should be provided in the following areas:

- Explanation of medical gases their properties and their clinical uses
- Medical gas cylinders identification and labelling
- Cylinder storage and handling
- Dealing with faulty cylinders and other equipment
- Fire and explosion risk associated with medical gases
- Practical use of cylinders including the types of valves used for each type and size of cylinder, leak tests as well as gas flowmeters used to regulate flow
- Medical gas pipeline systems
- Training in the handling of liquid nitrogen (if appropriate for role)

2.1 Training should be provided on a regular basis in line with the statutory and mandatory training matrix, and personnel records must be maintained.

2.2 Staff must attend the BOC yearly updates to retrain themselves for the safe handling of medical gases and handling of medical gas cylinders.

3.0 Medical Gases In Cylinders

For many settings in ELFT, medical gases are provided in cylinders that are stored and transported to the area of use when required, for example oxygen cylinders used in emergency situations.

4.0 Ordering Medical Gases And Inventory Control

4.1 The service lead for each clinical setting that uses medical gases should designate a suitably trained person with the responsibility for ordering and maintaining inventory control for medical gases.

4.2 Medical gas cylinders belong to the contracted supplier and are rented by ELFT.

The frequency of ordering depends on the amount used but should be frequent enough to ensure adequate supplies are always available.

4.3 Written orders should be prepared so delivery notes and invoices can be matched.

4.4 A record must be maintained for each type of medical gas cylinder kept at each community setting showing:

- Maximum number of cylinders to be kept in cylinder store
- Dates and quantities received from suppliers
- Date and quantities issued to each location
- Expiry date for each cylinder issued

This record should be used for inventory control purposes and for establishing maximum numbers of stock to be kept at the unit. It is very important that accurate inventory control is maintained to avoid wastage or loss. Some medical gas suppliers will supply tags to assist with this process.

5.0 Storage Of Medical Gas Cylinders

5.1 The service lead for each clinical setting that uses medical gas should designate a staff member to ensure medical gases are stored correctly.

5.2 Medical gas cylinders must be stored separately from any non medical gases in a dedicated area which must be designed to the requirements of HTM 02-01.

5.3 Cylinders must be stored under cover, preferably inside, in a dry, clean secure lockable area not subjected to extremes of heat or cold.

5.4 Cylinders must not be stored near stocks of combustible materials or near sources of heat.

5.5 Warning notices prohibiting smoking and naked lights must be posted at the cylinder store that is clearly visible to all.

5.6 The storage area must provide adequate space to allow segregation of cylinders of different gases as well as full and empty cylinders. It must also be large enough to allow easy access for stock examination and cylinder rotation.

5.7 Full cylinders should be used in strict rotation according to expiry dates.

5.8 When new cylinders are placed into the storage area, inventory control measures must be employed (as per 4.4 above) the expiry dates on each cylinder should be recorded and checked regularly to avoid cylinders with short dates being distributed to areas of use. Cylinders with less than 3 months

expiry should be returned to the supplier along with empty containers.

5.9 F size cylinders and larger must be stored in an upright manner by the use of safety chains.

E size cylinders and smaller should be stored horizontally on racks.

5.10 Gas cylinders must always be firmly secured and never left unsupported.

5.11 Cylinders in a clinical area (ward or unit) must be stored on a secure trolley or suitable rack in a well-ventilated “parking” area that will not block doorways or fire exits.

5.12 In the event of an emergency the Emergency services should be advised of the location of the cylinder store by the responsible person for fire safety at the site.

6.0 Handling Medical Gas Cylinders

6.1 All personnel handling medical gas cylinder must receive regular manual handling training in line with the statutory and mandatory training matrix.

6.2 Personnel moving cylinders should be aware of the hazards of moving cylinders and wear appropriate Personal Protective Equipment (PPE).

6.3 Cylinders must be handled with care, never knocked violently or allowed to fall over.

6.4 Cylinders must only be moved with the appropriate size and type of trolley. When cylinders are moved with apparatus attached, the cylinder valve should always be closed.

6.5 When in use cylinders must be firmly secured to a suitable cylinder support.

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

7.0 Use Of Cylinders

7.2 When using medical gas cylinders it is most important that no part of the cylinder valve or equipment is either lubricated or contaminated with oil or grease.

7.3 Special care is needed with the use of hand creams as these could provide sufficient contamination to the medical cylinder valve surface when handling the cylinder to cause an ignition when the valve is turned on.

7.4 Before use ensure that:

- the correct cylinder is selected for the application and where a regulator is required, check that the cylinder product and filling pressure are compatible

with the selected regulator

- only correctly designed valve spindle keys are used to open the cylinder valve
- the cylinder contents are checked to ensure that sufficient gas is available for the required use (contents may be determined by reading the gas regulator pressure gauge)
- the cylinder is in date

7.5 The cylinder should be prepared for use as follows:

- remove the disposable seal by pulling the tear tag and discard
- for cylinder fitted with bullnose outlet valves, remove the cap from the valve outlet by pulling forward and leaving to one side
- for cylinders fitted with pin-index valves, remove the disposable seal and outlet clip and discard
- check for signs of oil or grease on the cylinder valve. If either is discovered do not use
- check that the regulator or equipment to be attached to the cylinder is appropriate for the cylinder to be used
- ensure that the regulator or equipment to be attached to the cylinder is also free of oil or grease
- check that the 'o' ring or sealing washer is in good condition. Replace it if shows any signs of wear or damage
- only reasonable force should be used to attach a regulator to the cylinder. Never use excessive force as this may damage the valve outlet threads
- open the cylinder valve slowly with a standard valve key or handwheel. Fully open the valve and then close a quarter turn to enable subsequent users to distinguish between and open and closed valve
- leave the spindle key in the valve so that it may be closed in an emergency
- ensure that the equipment operating instructions are available. Cylinders should be checked regularly whilst in use to ensure that they have sufficient content and that leaks do not occur

7.6 Checks must be made to avoid leaks of gas while using gas cylinders. The procedure for checking is as follows:

- listen for hissing sound from cylinder connections
- close the cylinder valve and verify the leak by noting any fall in the regulator pressure gauge reading
- tighten connections and check for leaks again
- if a leak is still present, do not attempt to use sealing or jointing compounds to stop leak but notify the supplier as soon as possible to

obtain advice. Do not use the cylinder

7.7 After use ensure that:

- the cylinder valve is closed immediately, using a correctly designed cylinder valve key with moderate force only
- that excess gas from the equipment regulator and connecting hoses are vented by opening the equipment flow control valves for a few seconds
- after venting, the control valves are closed
- the equipment connectors are removed from the cylinder using the correct tool or manually
- on cylinders fitted with bullnose valves, the valve outlet protection is replaced to protect the valve outlet from contamination
- the cylinder valve is closed
- all empty cylinders are returned to the appropriate place in the cylinder store

8.0 Piped Medical Gases

Recent guidance from NHS National Patient Safety Agency has stated that the use of oxygen cylinders in a ward environment should be minimised and wherever possible piped oxygen should be provided. Guidance for planning piped oxygen must be in accordance with HTM 02-01 Part A and B. Key Personnel in ELFT responsible for Medical Gases Pipeline Systems (MGPS) are defined in Appendix A.

ELFT is working towards having piped oxygen available in all its community hospitals, where appropriate.

8.1 All personnel handling or responsible for medical gas manifold equipment must ensure they are familiar with the operating and safety procedures laid down in the manufacturer's user manual. They must have undertaken the training outlined in Section 2.

8.2 The procedures for handling and storage of medical gas cylinders used with manifold equipment for piped gases is the same as listed above for medical gas cylinders.

8.3 Only personnel trained in the use of cylinders in the manifold room are allowed to enter the room and replace the large cylinders used for supplying piped medical gases.

8.4 When supplying cylinders to the manifold room, ensure that:

- the pipeline connections are leak tested when connecting to cylinders,

using an approved leak test solution

- any separate emergency cylinders are full and available for use and that they are checked and stock rotated on a regular basis
- the manifold room is not used as a general cylinder store
- all empty cylinders are removed immediately from the manifold room and returned to the empty cylinder storage area of the main cylinder store

8.5 Where cylinder manifolds are used it is important to ensure that:

- adequate training is given to all personnel involved in pipeline operations
- written procedures are readily available giving details of operating instructions and actions to be taken in the event of a gas supply failure or maintenance shutdown
- at maintenance shutdown, written warnings are given to all persons responsible for gas supplies in line with the “Permit to Work” system and this must be done with the Estates Department
- in the event of an emergency failure, all hospital departments are advised verbally as an immediate priority

8.6 For automatic changeover manifolds ensure that:

- all cylinder valves on both banks are open at all times (with the exception of the emergency standby cylinders)
- as soon as the running bank cylinders are empty and the manifold changeover has taken place, close the cylinder valves and replace with full cylinders
- open the cylinder valves on the reserve bank and complete leak checks

8.7 For manual changeover manifolds ensure that:

- the cylinder valves on the running bank are open
- the cylinder valves on the reserved bank are closed
- as soon as the running bank cylinders are empty, open the valves on the reserve bank and manually changeover the manifold
- the empty cylinders on the now empty bank are replaced
- the connections are leak tested and the cylinder valves then left closed

8.8 Liquid Oxygen (Cryogenic liquid)

- Piped oxygen can be supplied from a stainless steel vessel containing liquid oxygen
- This source of oxygen is connected to the piped line system and has its dedicated control panel for monitoring purposes
- Liquid oxygen vessels are refilled by the gas provider at frequent intervals to ensure a constant supply of oxygen

- Caution must be taken to avoid the following possible health hazards associated with liquid oxygen:
  a) Effects of cold on lungs
     Transient exposure to very cold gas can provoke an attack of asthma in susceptible subjects. Prolonged breathing of extremely cold gas may damage lung tissue
  b) Cold burns and frostbite
     Because of the low temperature of liquid gases, the liquid, cold vapour or gas can produce damage to the skin. Unprotected parts of the skin coming in contact with uninsulated items of cold equipment may also stick fast to them and the flesh may be torn on removal
- If for any reason hospital personnel are involved in handling or connecting liquid oxygen to the pipe line system personal protective equipment must be available
- Should a spill or splash of liquid oxygen occur prompt medical attention must be obtained. Guidance is given in Appendix B

8.9 If for any reason work needs to be undertaken that affects the piped medical gas system, a “Permit to Work” systems must be used and this must be done with the Estates Department.

8.10 If for any reason the piped medical gas system is not working:

- Contact the Designated Officer (Medical or Nursing) at the hospital or unit responsible for piped medical gases
- Use medical gas cylinders as described above until instructed to recommence using the piped medical gas system

9.0 Types Of Medical Gases Used In ELFT Settings

9.1 Medical Oxygen

Oxygen is one of the most common medicines used in hospital settings. It is administered to patients across a range of specialties to provide oxygen to the lungs and thereby increase the availability of oxygen to the body tissues. If used appropriately, oxygen is life-saving and part of first-line treatment in many critical conditions; however, if used incorrectly it may cause serious harm or even death.

9.1.1 Care and Handling of Oxygen Cylinders and their Regulators

- All staff involved with medical oxygen should be fully trained in the use of cylinders and the attachment of regulators as well as the fire risks associated with oxygen
- Ensure hands are clean before handling oxygen cylinders due to the risk of combustion from oils and grease. In particularly, make sure that hands are

adequately dried after the use of alcohol gels

- Clean clothing, free from oil and easily combustible contaminants should be worn when handling oxygen cylinders
- Make sure that the oxygen cylinder outlet and oxygen regulator inlet are clean before attaching a regulator. Always open the cylinder slowly and check for leaks. Close cylinder valves when not in use
- When using medical oxygen cylinders ensure adequate ventilation. If clothing becomes impregnated with oxygen (due to leak) keep away from sources of ignition or open flames. Clothing impregnated with oxygen should be ventilated in fresh air for a minimum of 15 minutes
- Although the risks are small, there is a potential for burns to hands and face if hand creams or other petroleum based lotions are used on patients receiving oxygen therapy

9.1.2 Prescribing Oxygen

- Oxygen should be prescribed in accordance with current British Thoracic Society guidelines. For the purposes of saving life, in an emergency, oxygen should always be given immediately and documented later
- Prescriptions for oxygen must be clearly written on the prescription chart indicating the dose to be administered, the method of delivery and the target saturation required
- When oxygen is no longer required by a patient, it must be crossed off the prescription chart by the prescriber along with the date of discontinuation

9.1.3 Administering Oxygen to Patients

- Only appropriately trained practitioners should administer oxygen to patients
- Before administering oxygen to a patient, the practitioner must confirm the identity of the gas, check the expiry date of the gas and ensure adequate supplies of oxygen are available to maintain the flow rate prescribed
- Care must be taken to avoid confusing oxygen with medical compressed air. Air flowmeters should be removed from wall outlets when not in regular use.
- Appropriate monitoring and flow rate devices including pulse oximetry must be used to achieve the target saturation prescribed
- Practitioners must regularly monitor saturation levels and adjust flow rates to keep within the target saturation range
- Accurate documentation of flow rates and target saturations achieved must be recorded in the patient's notes

9.1.4 Emergency Oxygen Cylinders

- Even if piped oxygen is available at the patient's bedside, it is important that each hospital has emergency cylinders of oxygen available for transporting

patients and/or for use in areas where piped oxygen is not provided

- Community Clinics should consider the type of intervention being carried out and following a risk assessment have emergency oxygen available if necessary. If emergency oxygen is required the service should have written guidelines for its use in place
- The expiry date and quantity of gas in each cylinder must be checked weekly and always immediately before the start of clinics. Within community hospitals this is the responsibility of the modern matron who may delegate it to a suitably trained person. Within community clinics and other units this is the responsibility of the service lead who may delegate it to a suitably trained person.

9.1.5 Oxygen in Patient's Own Home

- Oxygen may be supplied to patients for use in their own home
- This will be arranged by the patient's General Practitioner
- ELFT nurses who attend patients at home should provide advice on the safe use of oxygen if required
- Safety guidelines for patients in their own homes are available from the Medicines Management Team

9.1.6 Piped Oxygen Supplies In Case of Fire

- In case of a fire, trained and assigned personnel on the Duty Senior Nurse rota must follow the Trust's Fire protocol regarding the isolation of fixed oxygen.

9.2 Entonox (Mixture of 50% Nitrous Oxide and 50% Oxygen)

Entonox is used exclusively for the relief of pain.

9.2.1 Care and Handling of Entonox Cylinders

- Nitrous Oxide begins to separate out from Entonox if the temperature falls below about -6°C. A homogenous mixture is again obtained when the temperature is raised to above 10°C and the cylinder is agitated
- Before use, to ensure it is properly mixed, cylinders should be stored horizontally for 24 hours at a temperature above 10°C. If this is not practicable, before use the cylinders must be maintained at a temperature above 10°C for at least 2 hours and then completely inverted 3 times or placed in warm water at body temperature for 5 minutes and then completely inverted 3 times
- Entonox is non-flammable but strongly supports combustion (including some materials which do not normally burn in air)
- Entonox is highly dangerous when in contact with oils, greases, tarry substances and many plastics due to the risk of spontaneous combustion

with high pressure gases

9.2.2 Prescribing Entonox

- Legally Entonox is a medical product but unlike oxygen, it does not require a prescription by a medical practitioner before it can be used
- Only trained practitioners may use Entonox and its use must be documented in the patient's notes

9.2.3 Dosage and Administration of Entonox

- Before a patient uses Entonox, it is important that the trained practitioner responsible for administration checks that there is an appropriate amount of gas in the cylinder to provide analgesia throughout the proposed procedure
- Since Entonox is self-administered it is important to ensure the patient understand how the apparatus works to produce analgesia
- The dose required for analgesia depends on the amount of gas inhaled. Its effects are apparent within four to five breaths reaching maximum effect within about two to three minutes of inhaling the gas
- The gas flow stops when the patient removes the mouthpiece or mask
- Overdosing does not occur since continued administration leads to light anaesthesia, causing the mask or mouthpiece to drop away as the patient relaxes
- Administration of Entonox must be documented in patient's notes

9.3 Medical Air

Like atmospheric air, Medical Air contains 21% oxygen. It is used:

- as a replacement for atmospheric air when the atmosphere is contaminated by noxious fumes, vapours or gases
- in anaesthesia as a carrier gas for volatile anaesthetic agents
- as a power source for pneumatic equipment
- in ventilators and incubators to provide uncontaminated and controlled air flows

9.3.1 Prescribing Medical Air

- Legally Medical Air is a medical product but unlike oxygen, it does not require a prescription by a medical practitioner before it can be used
- Only trained practitioners may use Medical Air and its use must be documented in the patient's notes

9.3.2 Care and Handling of Medical Air Cylinders

- The guidance in section 6.0 regarding the handling of medical gases should

be followed when handling Medical Air cylinders

9.3.3 Dosage and Administration of Medical Air

- For breathing purposes, medical air is administered by various means, commonly by self-contained or compressed air line breathing apparatus
- In anaesthesia, medical air is administered from a cylinder and valve assembly or pipeline through a face mask or endotracheal tube
- Medical air is contra-indicated when oxygen or other gaseous combinations are required. Utmost care must be taken to avoid using medical air when oxygen has been prescribed

- To protect against medical air being used instead of oxygen, medical air flow meters should be removed from the wall outlet when not in regular use

9.4 Liquid Nitrogen

Nitrogen is a normal constituent of the atmosphere making up about 80% of the air we breathe. When cooled to below its boiling point (-196°C) gaseous nitrogen can be condensed to a liquid. It will remain in this form provided it remains below this temperature. On rapid warming the vapour may be briefly visible as a white mist.

9.4.1 Ordering Liquid Nitrogen

Liquid nitrogen is ordered from a supplier of cryogenic gases. The liquid gas is delivered by the supplier and transferred to a special storage cylinder which maintains the temperature required to keep the gas in the liquid form.

9.4.2 Storage of Liquid Nitrogen

Liquid nitrogen must only be stored in containers designed for storing cryogenic liquids. It must be stored in a well ventilated secure area that is only accessible by persons trained in the proper handling of liquid nitrogen.

9.4.3 Care and Handling Liquid Nitrogen

There are two main hazards associated with liquid nitrogen:

- Cold burns or frostbite when in contact with the skin or respiratory tract
- Asphyxiation due to high concentrations, and the displacement of oxygen in the atmosphere. Breathing a pure nitrogen atmosphere will produce immediate loss of consciousness and almost immediate death

Therefore, when handling liquid nitrogen, utmost care must be taken to reduce the risk of these two hazards. Personal Protective Equipment (PPE) must always be used when handling or using liquid nitrogen.

Types of PPE:

- Loose fitting non-absorbent leather gloves must be worn when transferring liquid nitrogen from one container to another
- Eye goggles or a full face-shield must be used to protect the eyes and face
- Splash resistant aprons must be worn to protect from spillage onto clothing
- Appropriate shoes must be worn to protect feet

Should a spill or splash of liquid nitrogen occur prompt medical attention must be obtained. Guidance is given in Appendix B.

9.4.4 Transfer of Liquid Nitrogen into Containers for Use in Clinics

Only personnel trained in the safe handling of liquid nitrogen may be involved in the transfer of the product from the main storage vessel into special Dewar containers that are used in clinical areas. To preserve the liquid state of the gas, liquid nitrogen should only be decanted into these specially designed vessels. These containers must be visually inspected each time they are refilled and any defects must be reported to the appropriate manager. When transported to the clinical area, the Dewar container of liquid nitrogen must be placed in a safe place until required.

9.4.5 Use of Liquid Nitrogen in Clinics

Liquid nitrogen must only be used by healthcare professionals trained in the appropriate use of the product and who are fully aware of the hazards associated with the product.

Liquid nitrogen remaining in the vessel at the end of the clinic must be allowed to evaporate from the container. It must never be poured out of the container.

9.4.6 Offsite Use of Liquid Nitrogen

When liquid nitrogen is required for use in GP surgeries, arrangements must be made by the surgery with a commercial supplier. It must not be provided by a ELFT unit or hospital.

10.0 Safety and Security of Medical Gas cylinders and Medical Gase Storage Areas

- Through work undertaken with the British Transport Police, NHS Protect identified that in particular parts of the country, gangs were targeting health bodies' medical gas storage facilities to steal medical gas cylinders for a number of reasons, including their use as a recreational drug, and for the financial value from the sale of cylinder contents and the scrap metal value of the cylinder. The size and portability of medical gas cylinders make them susceptible to being stolen.
- An annual risk assessment should be undertaken by trained staff to establish and re-establish the physical security requirements for the medical

gas storage facilities with a view of ensuring that any breaches or failures in security are addressed as soon as possible.

- Gas cylinders must be tracked from point of receipt into the NHS organisation to their return when empty to the suppliers.
- Any concerns of theft and/or misuse of cylinders must be reported to the Lead Nurse immediately and reported using the Trust Datix reporting system in order for the matter to be recorded, assessed and investigated.
- All personnel involved in the managing of medical gases must be appropriately trained for the management and use of medical gas cylinders, medical gas pipeline systems and VIEs in NHS organisations to equip them to recognise security risks.
- Any new builds or refurbishment of storage facilities should have due regard to incorporating security measures into the early stages of the design process, in discussions with the local police Designing Out Crime Officer/Crime Prevention Design Advisor, involvement of the Local Security Management Specialist and taking account of relevant guidance.
- Any concerns regarding the breach of security, evidence of intruders, evidence of loss or theft of medical gas cylinders must be escalated with the Buildings Manager and Estates straight away. Datix incidents forms must be completed.
- Staff must be made aware and trained about what to do in the case of discovery of a breach of security, evidence of loss or theft of medical gas cylinders. This should be done:
    - via induction
    - through training
    - the use of awareness materials
    - use of policies and standard operating procedures (SOPs)
- Staff must be monitored to ensure that they comply with SOPs, policies and security measures for managing and accessing the medical gas cylinder storage/supply areas and reporting incidents when they occur.
- No untrained personnel should be permitted to handle the security and storage of medical gas cylinders without having received training beforehand.
- Security of medical gas cylinders on wards must be assigned to an

appropriate member of staff in that area.

- Only authorised and assigned members of staff may be given permission by way of carrying keys for areas where medical gas cylinders are being stored. When carrying keys or any other device that allows them access to such areas, the staff member will be responsible to ensure that all areas are left in a secure state to restrict any unauthorised access to medical gas cylinders, whether they are empty cylinders or not.
- Stock levels must be managed by setting an agreed minimum and maximum cylinder stock level.
- The requisitions of all medical gas cylinders must be recorded
- Keys to the medical gas cylinders storage area:
    - must be securely stored
    - restricted to authorised staff only
    - must be on person to authorised staff only to restrict the key holding responsibility (where master keys are used to provide access to storage areas); appropriate measures must be in place to restrict the key holding responsibility to authorised personnel only.
    - must be regulated by undertaking a regular inventory, especially if more than one set of keys are in circulation that provide access to medical gas storage facilities.
    - if lost or missing must be reported using the Datix reporting system and reported to the Duty Senior Nurse.
- Access to the main medical gas storage facility must be controlled. Ideally keys to the medical gas cylinders storage areas must be auditable by signing keys between one staff member to another.
- If numeric key pads are used, are codes must be changed monthly.
- Only authorised staff members may order medical gas cylinders from suppliers in accordance with the Trust's SOP. The supplier may also have to be aware of the individuals from the Trust who are able to order medical gas cylinders from them.

- A record of all the staff who are authorised to order medical gas cylinders must be in operation at all times and reviewed whenever a member of staff leaves or joins and at quarterly intervals periodically.

- Receipt of medical gas cylinders following an order must be witnessed and supervised by appropriate personnel. All received gas cylinders must be checked against a delivery note and the original requisition form to verify that the correct (medical gas) type, cylinder size, and quantity have been received.

- A dedicated stock management system must be used to record the requisition of medical gas cylinders

- There must be a written process in place for the ordering of medical gas cylinder stock from suppliers

- If it is not possible for deliveries to be signed for and witnessed by an appropriate member of staff (e.g. out of hours deliveries), the cylinders must be left in an agreed secure location on Trust premises until the receipt of the cylinders can be validated against the order and the delivery note.

- Internal ordering of medical gas cylinders within the same building such as ward or other inpatient area be done so according to the Trust SOP. Stock levels remaining in the main storage area must be recorded to indicate the transfer of the cylinder(s) from the main storage area to the ward to where they have been transferred to and back.

- Daily stock checks must be carried out in the main storage area of each medical gas cylinder types and of each cylinder size that are being held in the main storage area. In case of any stock discrepancies, the buildings manager must be informed immediately and the issue must be reported using the Trust Datix incident reporting system so that an investigation may be carried out.

- Patients who arrive onto the trust with their own medical gas cylinders may continue to use their own cylinders until empty though the ward should keep a record of this and once empty must transfer this to the main storage site by informing the appropriate personnel so that the supplier can be contacted to have these returned to the appropriate supplier.

- Any attempted or real theft or robbery of medical gas cylinders must be

reported and to the police and Local Security Management Specialist (LSMS) as well as on the Trust's Datix incident reporting system and recorded on NHS Protect's Security Incident Reporting System (SIRS)

- All records of medical gas cylinder stock must be maintained for auditing and reconciliation purposes
- No unauthorised vehicle access to external medical gas storage and VIE areas at any time.

11.0 MONITORING ARRANGEMENTS

The monitoring arrangements are given in Appendix C.

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http://www.nhsbsa.nhs.uk/4430.aspx

http://www.nhsbsa.nhs.uk/Documents/SecurityManagement/Security_of_medical_gas_cylinders_General_checklist.docx

http://www.nhsbsa.nhs.uk/Documents/SecurityManagement/Security_of_medical_gas_cylinders_Physical_security_and_storage_checklist.docx

APPENDIX A – Key Personnel with Specific Responsibilities within the Medical Gases Pipeline Systems (MGPS)

Executive Manager

This is the person with ultimate management responsibility, for the Medical Gas Pipeline System, including allocation of resources and the appointment of personnel, for the organisation in which the MGPS is installed. This may be the CEO, Laboratory Manager or other person of similar authority. The Executive Manager has responsibility for the overall implementation of the operational policy including monitoring of the effectiveness of the policy. The Executive Manager may delegate certain responsibilities and the scope of the delegation shall be clearly set out in the policy.

Estates Operational Manager

The Estates Operational Manager holds responsibility for the integrity of the MGPS. This duty shall include monitoring the implementation of the operational policy, ensuring that the MGPS is compliant with HTM02-01 and ensuring all work on the MGPS is carried out in accordance, where possible, with the permit-to-work procedures.

Authorising Engineer (MGPS)

The Authorising Engineer shall be suitably qualified in accordance with the training requirements identified in Chapter 7 of HTM02-01. The Authorising Engineer shall be responsible for the assessment and subsequent recommendation to the Executive Manager, of appointment of the Authorised Person(s).

The Authorising Engineer shall be independent to the organisation within which the MGPS is located.

Authorised Person

The Authorised Person is defined as that person, designated by the Executive Manager with responsibility for the day-to-day management of the MGPS at particular Trust sites. The Authorised Persons shall be appointed in writing by the Executive Manager on the recommendation of an Authorising Engineer and shall be responsible for issuing permits in accordance with the permit-to-work procedures.

The complete responsibilities and duties of the Authorised Person are outlined in Section 4.0 of HTM 02-01.

Competent Person

The Competent Person is the person who carries out the installation and/or maintenance work on the MGPS. This person must have received appropriate training and should be on a list of Competent Persons for work relating to MGPS. This person can be either in-house or external to the Trust, such as a specialist contractor.

APPENDIX A – Key Personnel with Specific Responsibilities within the Medical Gases Pipeline Systems (MGPS)

Quality Controller

The Quality Controller is responsible for the quality control of medical gases at the terminal units and on the MGPS. The Quality Controller will accept the professional responsibility for the last independent check of an MGPS that, if faulty, could cause critical consequences to patients. The Quality Controller will be contacted by the Authorised Person and the Chief Pharmacist when testing of an MGPS is required. The Quality Controller shall be able to provide documentary evidence of continuing and recent experience in MGPS testing.

The Authorised Person will need to liaise with the Quality Controller before an MGPS can be taken into use, as quality tests may be required before gases are passed to patients.

Designated Officer (Medical or Nursing)

This is the person in each hospital department that the Authorised Person must liaise with on any matters affecting the MGPS and who can give permission for a planned interruption to the MGPS supply.

The Designated Officer will be required to sign the relevant parts of any permit-to-work set up by the Authorised Person.

Deputy designated Officers must also be identified who can cover for the Designated Officer due to absences.

The Designated Officer or their deputy would normally carry out any appropriate action in the event of an emergency (for example isolation of a ward supply).

All Designated Officers shall have received appropriate training on the MGPS relevant to the department in which they are working and also on the actions to be taken in the event of an emergency.

APPENDIX B - First Aid Measures for Treating Burns Associated with Liquid Gases (Liquid Oxygen/Liquid Nitrogen)

INTRODUCTION

Cold burns and frostbite are a hazard related to spills and splashes of liquid gases onto unprotected parts of the skin. Medical attention should be provided as quickly as possible. However, such injuries are not an everyday occurrence and doctors, hospital staff or first aid personnel may not be aware of the basic methods of treatment. Therefore the following first aid measures must be followed.

1.0 The aim of first aid treatment is to raise the temperature of the affected areas of skin slowly back to normal.

1.2 Minor Injuries:

- Move victim to a comfortable room if possible
- Ensure that clothing is loose to provide unrestricted blood circulation. Do not remove clothing that is stuck to the body until area is completely thawed
- Place the affected area of skin in TEPID WATER or run TEPID WATER over the area for half an hour until the skin changes from pale yellow to pink or red. DO NOT use hot water or any other form of direct heat
- Cover the affected area of skin with a bulky dry sterile dressing
- Do not rub the area in attempt to improve blood circulation
- Transport injured person to the nearest Accident and Emergency Department for further medical attention

1.3 Major Injuries:

- Dial 999 for ambulance service and follow procedure for minor injuries

REFERENCES

BOC Care with Cryogenics

BOC Liquid Nitrogen Safety Data Sheet

BOC Liquid Oxygen Safety Data Sheet

APPENDIX C – Monitoring Table

What will be monitored	How/Method	Frequency	Lead	Reporting to	Where would Deficiencies/gaps recommendations and actions go?	Implementation of any Required Change
Appropriate inventory control records	On-going monitoring	3 monthly	Service Managers and Service Leads	AD of the Service	Patient Safety and Quality	Gaps in compliance will be rectified by Service Manager or Service Lead
Staff receive appropriate training for using medical gases	Individual Personal Development Plan	At appraisal	Line Manager	Service Manager	Training Department	Gaps in compliance will be rectified by Service Manager or Service Lead in conjunction with the training department
Errors and Incidents	Analysis of Error Reporting	Monthly	Clinical Governance	Patient Safety and Quality	Integrated Governance	Trend analysis may inform future policy