

Policy Document Control Page

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- 5.10.9 Warning signs – amended
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Originator

Originated By: Lesley Smith

Designation: Chief Pharmacist

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Review

Review Date: 4 November 2019

Responsibility of: Lesley Smith

Designation: Chief Pharmacist

This policy is to be disseminated to all relevant staff.

This policy must be posted on the Intranet.

Date Posted: 16th January 2017

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1 INTRODUCTION

Medical gases are classified as medicinal products under the Medicines Act 1968 and are therefore subject to the same procurement and quality procedures as all medical products.

Pennine Care NHS Foundation Trust provides medical gases that are used by staff for patient care by the following means: -

- Cylinders
- Manifold systems

Pennine Care NHS Foundation Trust recognises its responsibility to implement in full, the safe management of medical gases in accordance with the statutory requirements.

Some services of the Trust receive medical gases delivered by the Medical Gas Pipeline Systems (MGPS) of the Acute Trust partners. The Acute Trusts have a statutory obligation to maintain such MGPS and failure to do so may result in a prosecution under various forms of legislation including the Health and Safety at Work Act 1974, the Pressure Systems Regulations 2000 and the Control of Substances Hazardous to Health (COSHH) Regulations 2002.

This policy applies to cylinders of medical gases supplied by Acute Trust Partners and those supplied by medical gas suppliers (for example Air Liquide, formerly Linde Gas UK).

Review of all aspects of medical gas use within the Trust and implementation of this policy will be overseen by the Drugs and Therapeutics Committee.

2 SCOPE

This policy is intended for use by all staff involved with medical gases, medical gas manifold systems and medical gas cylinders and any related equipment within premises of the Trust, as defined in the Health Technical Memorandum 2022: 1977, irrespective of whether those activities are being undertaken by Trust personnel or subcontractors in their employment.

3 ROLES AND RESPONSIBILITIES

Chief Executive

Responsibility for the management of medical gases, including the allocation of resources and appointment of personnel lies with the Chief Executive for, and on behalf of, the Trust Board.

Head of Estates

The Head of Estates holds responsibility for the integrity of the medical gas manifold systems and outlets.

Also for the negotiation of Service Level Agreements (SLA) on the maintenance of manifold rooms / systems, outlets and the services of the Authorised Person(s).

Estates Department

The Estates Department is responsible for advising Trust Units about the safe storage of medical gas cylinders.

This will also include advice on the order and supply of

- storage cradles
- regulators
- hazard warning notices
- pulse oximeters

Authorising Engineer

This engineer should be suitably qualified in accordance with Health Technical Memorandum (HTM) 02 and will have specialist knowledge of Medical Gas Pipeline System and Manifold Systems. The Authorising Engineer may be employed independently of the organisation employing the Authorised Person.

Authorised Person

A person who has sufficient technical knowledge, training and experience in order to understand fully the dangers involved and who is appointed by the Trust on the recommendation of a Chartered Engineer with specialist knowledge of MGPS (the Authorising Engineer).

The Authorised Person must ensure that work on MGPS and manifolds, is only carried out by appropriately registered Specialist Contractors.

Pennine Care NHS Foundation Trust subcontracts the role of the Authorised Person via the Head of Estates.

Competent Person

A person having sufficient technical knowledge, training and experience to carry out his/her duties in a competent manner and fully understand the dangers involved and whose name is on the register of competent persons.

Pennine Care NHS Foundation Trust subcontracts the role of the Competent Person via the Head of Estates.

Chief Pharmacist

The Chief Pharmacist is responsible for putting systems in place to ensure:

- Medical gas cylinders purchased by Trust Units are of adequate quality and comply with the Medicine Act 1968.
- Trust Units hold adequate medical gas cylinders for normal usage provided that gases are used in an efficient and responsible manner.
- Liaison takes place with the Quality Controller Pharmacist regarding the carrying out of any specific tests in accordance with the permit to work procedures and relevant pharmacopeia standards.

A national code of practice in relation to medical gases for Chief Pharmacists is currently being written. This will be circulated by the Strategic Health Authority Regional Quality Control team (Quality Control North West), when available.

Quality Controller (MGPS) Pharmacist

The Quality Controller (MGPS) Pharmacist is responsible for the quality control of the medical gases being delivered by manifold systems. The Quality Controller Pharmacist works from Quality Control North West.

A national register of Quality Controller (MGPS) Pharmacists is currently being written. This will be circulated by the Strategic Health Authority Regional Quality Control team (Quality Control North West) when available.

The Authorised Person will liaise with the Quality Controller Pharmacist via the Chief Pharmacist and Estates Manager to carry out specific tests in accordance with the Permit to Work procedure and relevant pharmacopeia standards.

Designated Medical Officer or Nursing Officer

- In each department served by a Medical Gas Manifold System, there will be a Designated Officer with whom the Authorised Person will liaise on any matter concerning alterations to the Manifold System.
- The Chief Pharmacist and Estates Manager will maintain a list of the names of the Designated Officers.
- Designated Officers must define arrangements for cover during their absence.

Designated Porters

Designated Porters should be familiar with the system for which they are responsible, and this will include:

- The hazards of compressed gases
- Cylinder colours and labelling
- Actions on finding defective cylinders
- Operation of cylinder valves
- Cylinder storage and handling

- Preparation of cylinders for use
- Selection of appropriate equipment and its connection and disconnection to /from cylinders
- Changing cylinders on manifold systems.

Not all Trust Units employ porters directly. The majority of portering services within the Trust are provided under Service Level Agreement (SLA) with Acute Trusts. Where porters are not employed directly then the role of the Designated Porter must be undertaken by an appropriately trained member of the Acute Trust portering staff.

4 CYLINDER MANAGEMENT

Medical gases are medicines and as such, it is recommended that regardless of operational infrastructure, the Chief Pharmacist should take an active role in the management of medical gas cylinders. It is essential that risk assessments be undertaken as part of the management process.

The Manual Handling Operations Regulations 1992 (as amended 2002) cover the handling and transportation of medical gas cylinders. A risk assessment must be performed by Trust Units for all situations. Attendance at Manual Handling training is essential for all staff handling medical gas cylinders.

The British Compressed Gas Association's (BCGA) Guidance Note GN3 – safe cylinder handling and the application of the Manual Handling Operations Regulations to gas cylinders defines the principles of safe practice for the handling of compressed and liquefied gas cylinders. It explains how compliance with the Manual Handling Regulations may be achieved.

Please also refer to:

- **Standard Operating Procedure for the safe handling, preparation and monitoring of oxygen cylinders (SOP 0030)**

5 HANDLING OF CYLINDERS & STORAGE

5.1 Cylinders

- a) Smoking and naked lights are prohibited in the vicinity of cylinders.
- b) Cylinders must only be handled by personnel who understand the hazards involved and who have received appropriate training.
- c) Cylinders should not be used as rollers or be permitted to strike together violently or be dropped.
- d) Cylinders and valves must be kept free from oil and grease.

- e) Cylinders must not be marked with chalk, crayon, paint or other similar materials, or by the application of adhesive tape. A tie-on label indicating the content state must be attached to the cylinder.
- f) Heavy protective gloves (preferably textile or leather) and protective safety footwear must be worn when loading or unloading cylinders. The gloves, protective boots and overalls must be free from oil and grease.
- g) Cylinders must always be secured during transportation and use.
- h) Cylinders must not be painted or be otherwise obscured in a manner that prevents identification of their contents.
- i) Care must be taken in order to preserve the cylinder labels and surface finish.
- j) Repairs, alterations or modifications must not be undertaken to pressure reducing regulators and components associated with medical gas installations and equipment unless there are available adequate maintenance manuals, service facilities, recommended spares and trained personnel.
- k) Alterations or modifications of gas cylinders and associated equipment must not be undertaken.
- l) Markings used for identification of cylinder contents, pressure testing of cylinders, tare weight etc. must not be defaced or removed. This applies to labels transfers, tags and undertaken marks.
- m) Cylinder valves must always be closed after use and when cylinders are empty. Keys for this purpose must be made readily available. Any gas trapped within the regulator/equipment should be safety vented to atmosphere and the equipment valves re-closed. (Refer to the suppliers operating instructions).
- n) Cylinder valves must not be dismantled.
- o) Medical gas cylinders must not be used for non-medical purposes and cylinders used for industrial purposes must not be used as medicinal appliances. Cylinders for industrial use must be segregated by a physical barrier from medical gas cylinders when stored.

Please also refer to:

- **Standard Operating Procedure for the ordering, delivery, storage and authorisation for payment of Medical Gas Cylinders by Trust Units from Air Liquide directly (SOP 0009)**
- **Standard Operating Procedure for the safe handling, preparation and monitoring of oxygen cylinders (SOP 0030)**

5.2 Unloading of Cylinders

Delivery vehicle hoists or tail loaders must be as clean as is practical and mechanical parts shielded in order to prevent contamination of cylinders with oil or grease.

5.3 Trolleys Trucks and Vehicles

- a) The conveyance used for the transportation of cylinders must be clean and the cylinder supporting surfaces must be free from grease and oil and the conveyance should be used exclusively for the transportation of gas cylinders.
- b) Cylinder trolleys must conform to BS 2718.
- c) Precautions must be taken to prevent cylinders falling from trolleys, trucks and vehicles.

5.4 Transportation of Cylinders with equipment attached

Where it is necessary to transport cylinders with equipment attached, unless it is essential for a patient to continue receiving a supply of gas, the cylinder valve should be closed and any gas contained in the equipment or regulator should be safely vented to atmosphere before transporting the cylinder.

5.5 Preparation of Cylinders for Use

- a) Check the cylinder for gas and colour code.
- b) Remove tamper-evident seal covers and valve protection caps tethered to the valve housing. Screw threaded protective caps must be retained and be refitted to the cylinder when it is returned to the store/supplier.
- c) Ensure that cylinders are only used in conjunction with equipment designed for their use.
- d) Ensure that cylinders containing liquefied gas such as nitrous oxide and carbon dioxide are only used in the upright position, unless specified otherwise by the supplier. If the cylinders are used horizontally, liquid can be emitted. Please note that it is NOT anticipated that cyclopropane will be used within Pennine Care NHS Foundation Trust.
- e) Inspect cylinder and equipment connection interfaces and their washer or 'O' ring seals to ensure that they are in good condition.
- f) Replace damaged sealing rings and 'O' rings ensuring that not more than one sealing washer is to be used at each interface.
- g) Ensure that cylinder paintwork and identification labels are not removed or obscured.

- h) Ensure that no lubricants, sealing or joining compounds are used when connecting cylinders to pressure reducing regulators, medical gas pipeline manifold trail pipes or other equipment and ensure that the cylinder valve, regulator, associated equipment tools and hands are clean and free from grease.
- i) When the cylinder is supported in the upright position, the valves must be partially opened momentarily, using a recommended cylinder key or hand wheel in order to blow away any grit or foreign matter that may have accumulated in the valve gas outlet. The handler must ensure that no part of his/her body is in line with the valve outlet and the valve must not be held during this operation.

Please also refer to:

- **Standard Operating Procedure for the safe handling, preparation and monitoring of oxygen cylinders (SOP 0030)**
- **Standard Operating Procedure for the safe administration of oxygen to patients of the Trust (SOP 0029)**

5.6 Connecting Cylinders to Equipment or Manifold Systems / Outlets

- a) Connect the cylinder to the manifold tail pipe or equipment and tighten firmly with the recommended spanner or by hand as appropriate. Do not use excessive force.
- b) Check to ensure that there are no gas leaks present between the cylinder valve and equipment and also between the valve spindle and the gland nut. A leak may be detected by sound. If in doubt use a soapy water solution or a leak detection fluid to detect the leak. If fluid is used, it must be wiped off with a clean damp cloth. When tightening connections in order to stop leaks ensure that excessive force is not used.
- c) Ensure that the regulators or equipment used are designed specifically for the gas it is handling.
- d) Ensure that the equipment flow control valves are closed prior to opening the cylinder valve.
- e) Slowly open the cylinder valve to its fullest extent by turning the valve spindle anti-clockwise with a recommended cylinder spindle key.

The spindle must then be turned back by approximately half a turn.

Faulty keys or excessive force must not be used as this may result in damage to the spindle. Only recommended cylinder keys/spanner should be used.

- f) Ensure that when cylinders are out of use that the cylinder valve is closed and that any gas trapped within the regulator/equipment is safely vented to atmosphere by opening the flow control valve and then closing it.

5.7 Preparation for Cylinders to be returned to store or to Medical Gas Supplier

After use, the cylinder valve should be closed and any gas in the equipment and regulator must be safely vented to atmosphere and the equipment/regulator control valve closed. Where the cylinder is to be removed or replaced, the recommended spanner must be used to disconnect the regulator or equipment. Empty cylinders or those which are no longer in use, must be returned to the gas cylinder store as soon as possible and identified as empty or part used as appropriate. Protection covers where supplied should be replaced.

The segregation of full and empty cylinders must be undertaken at all times.

5.8 Medical Gas Associated Equipment & Fittings

5.8.1 Fittings

Gas connection equipment to cylinders and fittings or regulators must be manufactured in accordance with BS 341 and BS 1319.

5.8.2. Associated Equipment

Needle valve or similar devices must not be used as pressure regulators on a system. Pressure reducing regulators must be used to avoid the possibility of excessive pressure developing downstream of a needle valve or similar device resulting in possible injury to personnel and damage to equipment.

Pressure regulators must be permanently marked with their maximum outlet pressure.

Pressure gauges on MGPS must be manufactured in accordance with BS 1780.

The entire assembly of oxygen therapy apparatus, lung ventilators and other similar equipment for use with cylinders, shall be so designed to be perfectly stable during transportation, storage and use.

Any castors fitted to equipment must conform to BS 2099 and all mobile equipment must be suitably buff clad to limit damage to the fabric of the building.

Equipment designed for use with gas cylinders must be fitted with pressure reducing regulators, with the exception of cyclopropane.

5.8.3. Gas Leak Precautions

The detection of leaks must not be carried out using a lighted cigarette or other naked flame. A soapy water solution or proprietary leak detection fluid must be used. After use, it should be wiped off with a clean damp cloth in order to prevent possible corrosion.

If a leak is identified between the cylinder valve and the equipment, carefully tighten the connecting nut. If after tightening the leak still persists turn the cylinder valve to the off position, vent any gas safely to atmosphere and detach the cylinder from the equipment.

When the connection incorporates a seal it should be replaced and the cylinder reconnected to the equipment following the procedure described in 8.6. If a leak still persists the cylinder should be detached from the equipment.

Where the connection does not incorporate a seal for example, a 'Bodok' washer or 'O' ring, the cylinder should be returned to the supplier and/or the equipment should be examined for damage and if necessary replaced.

If a leak is identified between the valve spindle and the gland nut; tighten the gland nut in a clockwise direction using the recommended spanner, without excessive force. This task should be carried out only by personnel trained in this procedure.

If the leak persists, close the cylinder valve, vent the gas safely to atmosphere, detach the cylinder from the equipment and return it under the complaint procedure to the supplier.

Under no circumstances must excessive force be used when connecting cylinders or closing valves as this may result in damaged threads and valve seals.

If it is evident that a valve can only be operated using excessive force, it may indicate a faulty valve seal. This should be reported to the supplier and the cylinder should be removed from use and a 'faulty' label should be tied to the cylinder. Also cylinders with damaged or very stiff valves must be labelled appropriately and returned to the supplier.

Sealing or jointing compound must not be used to remedy leaks. Any leakage, which cannot be correctly rectified on equipment, must be notified to the supplier.

No attempt must be made to repair, alter or modify any cylinder or its valve.

A system must be in place to ensure that defective items of equipment are withdrawn from use and repaired or condemned as appropriate. Defective pressure reducing regulators, gauges and equipment may be hazardous in use.

5.9. Fire & Heat Precautions

5.9.1 General

Fire can occur when the following three conditions are present:

- Flammable materials
- Oxidising atmosphere
- Ignition

All cylinder stores should be free from naked flames and all sources of ignition and should be designated as “no smoking areas”.

Appropriate fire-fighting equipment should be provided and the fire brigade notified of the location of stores and any emergency access keys.

Smoke/heat detectors should also be installed in medical gas cylinder stores.

5.9.2 Combustible Materials

The combustible materials which may be present near patients include skin lotions, cosmetic tissues, hair oils, some nail varnish removers, oil based lubricants, clothing, bed linen, rubber articles, plastic articles, alcohol's (including alcohol rubs), acetone, skin preparation solutions and certain disinfectants.

5.9.3. Ignition Sources

Ignition sources include, lighted cigarettes/pipes, open flames, sparks (which may be produced by some children's toys), high frequency and short-wave equipment, laser equipment, hair dryers, excessive temperature in electrical equipment and arcing. Ignition can also be caused by the discharge of a cardiac defibrillator.

Other sources of ignition may include electrical equipment not specifically designed for use in an oxygen-enriched atmosphere.

Ignition may also be caused by non-electrical equipment. For example, a static discharge, which may be created by friction, can cause ignition especially if easily ignited substances such as cyclopropane, alcohol's (including alcohol rubs), acetone, some nail varnish removers, oils, greases or lotions are present.

5.9.4 Fire Precaution Guidance

Personnel should be made aware of the recommendations contained within HTM 83 and HC (78) 4 'The Organisation and Maintenance of Fire Precautions in the National Health Service'.

Further guidance shall be obtained from the fire prevention officers, fire safety officers and the local fire brigade.

5.9.5 Other Fire & Heat Precautions

Special precautions are required when administering flammable gas mixtures and flammable anaesthetic agents to patients. Refer to Hospital Technical Memorandum No. 1 and BS 5724 Part 1.

Mixtures of breathing gases will support combustion, materials not normally considered to be combustible and flammable in air ignite more easily and burn more vigorously in an oxygen or nitrous oxide enriched atmosphere.

Clothing may become saturated with oxygen or nitrous oxide and constitute a fire risk. Clothing will become free from the enrichment of the gases after approximately 5 minutes in ordinary air. However blankets or other similar articles may need to be turned over several times in ordinary air in order to achieve the same result.

Oil and grease must not be used as a lubricant on any gas cylinder or equipment due to when in the presence of high pressure oxygen or nitrous oxide; it is prone to spontaneous combustion. In particular, oil and grease must not be used on cylinder valves, couplings and regulators. Tools, hands and clothing must also be kept free from oil and grease.

Cylinders must be kept away from sources of heat, such as sunny locations or proximity to steam pipes etc.

When equipment is coupled to cylinders, the cylinder valve must initially be opened as slowly as possible. Rapid opening can create a sudden adiabatic increase in downstream gas pressure. The consequential rise in temperature may result in ignition of any combustible material coming into contact with the hot gas downstream, which could include the regulator valve seal.

Ignition within the cylinder valve or regulator may have occurred which has been attributed to friction generated by particle matter such as dust or dirt within the system when the cylinder valve is opened.

5.9.6 Chemical Hazards

Oil, grease, bituminous products, acids and other corrosive substances must not be allowed to come into contact with cylinders and their associated equipment.

5.9.7 Incidents Involving Cylinders

Under no circumstances should an attempt be made to examine or use a cylinder and/or tamper with its valve after it has been involved in an incident, until the Health and Safety Officer and Strategic Health Authority have been consulted. Compressed medical gas in cylinders may introduce fire, chemical, electrical or mechanical hazards.

5.9.8 Cylinder Storage in Ready-To-Use Stores

The number of cylinders should be kept to the minimum but be capable of providing at least 72 hours supply. This quantity will need to be risk-assessed in relation to Bank Holiday periods, emergency cover arrangements and heavy periods of use.

Cylinders should be kept in a specially designated room that is clearly labelled with the types of cylinders stored and with “No Smoking” warning signs. The room should comply as far as is possible with the requirements for manifold rooms, and must be well ventilated, and if possible have at least one external wall to facilitate natural ventilation.

No combustible material shall be stored in the cylinder stores, manifold rooms or liquid oxygen compounds.

Cylinders should be stored in racks that have been constructed in accordance with BS1319. Sufficient space should be provided for manoeuvring cylinders on and off trolleys and adequate means should also be provided to prevent large cylinders from falling. All cylinders should be chained upright.

Cylinders placed in or returned to the store should be checked for leaks and keys should be available to ensure that cylinder valves are turned off.

5.10 Stock Control and Receipt of Cylinders into Stock

5.10.1 General

The amount of oxygen stored in each clinical area should have been risk assessed and be the minimum considered necessary for routine or emergency treatment in that patient group.

Stock control and accounting must ensure that the correct cylinders are received and used, avoiding unnecessarily large stock build-ups.

5.10.2 Order from Suppliers

The Trust Standard Operating Procedure for the ordering, delivery, storage and authorisation for payment of Medical Gas Cylinders by Trust Units must be followed when ordering cylinders directly from Medical Gas Suppliers (for example Air Liquide, formally Linde Gas UK).

The orders must specify: -

- a) That the gas is for medical purposes
- b) The gas required
- c) The cylinder size

d) Cylinders and valves must comply with BS 341, BS 1319 and BS 5045.

Ordering and stock control records must be kept and should include: -

- a) Name of gas
- b) Date of receipt
- c) Expiry date
- d) Cylinder size
- e) Batch number of each cylinder
- f) Quantity of cylinders received

Please also refer to:

- **Standard Operating Procedure for the ordering, delivery, storage and authorisation for payment of medical gas cylinders by Trust units from Air Liquide directly (SOP 0009)**

5.10.3 Return to Suppliers

Written procedures must detail the method of accounting for and returning of cylinders to suppliers.

Empty cylinders must not be retained longer than is necessary.

5.10.4 Issue from Stores by Acute Trust Partners

Written procedures must describe the system by which cylinders are requisitioned for use. A record of the issue should be kept and should include the name of the gas, number of cylinders issued, size of cylinder, date of issue, expiry date and the department/ward and name of the recipient.

5.10.5 Return of Cylinders to Stores by Acute Trust Partners

A written procedure must be used for the return of unused and empty cylinders to the main store and for return to the supplier.

5.10.6 Return of Cylinders into Stock

Each cylinder must have one batch identification label which details the contents complying with the requirements of BS1319 clearly stating by name the gas or gas mixture contained within the cylinder.

In the case of gas mixtures, the proportions of the constituent gases must be shown. The cylinder must also have stencilled in paint of a contrasting colour on the shoulder of the cylinder, the name of the chemical symbol of

the gas complying with the requirements of BS1319. The batch and identification labels must also be clearly legible.

Cylinders should be free from rust, scale and the paintwork must be in a clean condition facilitating easy identification from the colour code chart (BS1319C).

A tamper evident seal must be fitted over the valve outlet.

The procedures for the rotation of stock are as follows: -

Written procedures must be in place detailing a stock control system.

The main store should be large enough to permit the use of a stock control system.

When a rotational stock control system incorporates an in-use bay and a latest delivery bay, the in-use bay must be emptied before a fresh delivery is loaded into it and appropriate moveable signs should be employed.

5.10.7 Cylinders Labelling/Marking

Cylinders must be marked and colour coded in accordance with BS 1319 and Packaging and Labelling of Dangerous Substances Regulations S1 No. 1244.

The general requirement of BS5724 Part 1 regarding stability should also be complied with.

Each cylinder must have: -

- a) The product licence number
- b) A label to include each number, cylinder code, filling branch code and product filling date and expiry date.
- c) A hazard warning sign
- d) The name and chemical symbol of the gas or gas mixture contained in the cylinder. In the case of gas mixtures, the proportion of the constituent gases must be shown.
- e) A substance identification number.
- f) The serial number
- g) Year and quarter of test of cylinder
- h) Any specific product and cylinder handling precautions.
- i) Particular instructions to the user where appropriate.

Pressure gauges should be manufactured in accordance with BS 1780 or with the appropriate British Standard covering a particular item of medical equipment or to BS 4274 Part 3 1989.

Cylinder pressure and reducing regulators and pressure gauges must be conspicuously marked "Use No Oil or Grease" or with an appropriate symbol.

Cylinder yokes, pressure reducing regulators and pressure gauges must be clearly and indelibly marked designating the gas or gas mixture for which they are to be used.

BS1319 may be used as guidance.

5.10.8 Decanting of Cylinders

Decanting of medical gases must not be undertaken within the Trust.

5.10.9 Warning Signs

Safety warning signs and notices for medical gases must be used where appropriate and located in prominent positions.

Signs must be sited and designed in accordance with S1 Number 1471 'The Safety Regulations' 1980, BS 5378 Part 1 1980, Part 3 Safety Signs and Colours BS 5499 1982, Part 1 'Fire Safety Sign Notices and Graphic Symbols' 1984 and Health and Safety at Work Act 1974.

When oxygen is being administered to a patient, fire and safety warning signs should be prominently displayed warning patients, staff and visitors that oxygen is being used and the need to take precautions.

Consideration may need to be given to signs in other languages.

Adequate warning signs in the vicinity of the medical gas cylinders should include one or all of the following:

- Warning compressed gas (yellow triangle)
- Warning oxygen cylinder (yellow triangle)
- No smoking or naked flames

"In the vicinity" refers to the warning always on the storage room door and/or next to the cylinders.

6 REGULATORS

Regulators are required for the administration of medical gases from a cylinder. Replacement regulators can be ordered via Estates and any faulty regulators must be reported to Estates.

Mental Health inpatient services of the Trust were previously issued with regulators in accordance with their usage of medical gases (one regulator per cylinder). At that time it was expected that wards ordered cylinders only and used the regulators

supplied. However, it is acknowledged that availability of cylinders with built-in regulators has increased.

Wards and clinical areas may choose to obtain such cylinders via Air Liquide and Service Managers may wish to authorise the ordering and rental of cylinders with built-in regulators but, this will incur an increased monthly rental charge on each cylinder.

All staff members who are involved with the administration of medical gases must be competent in how to handle, store, monitor and replace the cylinders and also how to attach and remove the regulator.

7 MANIFOLD SYSTEM/ OUTLET MANAGEMENT

7.1 Storage of Gas Cylinders in Manifold Rooms

Only cylinders containing the gases required for connection to a particular manifold should be kept within the manifold room, with the exception of essential storage of nitrous oxide/oxygen mixture cylinders on trolleys for use with directly connected equipment to permit their temperature equilibration.

The number of cylinders in manifold rooms should be limited to the minimum required for operational and reserve purposes. This will include cylinders connected to the manifold(s) and a sufficient reserve to replenish one complete bank(s).

In the case of manifolds handling nitrous oxide/oxygen mixtures, sufficient cylinders should be stored to replace two complete banks.

The temperature requirements for the storage of the cylinders within manifold rooms/ stores must be adhered to.

7.2 Connecting Cylinders to Equipment or Manifold Systems / Outlets

- (a) Connect the cylinder to the manifold tail pipe or equipment and tighten firmly with the recommended spanner or by hand as appropriate. Do not use excessive force.
- (b) Check to ensure that there are no gas leaks present between the cylinder valve and equipment and also between the valve spindle and the gland nut. A leak may be detected by sound. If in doubt use a soapy water solution or a leak detection fluid to detect the leak. If fluid is used, it must be wiped off with a clean damp cloth. When tightening connections in order to stop leaks ensure that excessive force is not used.
- (c) Ensure that the regulators or equipment used are designed specifically for the gas it is handling.

- (d) Ensure that the equipment flow control valves are closed prior to opening the cylinder valve.
- (e) Slowly open the cylinder valve to its fullest extent by turning the valve spindle anti-clockwise with a recommended cylinder spindle key.

The spindle must then be turned back by approximately half a turn.

Faulty keys or excessive force must not be used as this may result in damage to the spindle. Only recommended cylinder keys/spanner should be used.

- g) Ensure that when cylinders are out of use that the cylinder valve is closed and that any gas trapped within the regulator/equipment is safely vented to atmosphere by opening the flow control valve and then closing it.

7.3 The location of Medical Gas Manifold Systems and MGPS outlets within the Trust are shown in Appendix 1.

8 ESTATES DEPARTMENT

- 8.1 The Director of Capital, Investment and Estates is responsible for the integrity of the medical gas manifold rooms/ systems and outlets and for the negotiation of Service Level Agreements (SLA) on the maintenance of manifold rooms / systems and outlets and the services of the Authorised Engineer(s).
- 8.2 Signed maintenance contracts will be held by the Estates Department for the maintenance of manifold rooms / systems and outlets and the services of the Authorised Engineer(s).
- 8.3 The maintenance and service of regulators and medical gas equipment will be carried out by the Estates Department on an agreed schedule as contained in the Trust's maintenance register.
- 8.4 The Estates Department will seek specialist advice from an independent Authorising Engineer with regards to MGPS compliance and advice on its MGPS and cylinder management.
- 8.5 The Trust will use in house staff as its Authorised Person(s) which will be confirmed in writing by The Director of Capital, Investment and Estates and on recommendation of the Authorising Engineer.
- 8.6 The Authorised Person(s) (MGPS) are responsible for ensuring that work is carried out only by approved specialist contractors, registered under ISO 9001 or ISO 13485, with scope of registration defined as design, installation, commissioning and maintenance of MGPS as appropriate.

8.7 The Competent Person(s) (MGPS) is the specialist contractor/ contractor's employee who carries out the work on the MGPS as directed by the Authorised Person (MGPS) in accordance with the MGPS Permit to Work procedures and appropriate Method Statements and Health and Safety policies submitted by the Contractor.

9 INCIDENT REPORTING

9.1 The Trust Incident Reporting System should be used to report any incident or near miss relating to medical gases or any aspect of their management.

9.2 Incident reporting should cover both the clinical use and the safe handling of medical gases and cylinders.

9.3 The Estates Department, Resuscitation Officer or Chief Pharmacist may be contacted directly if there are concerns regarding the safe handling of medical gases.

10 OXYGEN

10.1 Oxygen is the most common medical gas used within the Trust and is a licensed medicine. It is administered across a range of services for both treatment and in the emergency situation.

In general using oxygen is safe, however, there is a potential for serious harm and even death if it is not administered and managed appropriately.

Oxygen was the subject of a National Patient Safety Agency (NPSA), Rapid Response Report in September 2009 which recommended that oxygen be prescribed in accordance with British Thoracic Society guidelines (but note these do not cover children under 16 years) and that in the emergency situation oxygen should be given immediately and documented later.

Within the Trust pulse oximetry must be available in all inpatient units where oxygen is used.

10.2 Community health services

Patients or carers may administer oxygen in their own homes. Oxygen supply and training in the use of oxygen is the responsibility of the supplier.

In an emergency situation a Registered Nurse, Dentist or Therapist may undertake the administration of oxygen to a patient in the absence of a prescription and without referral to a medical practitioner. Such staff should ensure they are competent to administer via the delivery system in use.

Transport of oxygen within staff vehicles

Please refer to

- **Standard Operating Procedure for carrying oxygen and other medical gas cylinders within vehicles (SOPCH 0001)**

10.3 Oxygen should be prescribed and administered in accordance with:

- **Medicines Policy (CL15)**
- **Standard Operating Procedure for the safe administration of oxygen to patients of the Trust (SOP 0029)**

11 RELATED POLICIES AND PROCEDURES

This policy should be read in conjunction with:

- **Medicines Policy (CL15)**
- **Standard Operating Procedure for the ordering, delivery, storage and authorisation for payment of medical gas cylinders by Trust Units (SOP 0009)**
- **Standard Operating Procedure for the safe administration of oxygen to patients of the Trust (SOP 0029)**
- **Standard Operating Procedure for the safe handling, preparation and monitoring of oxygen cylinders (SOP 0030)**
- **Standard Operating Procedure for carrying medical gas cylinders in vehicles within dental services (SOPCH001)**

12 IMPLEMENTATION AND TRAINING

The Trust will ensure that this policy has been issued and implemented as follows:

12.1 Issue and Implementation

A variety of dissemination methods are in place to make sure that all staff are aware of, have access to and comply with, this policy.

Lists of all new policies are published in the Trust's Corporate Brief including a brief description and its intended audience.

All policies are held on the Trust's intranet, to which all staff have access. Staff should always consult the intranet for the latest version.

Where a hard copy is kept on a ward/clinical area, it is the responsibility of the Ward Manager/ Service manager to ensure that the current version is on file.

Following approval, the Chief Pharmacist is responsible for cascading details of the latest version of all policies to all healthcare professionals.

Ward and service managers are responsible for ensuring staff in their area of managerial control are fully aware of the content of policy on the prescribing, supply and use of unlicensed medicines and to act accordingly.

All healthcare staff are responsible for ensuring they understand the content of this policy and to act accordingly.

12.2 Training

Training in medicines optimisation and in relation to this policy forms part of the Trust's essential to role training programme for identified staff groups.

The format of the Trust medicines optimisation training is described as per the Trust Training Needs Analysis (TNA).

Where pharmacy staff provide additional training on medicines on an 'ad hoc' basis or at the request of managers within the Trust, attendance records will be completed and forwarded to the Workforce and Organisation Development Department for inclusion on the electronic training record.

Pharmacy staff contribute on an ongoing basis to the induction programme of junior medical staff.

Further training will be made available when necessary to support initiatives of the National Reporting and Learning System / National Institute for Health and Care Excellence (NRLS / NICE).

Medicines management training needs in relation to the Medicines Policy should be identified through the Individual Performance and Development Review (IPDR) process and fed into the Trust TNA.

Training required for individual members of staff is identified through the Trust's IPDR process and arranged as appropriate.

13 AUDIT AND MONITORING OF COMPLIANCE

13.1 Audit in relation to this policy will be carried out as part of the Trust's clinical audit programme and in accordance with the annual audit calendar.

The following audits will be overseen by the Drugs and Therapeutics Committee and carried out on an annual basis.

- The Safe and Secure Handling of Medicines audit across all services of the Trust who handle and store medicines.

- Record Keeping Audit in relation to prescribing standards on inpatient prescription charts

13.2 Monitoring

Compliance with this policy will be monitored using an analysis of incidents and complaints, by the Managing Prescribing Risk group on a quarterly basis, where there has been a failure to follow procedure.

Action plans to manage improvement in compliance will be developed by the Managing Prescribing Risk group on a quarterly basis where necessary and key findings of both audit and monitoring of compliance will be reported to the Drugs and Therapeutics Committee.

14 KEY PERSONNEL CONTACT DETAILS

The contact details for all key personnel are shown in Appendix 2.

15 REVIEW

This policy will be reviewed every 3 years.

16 REFERENCES

The following documents are considered appropriate for formulating the framework for defining activities with MGPS and medical gas cylinders.

- Health Technical Memorandum. HTM 02-01: Medical Gases: Medical Gas Pipeline Systems Part B: Operational Management ISBN: 0-11-322743-4, The Stationary Office 2006.
- Health and Safety at Work Act 1974
- Control of Substances Hazardous to Health (COSHH) Regulations 2002
- Medicines Act HMSO 1988
- Medical Gas Pipeline System (MGPS), Estate Policy and Safety Procedure Module. University Hospital of South Manchester NHS Foundation Trust - February 2007
- NPSA. Rapid Response Report/ 2009/ RRR0006. Oxygen Safety in Hospitals. 29 September 2009.

LOCATION OF MEDICAL GAS MANIFOLD SYSTEMS AND MGPS OUTLETS

| Gas | Location | Installation details |
|--------|---|--|
| Oxygen | Treatment Support Unit Birch Hill Hospital | East Healthcare Automatic Manifold Penlon regulators 6 J size cylinders in use. 6 J size cylinders back up |
| Oxygen | ECT Suite Parklands House Oldham | Medaes oxygen outlet MGPS (Line isolated before entry into Parklands House) |
| Oxygen | ECT Suite Mental Health Unit Stepping Hill Hospital | 1 MGI connector in Recovery Area 1 MGI connector in Treatment Area 1 MGI connector in Staff Room |
| Oxygen | Bealey Community Hospital Bury | Penlon Automatic Manifold SJ 6x6 1x1 ESM, Terminal Unit Penfold |
| Oxygen | Dental Suite Nye Bevan House Rochdale | Penlon Automatic Manifold |
| Oxygen | Dental Access Phoenix Centre Rochdale | Penlon Automatic Manifold |

KEY PERSONNEL IN RELATION TO MEDICAL GASES

| TITLE | MEDICAL GAS ROLE | TEL NO. |
|--|---|---|
| Director of Capital, Investment and Estates | Integrity of Medical Gas Manifold System / Outlets | 0161 716 3122 |
| Authorised Person for Treatment Support Unit Birch Hill Hospital | Work on Manifold System/Outlet | Estates Department Helpdesk 0161 716 3030 |
| Authorised Person for ECT Suite Parklands Royal Oldham Hospital | Work on Manifold System/Outlet | Estates Department Helpdesk 0161 716 3030 |
| Authorised Person for ECT Suite, Stockport | Work on MGPS | Estates Department Helpdesk 0161 716 3030 |
| Authorised Person for Bealey Community Hospital Bury | Work on Manifold System/Outlet | Estates Department Helpdesk 0161 716 3030 |
| Chief Pharmacist | Responsible for Licensed Medicines (Medical Gases) | 0161 716 3026 |
| Quality Controller (MGPS) Pharmacist | Quality Control of MGPS QCNW | 07659 101088 |

Other important telephone numbers:

| <u>Name</u> | <u>Telephone No.</u> |
|--|------------------------------|
| Medical Gas Services Ltd (Authorising Engineer) | 0800 048 1616 07786838188 |
| Air Liquide | 0845 9211100 |

In emergency: 0800 0567 345