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**Ref: QS 07**

## **MEDICAL GAS CYLINDER POLICY**

<b>Executive Sponsor &amp; Function:</b>	Medical Director
<b>Document Author:</b>	Chief Pharmacist
<b>Approved by:</b>	Trust Quality and Safety Committee
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## **1. Purpose**

This policy covers handling and management arrangements for medical gas cylinders which are defined as medicines supplied in gas form in a pressurised container for medicinal purposes. The cylinders are also referred to as 'bottles'.

It does not cover the medical application of the gases concerned.

It does not cover the use of medical gases for non-patient direct purposes

## **2. Policy Statement**

This policy covers medicines in gas form and supplied in cylinders. It does not cover liquid oxygen or the Medical Gas Pipeline System (MGPS) except insofar as the requirement to handle gases in cylinders, for example on manifolds. This policy should be read in conjunction with the administration of medicines procedure and the MGPS policy.

## **3. Principles**

The contents of medical gas cylinders are medicines and their use should not differ from any other medicine. However, their presentation requires a different approach to handling and management of stocks. All staff concerned in the supply, handling and use of medical gas cylinders must comply with this policy and have a duty in the safe supply, storage and use of them. Consequently, this policy is about the use and storage of medical gas cylinders and applies to all Velindre University NHS Trust staff, wherever they use medical gas cylinders and everyone who uses medical gas cylinders on Trust premises, including external agencies who may from time to time bring cylinders onto the sites.

## **4. Scope**

This policy covers handling and management arrangements for medical gas cylinders outlining which groups of staff are responsible for which aspects of cylinder management. In addition it provides information on safety and security including training requirements. Transportation of small quantities of portable cylinders by staff as part of their professional duties is also included.

## **5. Overview of Medical Gas Cylinders**

The use of MGPS is the preferred method of delivering medical gases to patients and should be used whenever available.

Cylinders are labelled according to their size; size A being the smallest and size W the largest. Small and medium sized cylinders (CD and HX) are used for individual patient care and are provided with integral valve and flow meter. Where clinically acceptable, size CD should be the first choice.

Medium and large cylinders are very heavy and can harm patients. Thus all F, HX and G size cylinders should only be used at the bedside of those patients who require continuous oxygen and must be firmly secured in a suitable trolley. Secured cylinders must be placed to ensure that a patient cannot use the cylinder as a support when moving from the bed.

Medical gas cylinders are held in the main medical gas store adjacent to the Consultant Car Park. Keys for the medical gas store are held by Theatres, Portering Service and at main switchboard. Only authorized personnel should access this store to retrieve medical gas cylinders.

There is also a small internal medical gas store. Keys for which are held by theatres, portering staff as well as with main reception.

In all settings, cylinders should be securely held, in a ventilated and designated area with the smallest stock holding possible which does not compromise patient care.

Replacement of empty, partly-used or out of date cylinders is arranged by contacting the portering staff.

Portering staff will return all partly-used/empty cylinders to the main medical gas store.

## **6. Staff Responsibilities:**

The groups of staff who have responsibilities under this policy are listed below:

### **Pharmacy will:**

- order medical gases and other ad hoc requirements,
- arrange medical gas cylinder counts across VCC site with BOC at regular intervals and address any anomalies,
- provide pharmaceutical advice to health care staff on the management of medical gases,
- monitor the medical gas cylinder usage and expenditure,
- agree appropriate ward and department levels and
- set stock holding trigger levels.

### **Porters and security services will:**

- move cylinders from the stores to wards/depts. and back as requested by clinical staff,
- report when cylinder stocks have reached trigger levels to pharmacy,
- perform a daily sweep of wards/depts. to return empty cylinders to the cylinder store,
- assist with providing access to areas to permit cylinder counts,
- keep main cylinder store rooms clean and tidy and free of rubbish including cylinder seals and report any maintenance requirements and
- work with estates staff in maintaining access to the main cylinder stores

### **Nurse managers and department managers will:**

- make use of piped gas wherever possible, **using cylinders only when absolutely necessary,**
- inform the Medical Gas Committee where usage of cylinders is such that it would be preferable to have piped medical gases,
- keep numbers of cylinders on their ward/dept. to a minimum, requesting a full cylinder only in return for an empty cylinder,
- maintain a tally of the number of cylinders on their ward/dept,
- ensure cylinders are turned off when not in use,
- ensure any cylinder used for a patient has not passed its expiry date,
- assist with regular cylinder counts,
- ensure cylinders in clinical areas are stored in accordance with HTM 02-01 and HTM 05-03, Part A and relevant safety procedures and protocols such as QS23A,
- ensure that all staff who utilise or transport medical gases are appropriately trained (see section15),
- identify their usual level of need and monitor against this and
- ensure that the number of cylinders held in their clinical area is within the agreed limit:

**The count will include part used cylinders which should be returned to the store if unusable e.g. insufficient gas to complete a patient transfer.**

**Estates will:**

- maintain external and internal cylinder store rooms and manifold rooms,
- change cylinders on manifolds when alerted by alarm panels/switchboard,
- check expiry dates of cylinders on manifolds and change them as necessary, including VIE and cylinder backup manifolds,
- work with facilities to ensure access to the external cylinder stores is not compromised by parked vehicles; including patient, staff and contractors' vehicles and
- ensure suitable storage equipment is available in clinical areas to store medical gas cylinders

## **7. How to use Medical Gas Cylinders: general principles**

If a cylinder is found to be not fit for use, it must be returned to main store and isolated in a separate section labelled for "faulty" or "incident" cylinders. The supplier should be notified via Pharmacy. Estates and Portering/Operational Services are also to be informed.

A "faulty" cylinder is one which is found to be leaking or empty at delivery or storage time.

An "incident" cylinder is one where the cylinder is not fit to be used when needed for "immediate use" on a patient. A Datix incident must be completed.

Ensure that no part of the cylinder valve or equipment is either lubricated or contaminated with oil or grease.

Before use always ensure that:

- the correct cylinder is selected for the gas required and administration of gas and
- there is sufficient supply.

Entonox should be stored at a temperature which has been  $>10^{\circ}\text{C}$  for 24 hours.

To prepare a cylinder:

- if present, remove the disposable seal by pulling the tear tag and discard,
- check for signs of oil or grease on the cylinder valve. If present, clean the cylinder valve and head gear before use,
- attach appropriate required tubing and/or administration equipment and
- open the cylinder valve slowly by the handwheel.

Cylinders must be checked whilst in use to ensure that leaks of gas are not occurring by listening for hissing sounds of escaping gas from the connections. If leaks are suspected, tighten any connects and check again. If leaks are still suspected, return the faulty cylinder (see above)

After use ensure that:

- the cylinder valve is closed immediately,
- equipment used to administer the gas is removed from the cylinder and
- cylinders are returned to the designated area

Detailed information on each different type of medical gas can be found at:

<https://www.boconline.co.uk/en/health-and-safety/safety-data-sheets/index.html>

## **8. Legislative and NHS Requirements**

Relevant parts of HTM 02 -01 and HTM 05 -03.

The Management of Health and Safety at Work Regulations 1999

The Control of Substances Hazardous to Health Regulations 2002

The Manual Handling Operations Regulations 1992

## **9. Security and Safety**

Medical gases are medicines and must be treated in the same way as other medicines.

Certain medical gases present a particular security risk due to their abuse potential: to prevent loss of and interference with the gases, cylinder store rooms must be kept locked at all times and only authorised, trained staff allowed access.

Most medical gases present a particular fire safety risk due to their ability to support combustion, whilst all pressurised cylinders pose an explosion risk when heated in a fire. To reduce these risks main medical gas stores should always be located in separate buildings and cylinders should only be stored in rooms **within** buildings conforming to HTM 02-01 and HTM 05-03, with a minimum of 60 minutes fire resistance.

The room must be vented directly to the outside of the building to prevent build up of gases. No combustible or flammable items must be stored within the same room. Local medical gas stores should only contain a sufficient quantity for daily use.

Access to the external store rooms must be kept clear of parked vehicles and other obstructions.

Cylinders available for 'immediate use' may be kept on wards or departments at a level agreed between the ward and pharmacy. Estates must advise on how this need can be met within the existing estate or how and if any changes could be made to accommodate the need (if extensive changes are required Capital will be involved in accordance with Trust policy).

The Trust fire safety manager will identify and assess storage of cylinders as part of the fire risk assessment process for all locations and will advise on the residual risk posed by holding cylinders where necessary.

## **10. Transport of cylinders**

### **10.1 Manual transport**

Medical gas cylinders of size F and above must only be moved using trolleys designed for that purpose and must be fitted with a chain or bar to prevent the cylinder falling out of the trolley.

All staff handling medical gas cylinders must receive manual handling training in line with statutory and mandatory training matrix. Designated porters (and security staff) must complete the transportation of medical gas cylinders training on an annual basis.

Cylinders must be handled with care, never knocked violently or allowed to fall over. Never roll a cylinder as this may damage the integrity of a cylinder or cause the valve to open accidentally.

### **10.2 Transport with patients**

Transport of medical gas cylinders which are required for patients in transit should be such to ensure that the cylinders are secure and will not cause harm to either the patient or

others. For example, medical gas cylinders should not be transported unsecured with a patient on a trolley or a wheelchair.

### **10.3 Vehicular transport**

Staff should seek advice from their manager and the Trust Fire Safety Manager before using their own vehicles to transport medical gases.

Only cylinders intended for portable use should be transported in their own or standard Trust vehicles by Trust staff. These include CD, ED and PD sizes. All other cylinders must only be transported in vehicles designed or converted for the purpose of carrying gas cylinders. All staff transporting gas cylinders in the course of their work in a vehicle must follow the basic legal requirements.

Further information can be found here:

<http://www.bcgq.co.uk/assets/publications/GN27.pdf>

### **11. Stock rotation and expiry dates**

The contents of medical gas cylinders will normally have a 3 year expiry. The expiry date of the gas is shown on a small square label on the neck of the cylinder.

**Medical gases which have expired must not be used and must be returned to the cylinder store for exchange.**

Expiry dates of cylinders on manifolds must be regularly checked – every 3 months is suggested – to ensure that should the backup systems be needed, the gas will be in date.

### **12. Stock holding and reporting**

It is essential that the stock of medical gas cylinders held within the Trust is appropriately managed to ensure a safe supply for patient requirements and to reduce waste on excess rental charges for the cylinders and reduce the fire risks associated with excess stock in locations.

Medical gas cylinders must be stored in appropriate protected rooms and used in appropriate ventilated premises – nitrogen, nitrous oxide, carbon dioxide, argon, and other gases present an asphyxiation risk whilst oxygen, Entonox and nitrous oxide will support combustion.

All compressed medical gas cylinders contain gas at high pressure: exposure to high temperatures in a fire will raise the pressure in the cylinder, potentially leading to cylinder rupture or explosive ejection of the valve head. Where practicable cylinders, whilst not in use, should be held in fire-rated rooms ventilated direct to outside of the building: all stock held in clinical areas must comply with HTM 02-01 which advises that it should be for immediate use only.

The store must have sufficient area to segregate full and empty cylinder and be large enough to allow easy rotation of cylinders. All cylinders must be securely stored. F cylinders and larger must be stored uprights and held by safety chains, E size cylinders and smaller must be stored horizontally on racks. Warning notices prohibiting smoking and naked lights must be visible.

Minimum stock holdings must be maintained in the main gas cylinder store.

Wards and departments who require medical gas cylinders must establish an agreed stock holding with pharmacy. This stock holding must not be exceeded unless agreed as above or in exceptional clinical need.

Every ward and department manager must maintain a list of their stock holding of medical gas cylinders by type and size.

### **13. External supply process**

Cylinders are supplied to the hospital sites by BOC. There is 1 regular delivery per week to VCC and no regular visits to Welsh Blood Service. Delivery to each storage area (known as a location) will incur a separate delivery charge even if these are on the same hospital site.

For the most frequently used medical gases, cylinders are automatically replaced from the main medical gas store on a part-used/empty for full one for one basis (known as a “milk float”).

**The number of cylinders delivered at the same time as collection will reflect the number of empties collected at the previous visit. To ensure cylinders are maintained at safe stock levels it is essential that empty cylinders are returned to the cylinder store ASAP.**

Special gases and other infrequently used products must be ordered in advance.

All cylinders on site in the Trust are the property of BOC and are **rented**.

**Unless a medical emergency, cylinders must not be provided to other agencies outside of the Trust as the Trust will incur the ongoing rental charges and a cost** if the cylinder is not returned to BOC.

Welsh Ambulance Service Trust has it's own supply of medical gas cylinders

Out of hours, if additional medical gases are needed in an emergency, contact the on-call pharmacist, who will arrange an emergency delivery.

### **14. Internal supply process**

Clinical areas which are supplied with piped medical gases should use the piped supply whenever possible. Medical gas in cylinders should only be used where piped gas is not available and for mobile use e.g. patient transport.

When a cylinder requires changing the nursing staff on the ward/dept/unit should contact the porters to collect a full cylinder and exchange it for the empty one.

### **15. Liquid Nitrogen**

Nitrogen gas is extremely dangerous as it is odourless, colourless, and tasteless and will produce rapid asphyxiation without any sensation or prior warning. Refer to liquid nitrogen procedures for detailed information on handling and use of liquid nitrogen.

Contacts:

BOC Customer service centre: 0800 111 333



## **16. Training Implications**

Training in accordance with HTM02-01, on the safe handling and use of medical gases and the cylinders containing them is mandatory for all staff who use or transport medical gases in cylinders.

- No person should operate medical gas systems or equipment unless they are properly trained or supervised
- All training will be evaluated and reviewed regularly
- Refresher training will be provided at regular intervals in order for the individual to maintain competent
- Any person new to Velindre University NHS Trust will be required to provide prior evidence of training, if not they will need to attend training before being able to operate medical gas systems. The same will apply to those individuals that have not received any prior training
- Refresher Training and reassessment schedule for individual staff groups working with medical gas systems:
- Training records will be maintained through the Electronic Staff Records (ESR) system and a copy of the competence should be kept by the manager and the individual.
- Refer to the Medical Gas Pipeline Systems Policy for staff training and re-assessment matrix.

## **17. Review, Monitoring and Audit arrangements**

This policy will be subject to audit and review. Regular reports will be provided to the Trust Medical Gas Committee.

All relevant persons must be informed immediately where there is any likelihood of risk to their safety.

Managers must ensure all incidents and near misses are reported promptly in accordance with the Trust Incident Reporting Procedure.

Managers must ensure that emergency procedures are in place for their respective areas.

## **18. Retention or Archiving**

This document will be retained in accordance with Velindre University NHS Trust policy.

## **19. Non Conformance**

There is a requirement for all staff to comply with this policy, and where requested, to demonstrate such compliance. Failure to comply will be regarded as a disciplinary incident, and will be dealt with under the appropriate Trust Human Resources Policy.

## **20. Equality Impact Assessment Statement**

This Policy has been subject to a full equality assessment and no impact has been identified. See Appendix A.

## **21. References**

Health Technical Memorandum 02-01: Medical gas pipeline systems (Parts A and B).  
Health Technical Memorandum 05-03: Fire safety measures for health sector buildings (Parts A – M)

<http://www.bcga.co.uk/assets/publications/GN27.pdf>

## **22. Acknowledgements**

CTUHB Medical Gas Policy approved May 2018.