

Reference Number: TBA Version Number: 1	Date of Next Review: Previous Trust/LHB Reference Number:
Medical Gases Policy	
Policy Statement To ensure the Health Board delivers its aims, objectives, responsibilities and legal requirements transparently and consistently, we will support staff through education and training to safely transport, store and deliver medical gases to our patients.	
Policy Commitment The UHB is committed to ensure the safe management and delivery of medical gases across all sites. The UHB will ensure that the standards comply with NHS Health Technical Memorandum (HTM) 02-01 part A and B and (HTM) 2022 Supplement 1, Safe systems of work, the reduction of hazards in the working and patient environments and day to day management of medical gas systems within the UHB. The Medical Gases Safety Group will monitor training compliance, ensure incidents are managed in a timely and appropriate manner, and ensure all works are carried out by appropriately trained designated persons.	
Supporting Procedures and Written Control Documents This Policy and the following supporting procedures describe the safe use and handling of medical gases: • All Wales Policy for Medicines Administration, Recording, Review, Storage and Disposal • Operational Maintenance Policy • Prescription and Administration of Emergency Oxygen in Adults • Fire Safety Policy • Estates Ventilation Policy • Manual Handling Policy • Health and Safety Policy • Asbestos Policy • Business Continuity Planning Policy • Site Specific Procedures Other supporting documents are: • Health and Safety at Work Act 1974 • Management of Health and Safety at Work Regulations 1999	

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- Workplace (Health, Safety and Welfare) Regulations 1992
- Provision and Use of Work Equipment Regulations 1998
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995
- Control of Substances Hazardous to Health (COSHH) Regulations 2002
- Pressure Equipment Regulations 1999
- Pressure Systems Safety Regulations 2000
- Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972
- Medicines Act 1968
- Manual Handling Operations Regulations 1992 (as amended 2002)
- Personal Protective Equipment at Work Regulations 1992
- Electromagnetic Compatibility Regulations 2005
- Electricity at Work Regulations 1989
- Other guidance applicable to medical gas pipeline systems
- European Pharmacopoeia standards for medical gases, including medical compressed air
- UHB Health and safety policy
- UHB Medicines Code
- Health Technical Memorandum 02-01 – ‘Medical gas pipeline systems’:
 - Part A: Design, installation, validation and verification
 - Part B: Operational management
 - Supplement No 1 – ‘Dental compressed air and vacuum systems’

Scope

This policy applies to all Cardiff and Vale UHB staff in all locations including those with honorary contracts whether using a piped supply or cylinder supply of medical gases.

Equality & Health Impact Assessment (EHIA)

Part 1 - Equality Impact Assessment (EQIA)	An Equality Impact Assessment (EqIA) has been completed and this found there to be a positive impact. Key actions have been identified and these can be found incorporated within this controlled document.
Part 2 - Health Impact Assessment (HIA)	A Health Impact Assessment (HIA) has been completed and this found there to be a positive impact

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	Key actions have been identified and these can be found incorporated within this controlled document.
Policy Approved by	Board/Committee/Sub Committee
Group with authority to approve procedures written to explain how this policy will be implemented	UHB Medical Gases Safety Group
Accountable Executive or Clinical Board Director	Executive Nurse Director
Author(s)	Nurse Advisor for Medicines Management & Medical Gases Safety Group
<u>Disclaimer</u> If the review date of this document has passed please ensure that the version you are using is the most up to date either by contacting the document author or the Governance Directorate.	

Summary of reviews/amendments			
Version Number	Date Review Approved	Date Published	Summary of Amendments
1	Approved by Medical Gases Safety Group on 02/03/2026	TBA	<i>New document</i>
2			

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1. Introduction

A Medical Gas Pipeline System (MGPS) is designed to provide a safe and effective method of delivering medical gases, medical air and surgical air from the source of supply to the appropriate terminal unit by means of a pipeline distribution system (HTM 02-01)

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Dental compressed air and vacuum systems have differing requirements, and these are covered in HTM 2022 Supplement 1 – ‘Dental compressed air and vacuum systems’

Medical gas cylinders are defined as medicines supplied in gas form in a pressurised container. Medical Gases are used in most areas within the UHB, Oxygen being the most recognisable but the following are also available in identified areas within the UHB:

- Entonox (50% Nitrous Oxide / 50% Oxygen), Carbon Dioxide, Anaesthetic gases, Heliox, Medical Air, Other Special Gases.

Appropriate management of these gases is essential to ensure safe storage and appropriate use of medical gases in the UHB. The Medical Gases policy sets out to provide up to date guidance for all sites and specialities and every member of staff involved in the medical gas process. Each site has its own Medical Gases Procedure document that must be followed. 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.

2. Responsibilities

The groups of staff who have responsibilities under this policy are listed below and further details of their duties can be located in Appendix A:

Executive Team / Clinical Boards

- Ultimate Management responsibility for the MGPS rests with the Health Board’s Chief Executive.
- The Chief Executive or a delegated person undertakes the written appointment of the Authorised Persons (MGPS) for the Health Board.
- The Chief Executive delegates day-to-day Management responsibility for the MGPS to the Authorised Persons (MGPS) via a Senior AP.
- Executive Nurse Director is responsible for the overall approval of this policy and 3 yearly reviews.
- Clinical Board Directors of Nursing to ensure Lead Nurses are appointed as DNOs

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- Lead Nurses have the responsibility to manage medical gas cylinders and MGPS disruptions within their Clinical Board alongside Authorised Persons.

Estates:

- Estates hold responsibility for the integrity of the MGPS.
- They will maintain external cylinder store rooms and manifold rooms
- Work with facilities to ensure access to the external cylinder stores is not compromised by parked vehicles, including UHB, staff and contractors' vehicles.

Clinical Engineering will:

- Supply and maintain regulators
- Deliver equipment required
- As per HTM 02-01 Appendix B, they will provide technical advice to those responsible for the purchase of any medical equipment which will be connected to the MGPS in order to avoid issues arising from insufficient capacity and inadequate flow rates. They will discuss any implications with the AP before purchase.

Authorised Persons

- The Authorised Persons (MGPS) assume effective responsibility for the day-to-day management and maintenance of the MGPS
- Senior Authorised Persons MGPS (SAP) are the lead nominated Estates personnel for overseeing the UHB MGPS systems
- Authorised Persons MGPS (AP) are the appointed Estates personnel to manage

Competent Person

- The Competent Person (MGPS) is the person who carries out the installation and/or maintenance work on the MGPS. The Competent Person should have received appropriate training and should be on a list of Competent Persons (MGPS).

Quality Controller

- The Quality Controller (MGPS) is responsible for the quality control of the medical gases at the terminal units and plant such as medical air compressors, oxygen concentrators and synthetic air systems.

Pharmacy

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- Pharmacy will arrange medical gas cylinder counts across UHB sites with BOC at regular intervals and address any anomalies
- Utilise Accura App to monitor movement of cylinders around the UHB
- Provide pharmaceutical advice to health care staff on the management of medical gases
- Monitor the medical gas cylinder usage and expenditure, maintaining a record of cylinder rental charges
- Agree appropriate ward and department levels (located in Appendix G)

Porters

- Move cylinders from the stores to wards/depts. and back as requested by clinical staff.
- Utilise Accura App to monitor movement of cylinders around the UHB

Designated Nursing Officer/Designated Medical Officer (DNO/DMO)

- All work with Medical Gas Piped Systems (MGPS) in wards and departments carried out under the MGPS permit-to-work system will be controlled and authorised by a Designated Nursing Officer listed in the hyperlink of Appendix A.
- In the event of any work outside normal working hours, refer to the site-specific procedures document.

Nurses, Midwives and Department Managers

- Undertake medical gases training on ESR
- Make use of piped gas wherever possible, ***using cylinders only when absolutely necessary e.g. ward transfers.***
- Keep numbers of cylinders on their ward/dept. to the agreed allowance within this policy.
- Request a full cylinder only in return for an empty cylinder
- Daily cylinder safety checks to be carried out and recorded (along with the resus trolley and cylinders), additional check to be carried out prior to its use on a patient
- Daily bedside oxygen and suction checks to be carried out and recorded daily, additional checks to be performed when new patients are admitted to the bed space
- 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 handled and stored in accordance with HTM 02-01 and HTM 05-03, e.g **Local storage on wards:** all cylinders must be stored in a secure standing trolley/bracket, with assigned designated

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“parking” areas. **Handling of cylinders:** Cylinders can be heavy (e.g, an empty J-size steel cylinder weighs approximately 70 kg), and should therefore be handled with care only by personnel who have been trained in cylinder handling and who understand the potential hazards.

Dental Staff

- Adhere to HTM 2022 Supplement 1, Dental compressed air and vacuum systems.
(*This Supplement provides advice and guidance on the specific requirements for compressed air and vacuum systems for use in the Dental Hospital*).

Other HCPs using medical gas in cylinders will:

- Ensure empty cylinders are returned to the store as soon as possible

3. Legislative and NHS Requirements

- Relevant parts of HTM 02 and HTM 05.
- The Management of Health and Safety at Work Regulations 1999
- The Control of Substances Hazardous to Health Regulations 2002
- The Manual Handling Operations Regulations 2002

See Annex A for comprehensive list

4. Security and Safety

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 will be allowed access.

Most medical gases present a particular fire safety risk due to their ability to support combustion. 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 a separate building. Cylinders should only be stored in rooms **within** buildings that conform 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 to be stored within the same room. Local medical gas stores should only contain sufficient quantity for daily use (HTM 05-02). Cylinders should not be dropped, knocked, used as “rollers”, or be permitted to strike each other. Cylinders and valves should be kept free from oil, grease and other debris.

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If a cylinder is noted to be defective, contact Pharmacy and refer to section 8.137 of HTM 02-02 Part B

5. Transport of cylinders by UHB staff

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.

Vehicular transport

Only cylinders intended for portable use should be transported in their own or standard UHB vehicles by UHB staff. 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 of BCGA (2021) which can be downloaded (See Appendix B):

6. Stock rotation and expiry dates

The contents of medical gas cylinders will normally have a three-year expiry date. 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.**

7. Stock holding and reporting

It is essential that the stock of medical gas cylinders held within the UHB are 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 with a storage sign displayed. Medical Gases must be used in an appropriate ventilated premises when they present an asphyxiation risk. NB: Oxygen and Entonox will vigorously support combustion and present a fire risk. 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. In line with this policy, every ward and department manager must maintain a list of their stock holding of medical gas cylinders by type and size, this should not go above the agreed stock holding

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levels unless through agreement with Pharmacy. Minimum stock holdings must be maintained in the main cylinder stores.

8. External supply process

Cylinders are supplied by BOC to the following C&V sites; UHW, UHL, SDH, Dental. Deliveries generally follow the 'milk round' scheme for routine gases. Empty cylinders are collected from the site and BOC deliver an equal number at the **next** scheduled delivery.

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.** Wards/Departments must not hold on to any excess supplies, all cylinders must be accounted for and must stay within the agreed stock level. All cylinders on site in the UHB are the property of BOC and are rented. **Cylinders must not be provided to other agencies outside of the UHB as the UHB will incur the ongoing rental charges and a cost** if the cylinder is not returned to BOC.

The UHB currently rent the following sizes of Medical Gas Cylinders:

Oxygen (C, CD, E, F, G, HX, J, ZH)

Nitrous Oxide (E, F, G)

Medical Air (E, F, G, J)

Medical Carbon Dioxide (C, E, VF)

Entonox (D, ED, EX, F, HX)

Other Special Gases (Ah, AV, AZ, BC, SAF)

HX Heliox 21

9. Internal supply process

Most clinical areas are supplied with piped medical gases which should be used whenever possible. This will include Oxygen, Medical/Surgical Air and Entonox. 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 refer to site procedure document.

10. Liquid Oxygen (not covered by MGPS) should include bulk Liquid Oxygen system or commonly known as (VIE) cryogenic Liquid system

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These are used to store the medical gas as a liquid at cryogenic temperatures and to vaporise it into a gas at ambient temperature for distribution through the hospital pipeline.

11. Education/Training

It is essential that staff at all levels have a sound general knowledge of the principles and functions of MGPS. No person should operate medical gas systems or equipment unless they are properly trained or supervised (HTM 02-01, Part B).

All staff members that use or transport medical gases must undertake training in accordance with HTM02-01, (safe handling and use of medical gases and the cylinders containing them).

Non clinical staff

Upon induction to the UHB, education must be provided in accordance with HTM02-01, on the safe moving/handling/storage of medical gases and the cylinders containing them. Details on accessing this training can be located in Appendix F.

Clinical staff

For staff that administer/handle medical gases, e.g nurses, midwives, physiotherapists, training will be available on ESR. This training is also linked to CAVUHB Medicine's Management online learning platform for all newly registered Nurses/Midwives to undertake. Details on accessing this training can be located in Appendix F.

12. Managerial Responsibilities

Managers must ensure that all staff involved in the use, handling and maintenance of medical gas cylinders read and adhere to this policy and any accompanying local Policies and Procedures.

Managers must ensure that they are promoting the online training package to their staff and will ensure that staff are released for training. Training records must be in place and kept up to date within each ward/department. Those areas covered under mandatory training should be centrally recorded on ESR.

Managers and Senior Managers will ensure medical gas cylinders are secured and properly transported to respective areas.

Managers will ensure that only the agreed quantity of gas cylinders are held where it has been identified there is a need.

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Managers must deal with faults or hazardous situations promptly and ensure that faults are rectified and a hazardous situation is remedied to ensure the immediate safety of others. 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 UHB Datix Incident Reporting Procedure.

13. Non-Conformance

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

14. Emergencies with the Manifolds

In the event that an MGPS emergency is declared, the following channels of communication MUST take place between the following:

- Fire Services, Estates Department, Pharmacy, Portering Staff, Clinical Staff

Actions to be taken in the event of emergencies can be located in Appendix D

15. Equality Impact Assessment Statement

This policy has been screened for relevance to Equality. No potential negative impact has been identified.

16. References

BCGA (2021) The carriage of small quantities of gas cylinders. Online, Available at www.bcga.co.uk/publications

HTM 02-01 Medical gas pipeline systems, Part A: Design, installation, validation and verification and Part B: Operational management and HTM 2022

HTM 02-01 2022 supplement 1, Dental compressed air and vacuum systems. Available at: [Dental compressed air and vacuum systems \(HTM 2022 Supp 1 revised\) \(england.nhs.uk\)](https://www.england.nhs.uk/publication/dental-compressed-air-and-vacuum-systems-htm-2022-supplement-1-revised/)

HTM 05-03 (2022) Fire safety in the NHS: Operational provision. Online, Available at: www.england.nhs.uk/publication/fire-safety/

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The Management of Health and Safety at Work Regulations 1999. Online.
Available at: www.legislation.gov.uk/uksi/1999

The Control of Substances Hazardous to Health Regulations 2002. Online.
Available at: www.legislation.gov.uk/uksi/2002

The Manual Handling Operations Regulations 1992. Online. Available at:
www.legislation.gov.uk/uksi/1992

APPENDIX A

Responsibilities & Duties of Authorised Persons

- Responsible for ensuring that a) All DNOs (MGPS) likely to be involved are advised within a reasonable timescale of the estimated duration of the work and any required interruption to the MGPS; b) All terminal units

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affected, that is, out of service, are appropriately labelled with “danger do not use” notices

- To ensure that the MGPS is operated safely and efficiently in accordance with the statutory requirements and guidelines. Always ensuring there is cover of this role particularly during holidays and other absences
- The Authorised Persons (MGPS) assumes effective responsibility for the day-to-day management of the MGPS.
- To manage the MGPS permit-to-work system, including the issue of permits to Competent Persons (MGPS) for all servicing, repair, alteration and extension work carried out on the existing MGPS.
- To supervise the work carried out by Competent Persons (MGPS) and monitor the standard of that work.
- To ensure that the Health Boards MGPS maintenance specification and schedule of equipment (including all plant, manifolds, pipe work, valves, terminal units and alarm systems) are kept up to date.
- To liaise closely with Designated Nursing/Medical Officers, the Quality Controller (MGPS) and others who need to be informed of any interruption or testing of the MGPS.
- The Authorised Person (MGPS), in conjunction with the Chief pharmacist, should contact the Quality Controller (MGPS) when testing of MGPS is required. Authorised Persons (MGPS) contracting in Quality Controller (MGPS) services should ensure that documentary evidence of continuing and recent experience in MGPS testing is provided before a contract is finalised.
- The Authorised Person (MGPS) will need to liaise with the Quality Controller (MGPS) before an MGPS can be taken into use, as quality tests may be required before gases are passed to patients.

Responsibilities of the Competent Person (CP) for the permit-to-work procedure

- Signing the permit, acknowledging responsibility for the work they are undertaking
- Obtaining and understanding instructions on work to be done

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- Isolating sections of the system on which work is to be carried out (under direct supervision of the Authorised Person)
- The CP will carry out the work
- Carry out system integrity tests on completed work (under direct supervision of the Authorised Person (MGPS) where appropriate)
- Signing the permit, declaring that the work is completed as indicated. Copy 3 (yellow copy) of the permit must be returned to the Authorised Person (MGPS) and placed in the permit book for final signing
- In the case of contractors, providing an appropriate safety method statement applicable to the work, evidence of compliance with relevant quality assurance requirements, and a company health and safety policy

Responsibilities of the Designated Nurse/Medical Officer (DNO/DMO-(MGPS))

- It is the policy of the Health Board that all MGPS work in wards and departments carried out under the MGPS permit-to-work system will be controlled by the appropriately trained Lead Nurses (Henceforth defined as Designated Nurse and Medical Officers and listed in Annex A to this Policy).
- Appointment, duties and responsibilities of the Designated Medical/Nursing Officer relate to piped medical gas and cylinder management on wards/departments and are as follows:
- Designated Nurse is the appropriately trained Lead Nurse for wards/departments, or their delegated Senior Nurse and information to be cascaded to Ward/Dept Managers
- It is the responsibility of the authorised DNO/DMO to liaise with the Authorised Person (MGPS) when any interruption to gas supplies is to be undertaken.
- NO PLANNED INTERRUPTION to a medical gas supply can take place without the WRITTEN PERMISSION of either the DNO (MGPS) or DMO (MGPS) via the signing of an appropriate MGPS permit to work (see also “emergencies” below).
- All work at department/ward level will be controlled by the relevant DNO (MGPS).
- Major supply interruptions will require the permission of a Senior DNO / DMO (MGPS).

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- In the event of any work outside normal working hours, responsibility for liaison with the Authorised Person (MGPS) and signing of necessary permits will be that of the Senior Duty Nurse/Clinician.
- During emergency situations it will be the responsibility of the Lead Nurse/Senior Nurse/ Clinician on duty to liaise with the Authorised Person (MGPS) to co-ordinate necessary remedial work, which may involve provision of alternative gas supplies etc.
- Training of the Designated Lead/Senior Nurses in operational and safety aspects of the MGPS should take place on a regular basis (as detailed in the HTM). The UHB's Education Department (ECOD) will provide advice and support to the Medical Gases group regarding education delivery, however, the AP (MGPS) will be able to advise staff on suitably agreed training for the DNO/DMO (MGPS). It is the responsibility of each appointed DNO to ensure they access the appropriate training.
- In the event of serious and imminent danger such as fire, isolation of piped medical gas at emergency valves should be undertaken by the most senior nurse on duty at that time.
- The overall accountability for any cylinder stocks in wards or departments sits with the DNO. Keeping these to a minimum and ensuring rotation on a regular basis. Also to provide stock control information to pharmacy every month.

List of trained DNOs

Insert hyperlink to DoNs

Responsibilities of the Quality Controller (QC)

- The Quality Controller (MGPS) is the person designated as the quality controller for MGPS. They are responsible for the quality control of the medical gases at the terminal units and plant such as medical air compressors, oxygen concentrators and synthetic air systems.
- The QC (MGPS) will accept the professional responsibility for the last independent check of an MGPS that, if faulty, could cause critical clinical consequences to patients.
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- The QC will liaise with the Authorised Person (MGPS) in carrying out specific quality and identity tests on the MGPS in accordance with the permit-to-work system and relevant Pharmacopoeia standards.

Appendix B

Carrying Small Quantities of Gas Cylinders in Vehicles

The carriage of small quantities of Medical Gas cylinders on vehicles (BCGA Leaflet 1). It is safe to carry gas cylinders on vehicles providing you follow some basic legal and safety requirements. There are exemptions from compliance with the full requirements of the Regulations for non-toxic, non-corrosive gases if the

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number of gas cylinders being carried is under specified threshold limits, for example, if you are carrying 1 or 2 portable cylinders of medical oxygen.

Avoid the risks of fire by following the Golden Rules

Smoking

Never let anybody smoke in a vehicle when carrying gas cylinders. This includes everybody - not just the driver.

Ignition of a flammable gas following a leak could be catastrophic. Oxygen and Entonox strongly support combustion.

Ventilation

Ideally gases should be transported in an open vehicle. If this is not possible, make sure you have good ventilation to maintain a healthy environment inside the vehicle. The best way to improve ventilation is to open a window.

Cryogenic liquefied gases

Take extra care with cryogenic liquefied gas containers. They continually vent cold gas (even when not in use) and could leak liquid if not kept upright. Transport in an open vehicle. For medical gases refer to BCGA Leaflet 13.

Cylinder storage

Cylinders are to be securely stowed, preferably in the luggage area.

If involved in an accident you could be injured by unsecured items being thrown around inside the vehicle. Use a carrying bag or box, if provided, to help keep cylinders secure.

Cylinder security

Gas cylinders should be removed at the end of your journey. If left for short periods, then keep out of sight. Gas cylinders and associated equipment are attractive to opportunist thieves.

All valves are to be closed

Ensure the valves are closed on all cylinders. Check there are no leaks. Disconnect and remove any ancillary equipment.

Driver responsibilities

Legal requirements

It is the driver's responsibility to ensure their vehicle is safe. The driver should have appropriate training and knowledge about the gases being carried and understand the basic actions required in the event of an emergency.

Documents

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The driver does not need to carry any special documents to transport small quantities of gas cylinders. However, it is useful to have the right information to assist the emergency services in the event of an incident. See 'Helping the emergency services'.

Signs on your vehicle

You are not required to display any hazard warning labels or signs on your vehicles if you are only carrying small quantities of gas cylinders.

Insurance for the vehicle

Make sure you have informed your insurance company that you are carrying gas cylinders on the vehicle.

Suspected gas cylinder leaks

If you suspect that there is a leak from your gas cylinder, take the following immediate actions:

- If driving, stop and park the vehicle as soon as practical in a safe place, away from naked flames and flammable substances. Turn off the ignition.
- Do not smoke or allow anybody to smoke in the vicinity of the vehicle.
- Check the cylinder valve. If it is open, close the cylinder valve immediately (if safe to do so).
- Increase the ventilation in the vehicle. Open all doors, windows, luggage areas etc.
- If you have a liquid leak. Do not touch the liquid it will give you cold burns.
- If the cylinder continues to leak, and it is safe to do so, remove the leaking cylinder from the vehicle and place in a safe, well-ventilated area. Consider notifying the emergency services.
- Ensure that the vehicle has been adequately ventilated before continuing with the journey.
- If you cannot stop the leak, do not return a leaking cylinder into the vehicle.

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Appendix C - General advice regarding vehicle fires

BCGA advise that a dry powder fire extinguisher is carried in vehicles transporting compressed gas cylinders. It is the responsibility of the employee's directorate to supply and maintain the dry powder fire extinguisher for the vehicle. The UHB advice regarding fires involving a vehicle carrying compressed gas cylinders is as follows:

In the unlikely event of a vehicle fire

- The first action must be to evacuate all passengers/occupants to a safe distance away from the vehicle fire (preferably up wind of the fire, out of the smoke).
- If possible **AND SAFE TO DO SO**, remove the cylinder(s) from the vehicle, and locate a safe distance away from the vehicle fire.
- If a fire extinguisher is carried in the vehicle only attempt to use it if there is an immediate **THREAT TO LIFE** (Caution: if an attempt to fight the fire is made, remember the extinguisher is dry powder and the resulting powder cloud may create a visibility hazard to other road users; dry powder can affect the respiratory system.)
- Contact the Fire Service by dialling 999 and inform them of the location of the incident and if anyone is injured or at risk. If the cylinders cannot be removed from the vehicle inform the Fire Service of the type, amount and location of the cylinders, and any other hazardous materials that may be being carried.
- If the cylinders cannot be removed from the vehicle, evacuate away from the fire (where possible upwind, and in a position to avoid any cylinder projectile hazard)
- Remain a safe distance away from the vehicle and make yourself known to the Fire Service on their arrival.

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Appendix D – Emergency protocol

Oxygen system

In the event of failure of the primary piped oxygen supply, the secondary cylinder manifold supply will automatically provide the UHB with gas. The manifold supply will change banks automatically but will require cylinder replacement as a bank empties.

Important: Cylinder manifolds have limited capacity in relation to the normal UHB demand supplied from BOC, so additional manpower may be required in an emergency situation of this kind, both to change the cylinders on the manifold and to bring the replacement cylinders to the manifold. Measures to reduce gas consumption may also need to be taken. It is the duty of Estates/MGPSAP to ensure that sufficient J-size cylinders are available to maintain the gas supply and that there is an emergency procedure in place for handling these cylinders.

Medical and surgical compressed air

The automatic manifold supporting the medical air plant will come online automatically and will change banks automatically. Cylinder replacement will be the responsibility of Estates/MGPSAP. Care should be taken to prevent transfer of oil/ grease from the compressor plant to the manifold cylinder connections

Nitrous Oxide and Entonox

The nitrous oxide and Entonox automatic manifold systems are fitted with manually operated emergency supply manifolds. These supply gas in the event of failure of, or loss of gas from, the main manifold. The ESM will come online automatically; it will not be necessary to open the ESM main isolating valve to ensure that gas supply is maintained. When in use, it will not change from left to right cylinder banks automatically.

Estates and Portering staff should be fully trained in the operation of the ESM. Detailed instructions identifying which valves to turn and in which order shall be posted adjacent to each ESM. Due to the limited capacity of the ESM, it is essential that the pressure in the cylinders be monitored continuously while it is in use. Manual changeover from an almost empty to a full cylinder will be required. A full one must then replace the empty cylinder. It is the duty of Porters to ensure that sufficient cylinders are available to maintain the gas supply.

The medical vacuum system has no emergency reserve manifold system. Failure of the plant for any reason will result in total failure of the vacuum service. Emergency cylinder ordering procedure can be located in the site specific procedures.

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The following procedure should be followed:

- Pharmacy will telephone the emergency number of the medical gas supplier BOC.
- Pharmacy will tell the medical gas supplier that “new issues” are needed, if no empties are to be returned.
- Upon delivery by the medical gas supplier, the duty porter should check the delivery against the request and sign the driver’s delivery note.
- The note should then be passed to pharmacy.

Failure of mains electricity supply

In the event of an electricity failure, medical gas supplies should be maintained by the emergency generator system (the “essential” supply). The surgical compressed-air plant, vacuum plant, oxygen system, all manifolds and medical gas alarm systems are connected to the “essential” electricity supply and will continue to provide and monitor gas supplies as normal.

In the event of failure of both mains and generator supplies:

- The oxygen system will continue to supply gas from its secondary supply manifold system
- The vacuum plant will not operate, and central vacuum service will be lost.
- “Normal” portable vacuum units can be used only if local electricity supplies are available. Ejector- or battery-driven units will have to be used where vacuum provision is essential for critical care
- The air compressor will fail, but air will be supplied from the air ESM
- Nitrous oxide and Entonox manifolds will continue to supply gas
- Alarm panels will display a “system failure” red warning light and give an audible alarm.
- If the electricity supply to an alarm panel only is interrupted, the panel will display a “system failure” red warning light and emit an audible alarm; gas supplies will not be affected.

In any of these events:

- The Authorised Person (MGPS) will be informed of the situation via the nursing staff/Switchboard
- Portering and Estates will arrange for staff to monitor manifold gas consumption, replacing empty cylinders as necessary until the electricity supply is restored
- The Authorised Person (MGPS) will arrange emergency cylinder/regulator supplies as necessary

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- The Authorised Person (MGPS) will monitor the situation and confirm resetting of compressor and vacuum plant and system alarms following restoration of supply.

A serious leak of medical gases

In these events:

- The duty porter and the Authorised Person (MGPS) will be contacted by the Switchboard/duty nurse
- Details of the leak should be confirmed: that is, the floor level, department, room number, the gas or gases involved and whether patient ventilators are in use
- Outside normal working hours, the on-call engineer will notify the Authorised Person (MGPS)
- It is the responsibility of the duty nurse to carry out isolation of medical gases to the area after ascertaining that no patients will be put at risk in any area(s) affected by the isolation
- The duty nurse will issue appropriate instructions to make the situation safe, such as to open windows in the affected area and close doors, in accordance with the UHB fire policy
- The duty porter will remain on stand-by to provide extra gas cylinders as required
- The Authorised Person (MGPS) will arrange for repairs to the system(s) affected to be carried out under the permit-to-work system.

Total or partial failure of a medical gas supply

In these events:

- The person discovering the failure will inform Switchboard and duty nurse immediately
- Switchboard will inform the duty senior manager, the duty porter and the duty Authorised Person (MGPS) of the leak
- Details of the failure should be confirmed: that is, floor level, department, room number(s), the gas or gases involved and whether patient ventilators are in use
- As a precautionary measure, the telephonist will also notify critical care areas that a failure has occurred on part of the system so that they are prepared in the event of the fault extending to their departments

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- It is the responsibility of the duty nurse to check which patients may have been put at risk by the failure and, if necessary, to arrange immediate emergency medical action
- Depending on the reason for the failure and its possible duration, the Authorised Person (MGPS) will decide the most appropriate method of long-term emergency gas provision. This may involve establishing locally regulated cylinder supplies at ward/department entrances
- Nursing and medical staff should attempt to reduce gas consumption to a minimum during the emergency
- Porter staff will be required to assist with transporting cylinders.
- Pharmacy will arrange emergency cylinder deliveries as necessary
- The Authorised Person (MGPS) will liaise with the Competent Person (MGPS) to complete emergency repairs needed to reinstate the gas supply, using the permit-to-work system
- When the supply is fully restored, the Authorised Person (MGPS) will complete a critical incident form and produce a full report, which will be given to the Chief Executive within 24 hours of the incident.

Contamination of a medical gas supply

It is not unusual for a smell to be noticed when using “plastic” equipment hoses to deliver gas to a patient. This smell usually disappears rapidly after first use of the hose, and will generally be familiar to operatives. However, if either operatives or patients complain of any unusual or strong smells from equipment, the situation must be treated seriously and immediate action taken to ascertain the cause. Where it is obvious that the smell is coming from the pipeline rather than a piece of connected equipment, the gas supply must not be used.

In such an event, the fault should be treated as a complete gas failure to that area and the actions described above taken immediately. It is very important that, if such an incident occurs, OPAT or SMOC will advise all departments of the problem, especially critical care areas.

Contamination of the medical vacuum system

This will usually be detected during routine maintenance inspection and evidenced by the presence of liquid in the on-line bacteria-filter drain flask. The infection control nurse should be informed immediately and should advise on any additional precautions to effect filter change safely. Portable suction units may be used in areas where there is a possibility of the vacuum system being contaminated. (The need for portable suction units will be discussed with the infection control officer). It is the responsibility of the Competent Person (MGPS) to change the filter in accordance with the procedure described in

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Health Technical Memorandum 02-01 and any additional advice from the infection control officer. If the contamination is due to system misuse, the Authorised Person (MGPS) must complete an incident report form (Datix).

Decontamination of pipework (if necessary) should be carried out in accordance with the procedure described in HTM 02-01 before filters are changed.

Appendix E- Training Impact Assessment

1. Will training be required as a result of the Policy?

Yes	Proceed to question 2
No	If no, please state how this policy will be communicated within the UHB

2. Please complete the following information relating to training

Course/ policy title	Specific medical gas user and handling training Designated Nursing Officer Training
Course type	Online Module for clinical and non-clinical staff. Face to Face for DNO training
Reference to KSF/NMC Dimensions	Unknown
Target Audience (refers to scope of policy)	Clinicians, medical staff, nurses, midwives, clinical support staff, technical and professional staff
Course / policy training objectives	Training must ensure that all staff involved in the use and handling of medical gas cylinders are aware of their legal/H&S responsibilities and the special precautions required due to the nature of the package and its contents DNO Training
Course / policy training content	Training must include awareness of this policy and access to documentation Content will vary according to target audience and local standard operating procedures.
Duration of course / programme	2-3 hours

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Name of trainer (or policy lead)	Health Education England online module ABMU training module on ESR BOC for DNO Training
Approximate cost of providing training	DNO Training cost £1600
Please embed lesson plan, link to e-learning, presentation or other relevant learning material	www.e-lfh.org.uk for non-clinical staff 000NHSWales-Medical Gases Education for Nurses, Midwives & AHP's or access via medicines management training – newly registered staff.

Appendix F

- **Clinical Staff**

All newly registered Nurses/Midwives, undertaking a preceptorship course will be booked onto CAVUHB Medicines Management training. They will be automatically directed to undertake the medical gases training as part of this course and must complete their Medical Gases competencies with an assessor. All other registered nurses/midwives & AHP's will be expected to complete the following ESR module:

"000NHSWales-Medical Gas Education for Nurses, Midwives & AHP's"

Following this they must complete the Medical Gases competencies located on Pharmacy page - SharePoint and/or via their Practice Development Nurse(s)

Who can access the training?

Nurses, Midwives, AHP's or anyone that directly administers medical gases to patients.

The Course

The training covers:

- Legislation & Regulation

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- Medical Gas Supply
- Safe Administration of Medical Gases
- Safe Handling, Transport & Storage
- Useful Resources
- MCQ Knowledge Assessment

Assessment and Compliance

There is a multiple-choice question knowledge assessment at the end of the module. The user must gain a minimum grade of 80% to pass the module.

The Nurse Advisor for Medicines Management and the Medical Gases Safety Group will monitor compliance with the completion of training and therefore may ask managers/ECOD to provide progress reports.

- **Non-Clinical Staff**

Whilst this is a Health Education England website, staff working in Wales can register to access the training at no cost.

Who can access the training?

Porters, Estates, Maintenance or anyone who has any involvement with moving and storing medical gases are required to complete Medical Gases training.

Managers should request that staff provide copies of certificates of completion once they have completed the course. It is hoped that the course will eventually be made available through ESR, however until then, managers will need to maintain records of course completion on individual personal files.

Registration & Modules

- 1) Go to www.e-lfh.org.uk – Click on the ‘Register’ tab, you will be asked to enter your email address to register an account (*please note this needs to be an NHS email rather than a personal email address*), once you have done so, you will be logged on to the site.
- 2) Type ‘e4E’ into the search box at the top of the screen. This will bring up a range of options – click on ‘Medical Equipment (e4E)’ from the list.
- 3) At the bottom of the list of training modules available you can select ‘The safe use, storage and set up of medical gases and cylinders used in healthcare’

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The training covers:

- Properties of medical gases
- Medical gases commonly found in healthcare premises
- Cylinder identification, colour codes and cylinder sizes
- Safe cylinder storage
- Cylinder valve types and switching on a cylinder
- Transporting, handling, connecting and disconnecting medical gas cylinders
- Patient safety and reducing risk

Assessment and Compliance

The training is assessed throughout the module and at the end of the course you will be assigned a score. A score of at least 80% is required to pass. Staff should allow 2-3 hours to complete the training and the assessments.

Once successfully completed, staff can download a certificate to evidence completion of the module and will also receive access to a Medical Gas Workbook.

The Nurse Advisor for Medicines Management and the Medical Gases Safety Group will monitor compliance with the completion of training and therefore may ask managers to provide progress reports.