POLICY FOR Medical Gases

Author(s)	Sarah Hepburn on behalf of the ManxCare Medical Gas Group
Version Number	1
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Intended audience	All ManxCare and Department of Infrastructure staff involved in medical gases	
Superseded documents	Medical Gas Pipeline systems at Nobles Hospital ver 2 2008	
Stakeholders consulted prior to ratification	ManxCare Medical Gas Group NonClinical Quality Group Executive Director of Health Services Director of Nursing Medical Director Director of Infrastructure ManxCare Chief Executive	
Ratified by	Non Clinical Quality Group	Date 2 October 2023
Previous reviews	n/a	
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1. INTRODUCTION

Purpose

The Medical Gas Policy details how medical gases (both piped and cylinders) are safely managed to ensure their effective, convenient and economic use.

Scope

This policy is for all staff employed, including any contractor, by ManxCare (MC) and Department of Infrastructure (DoI) involved in the management and use of medical gases. It applies throughout MC facilities to all fixed medical gas pipeline and manifold systems, medical gas cylinders, liquid oxygen storage plant and any medical gas generating system.

Definitions

Roles, Responsibilities and duties

Chief Executive Officer (CEO)

The CEO is ultimately accountable for the safe operation of the MC premises and responsible for the implementation of the MC medical gas policy. He/she should ensure that the operational policy clearly defines the roles and responsibilities of all personnel who may be involved in the use, installation and maintenance of medical gases and associated equipment. He/she has board responsibility for medical gases.

The CEO may delegate specific responsibilities to key personnel; the extent of such delegation is clearly set out in this policy, together with the arrangements for liaison and monitoring

Executive Director of Health Services (DoHS)
The DoHS has management responsibility for medical gases, including the allocation of resources and the appointment of personnel.
The DoHS will appointment in writing

- **Authorising Engineer [AE MGPS], Authorised Persons [AP(MGPS)]** and **Competent Persons [CP(MGPS)]** on recommendation of the Director of Infrastructure ManxCare
- **Quality controller [QC(MGPS)]** on recommendation of the Chief Pharmacist (Acute Care)

Director of Infrastructure ManxCare (DoI MC)
The DoI MC will engage the services of an **Authorising Engineer (MGPS)**. He/she will be a person with suitable qualifications (e.g. a chartered or incorporated engineer) and sufficient relevant experience to oversee and audit the medical gas systems and their associated **Authorised Persons (MGPS)**.

Authorising Engineer (MGPS)
He/she will undertake the following duties:
To recommend to the DoHS those persons who, through individual assessment, are suitable to be Authorised Persons (MGPS)
To ensure that all Authorised Persons (MGPS) have satisfactorily completed an appropriate training course
To ensure that all Authorised Persons (MGPS) are re-assessed every three years and have attended a refresher or other training course prior to such re-assessment
To review the management systems of the MGPS, including the permit to work system
To monitor the implementation and subsequent reviews of the Medical Gas Policy and Procedures.
To offer expert technical advice to MGPS managers and users.
To undertake a full audit of the organisations' documentations and processes

Authorised Person (AP) (MGPS)
A minimum of three (3) AP(s) (MGPS) will be appointed, one of who will be assigned to the hospitals. The formal responsibility for the MGPS rests with the Director of Operations though the AP (MGPS) assume effective responsibility for the day-to-day management and maintenance of the MGPS.

The duties and responsibilities of an AP (MGPS) are:

a) To ensure that the MGPS is operated safely and efficiently in accordance with the statutory requirements and guidelines.
b) To be responsible for the Permit to Work System, including the issue of High & Low level Permits to Competent Persons (MGPS) for all servicing, repair, alteration and extension work carried out on the existing MGPS;
c) To be responsible for the supervision of the work carried out by Competent Persons (MGPS) (Contractors) and, by choosing registered contractors, for the standard of that work.
d) To ensure that the hospital's MGPS maintenance specification and schedule of equipment (including all plant, manifolds, pipework, valves, terminal units and alarm systems) are kept up to date;
e) To liaise closely with the Designated Medical Officers/Designated nursing Officers, Care Group General Managers, Clinical Directors and Associate Directors of Nursing, the Quality Controller (MGPS) and others, who need to be informed of any interruption or testing of the MGPS

f) To provide technical advice to those responsible for the purchase of any medical equipment which will be connected to the MGPS, in order to avoid problems arising from potentially insufficient capacity and / or flow rate;
g) In accordance with the hospitals policy on provision of services, provide advice on the provision and / or replacement of MGPS central plant and associated systems. (The Authorised Person will hold overall responsibility for the provision and maintenance of MGPS services within the hospital);
h) To facilitate such training of Engineering staff (and other staff if requested) and / or transfer of MGPS information, as is needed for the efficient and safe operation of the MGPS.
i) To hold training records for MGPS personnel.

Competent Person (CP) (MGPS)
All CP(s) (MGPS) are Craft Persons either directly employed by the DoI, or registered and employed by specialist contractors (The latter shall be known as "Approved Competent Persons (MGPS)").
All Contractors' Competent Persons (MGPS) shall be registered to BS EN ISO 9001 / BS EN ISO 13485, with clearly defined registration criteria.

All CP (MGPS) directly employed by the DoI shall have satisfactorily completed an appropriate training course, be sufficiently experienced and familiar with the MGPS before being appointed. Training should be recorded and reviewed regularly.
The AP shall keep a record of the contracting companies and individuals approved to carry out this work .

The duties and responsibilities of CP (MGPS) are:
a) To carry out work on the MGPS in accordance with the hospital's installation and maintenance specifications.
b) To carry out repair, alteration or extension work, as directed by an AP (MGPS) in accordance with the Permit to Work System and HTM 02.
c) To perform engineering tests appropriate to all work carried out and prove to the AP (MGPS) all test results.
d) To carry out all work in accordance with the Manx Care and DoI Health & Safety Policies.

Quality Controller (QC) (MGPS)
It is the responsibility of the Chief Pharmacist to appoint a QC Pharmacist with MGPS responsibilities.

The duties and responsibilities of the QC (MGPS) are:
a) To assume responsibility for the quality control of the medical gases at the terminal units, i.e. the wall or pendant medical gas outlets;
b) Ensure that cylinder gases comply with the requirements of the European Pharmacopoeia (Ph. Eur).
c) To liaise with the AP (MGPS) in carrying out specific quality and identity tests on the MGPS in accordance with the Permit to Work System and relevant Pharmacopoeia Standards or delegate to another suitably qualified Pharmacist.

To advise the Executive Director of Healthservices and the Chief Pharmacist of the results of all tests carried out on the MGPS and any other findings that could affect the integrity of the MGPS.

Designated Medical or Nursing Officer (DMO/DNO)

All MGPS work in Wards and Departments and carried out under the MGPS Permit to Work System, will be controlled by the Authorised Person (MGPS) in liaison with the relevant DMO/DNO

a) The person acting as DMO/DNO must reflect the level of hazard as illustrated in the table below

b) The DMO/DNO is in charge of a Department/Ward, with whom the AP (MGPS) liaises on any matters affecting the MGPS.

c) The DMO/DNO will give permission for a planned interruption to the supply by signing the relevant sections of the Permit to Work Form.

d) For the purposes of MGPS work at ward level, the DMO/DNO will have jurisdiction over all MGPS work, including that requiring cutting and brazing of pipelines in their area of responsibility. This will include all planned and emergency local work in normal working hours.

e) THE DMO/DNO will prepare and implement mitigations to enable essential maintenance or repairs to the medical gas pipeline system in clinical areas.

f) In the event of a planned interruption involving more than one department, e.g. for a major shutdown, the Executive Director of Nursing & Governance, (or a nominated Senior Nurse Manager, acting as deputy) will give permission to the interruption to the MGPS supply.

g) A Senior Night Nurse will act as the lead nurse outside normal working hours but will sign Emergency Permits for local work only.

h) Training of the lead nurses in operational and safety aspects of the MGPS should take place on a regular basis. This training should be organised by the hospitals Training Department and may involve liaison with the Authorised Person (MGPS).

i) Other lead nurses not directly involved with the Permit to Work System should also ensure that all nursing staff are aware of any MGPS work that may affect them, and that these staff understand MGPS standard and emergency procedures.

j) Prior to work commencing the DNO will

1. Verify the contractor has a valid permit from ManxCare and undertakes the proposed work at the specified location
2. Advise the contractor on Personal Protective Equipment and Infection Control and Prevention requirements supplying PPE as needed
3. Assess the clinical risk to service users to determine if the proposed work can take place at the proposed time
4. Communicate to all staff working in the clinical areas affected

DMO/DNO	Authority Level for Hazard
Clinical site manager (day or night), Assistant Director of Nursing, matron or departmental nurse manager, senior clinician, intensivist or anaesthetist	Planned work requiring either Low or High Hazard PTW Emergency isolation
Ward manager or deputy in charge of a number of wards or a department	Planned work requiring either Low or High Hazard PTW
Senior nurse in charge of a ward	Planned work requiring low hazard PTW

Purchasing & Supplies Department will:

a) Order and take delivery of cylinders of medical gases for use in wards and departments and on manifolds.
b) Ensure cylinders are stored in a safe and secure environment.
c) Receive delivery notes for medical gas cylinders, check against invoices received and pass invoices to the Pharmacy Department for authorisation for payment.
d) Maintain a record of cylinder rental charges and pass rental invoices to the Pharmacy Department for authorisation for payment.

Portering at the Hospital will:

a) Accept requests from wards and departments for replacement gas cylinders, and arrange for Designated Persons to deliver cylinders to the point of use and change regulators and flow meters as required.
b) Return empty cylinders to the medical gas stores for secure storage awaiting collection by the supplier.
c) Upon notification by alarm or advice from the Switchboard arrange for Designated Persons to attend to and change cylinders on Oxygen, Nitrous Oxide, Entonox and Medical Air manifolds.

Designated Person

A Designated Person is a Porter with particular responsibilities for medical gases. He/she will have undergone specialist training in the identification and safe handling and storage of medical gas cylinders, including mandatory manual handling training.

Designated Persons in the Hospital will undertake the following duties:

a) Deliver full gas cylinders from the Cylinder Stores (as appropriate) to wards, theatres and manifold rooms and return empty cylinders to these stores;
b) Attach to and remove from cylinders, medical equipment regulators (or regulator/flow meter combinations) and manifold tailpipes.
c) Identify and remove from service, faulty (e.g. leaking) cylinders and subsequently notify the Purchasing & Supplies Manager of the location of such cylinders;
d) Perform a weekly check on cylinder stocks and store areas, reporting any deficiencies to the Purchasing & Supplies Manager.
e) Ensure that all cylinder contents are used within the 3-year fill/refill timescale specified by the gas supplier. Any cylinder that is within 1-month of its end date for use is to be removed from service and returned to the Purchasing & Supplies Manager.
f) It is essential that the Designated Person works safely at all times, using the appropriate Personal Protective and Manual Handling Equipment.
g) Personal Protective or Manual Handling Equipment found to be missing, or defective in any way, must be reported immediately to the Portering Manager or his deputy.

2. RELATED POLICY/STRATEGY/LEGISLATION/GUIDANCE

Fire policy, Medicines Policy, Health and Safety Policy, Training Policy, Incident Policy, Risk Policy

3. POLICY

3.1 Overall Systems Management

3.1.1 Quality

3.1.1.1 Medical gases in use are licensed medicinal products, with the exception of medical air, which is tested quarterly to confirm compliance with the relevant monograph in the British Pharmacopeia.

3.1.1.2 The design, use and any works on the medical gas pipe system are in accordance with Health Technical Memorandum 02-01: Medical gas pipeline systems (HTM 02) (MGPS) (1)

3.1.1.3 Whilst medical gases are not one individual's responsibility, this policy, supported by the Medical Gas Group, identifies the key stakeholders, their roles duties and responsibilities along with clear guidance on the safe and effective management of medical gases.

3.1.1.4 Effective management of medical gases is achieved using standard operating procedures.

3.1.2 Safety

3.1.2.1 Staff need to follow the approved standard operating procedures to ensure the safe receipt, storage, transportation and operation of medical gas cylinders or any use or work on the MGPS including in an emergency.

3.1.3 Permit to work PTWS (MGPS)

3.1.3.1 Before any work can be undertaken on any area of a hospital's MGPS, the possible impact of this work needs to be assessed, documented and communicated to the relevant areas.

3.1.3.2 This assessment is carried out using a permit to work scheme (PTWS), by the AP (MGPS) who quantifies the risk as either High or Low Hazard as defined in HTM 02 (1). The PTW provides

- The communication between the AP (MGPS) and DNO/DMO of work to be carried out
- the evidence of the date(s), time that the work was carried out,
- confirmation by the QC (MGPS) that at time of testing the medical gas was of appropriate quality (High Hazard)
- The suitability of taking the MGPS back into use (DNO / DMO).

3.1.3.3 Planned interruption on the MGPS will be for repair, extension or modification to the MGPS. This carried out in accordance with the PTWS and under the supervision of the AP (MGPS). The AP (MGPS) must liaise with the lead nurse and chief pharmacist during the planning.

3.1.3.4 High Hazard work includes work that introduces the hazard of cross connection and/or pollution or involves a major shut down for one or more medical gases. The quality of the medical gas at the outlet is confirmed by the QC (MGPS) and prior to the system being taken back into use and the suitability is confirmed by the DMO/DNO.

3.1.3.5 Low Hazard work includes work that would not introduce the hazard of cross connection and/or pollution. A performance test by the AP(MGPS) is required before the system is taken back into use.

3.1.4 Training

It is essential that relevant personnel at all levels have a sound general knowledge of the safe and appropriate use of medical gases including where relevant the principles, design and functions of MGPS.

All staff will be trained in relationship to their particular responsibilities, and where relevant the training provided by an appropriately accredited provider.

3.1.4.1 Safe use of medical gases – to include properties and hazards of medical gases, safe use of equipment, cylinder safety handling and management

3.1.4.2 Emergency Procedures and Permit to work system – to include emergency supply provision, actions in the event of an emergency, responsibilities and application of the PTWS

3.1.4.3 Management of the MGPS – to include standards and specifications, documentation and records, system components + operational responsibilities

3.1.4.4 Installation and Maintenance of the MGPS – to include design and application of MGPS, installation, validation and verification, maintenance requirements of components

3.1.4.5 Medical Gas quality control and testing – to include requirements of medical gas testing, specifications, test equipment + protocol for use, statutory requirements for medicines management

Position	Safe use of medical gases	Emergency Procedures and Permit to work system	Management of the MGPS	Installation and maintenance of the MGPS	Medical gas quality control and testing
Authorised person	3 yearly	3 yearly	-	3 yearly	-
Competent person	3 yearly	3 yearly	-	3 yearly	-
Designated Medical/Nursing Officer	3 yearly	3 yearly	3 yearly	-	-
Nursing Staff	Annually	-	-	-	-
Designated Person	Annually	-	-	-	-
Quality Controller (MGPS)	3 yearly	3 yearly	3 yearly	3 yearly	3 yearly

Monitoring and Control

All departmental managers are responsible for ensuring that their staff, agency and contractors have received adequate medical gas training and that they are assessed as proficient in their area of responsibility. Individual training records will be held and used to determine future training events and requirements.

3.1.5 Department – emergency

3.1.5.1 In the case of an emergency such as a fire or major gas leak the DNO/DMO is responsible for the emergency isolation of a ward pipeline system and must be the most senior member of the medical or nursing staff present.

3.1.5.2 The DMO/DNO must first determine usage of medical gases and make alternative arrangements before isolating supply at the Area Valve Service Unit (AVSU).

3.1.5.3 There is no requirement to follow the PTWS to isolate the supply; however, the AP (MGPS) will need to follow the PTWS to take the system back into use.

3.1.6 Gas Sources – emergency

Nobles

3.1.6.1 Oxygen

a) Vacuum Insulated Evaporator (VIE) 1 (main source), BOC 281-17 with a capacity of 225 HCM, located at the rear of the hospital.

b) VIE 2 (secondary source + back up) 83 with a capacity of 70 HCM, at the same location.

c) tertiary supply from one of 3 manifolds

1. located main gas store 2 x 6 J cylinders
2. PSA plant 2 x 10 J cylinder
3. ward 20 2 x 4 J cylinders.

The VIE's are remotely monitored by a BOC telemetry system

3.1.6.2 Medical Air

a) plant 1 maternity plant room (3 compressors) + secondary back up 2x5 J cylinder manifold (Gas store located back of the hospital)

b) plant 2 theatre plant room C (3 compressors) + secondary back up 2x5 J cylinders manifold (Gas store located @ back of hospital

3.1.6.3 Surgical Air

a) theatre plant room C (2 compressors) + secondary back up 2 x 4 J cylinder manifold (gas store @ back of hospital

3.1.6.4 Entonox

a) manifold 2 x 4 G cylinders with secondary back up 2x1 G ERM (gas store @ back of hospital)

3.1.6.5 Nitrous

a) manifold 2 x 6 G cylinders with secondary back up 2x1 G ERM (gas store @ back of hospital)

Central Care Health Centre

3.1.6.6 Oxygen

a) (dental) manifold 2 x 2 j cylinders with secondary back up 2x1 J ERM

3.1.6.7 Nitrous

a) manifold 2 x 2 G cylinders with secondary back up 2x1 G ERM

Ramsey District Cottage Hospital

3.1.6.8 Oxygen

a) 2 x 10 J cylinder manifold with 2x1 J cylinder ERM (adjacent to rear entrance to hospital)

3.1.7 Servicing and maintenance

3.1.7.1 All equipment used to deliver medical gases need to be serviced and maintained in compliance with HTM 02 (1)

3.1.7.2 All equipment used to test compliance with the pharmacopeia monograph and HTM 02 need to be serviced, calibrated and maintained as detailed by the manufacturer.

3.1.8 Incidents, recalls

3.1.8.1 If an incident occurs during the use of a medical gas, or during the maintenance of the MGPS which would affect patient safety then the MC incident reporting, investigating and learning policy needs to be followed (Datix).

3.1.8.2 Any drug recall of a medical gas is managed as detailed in the MC medicines policy.

3.1.8.3 The MC Medical Gas group will review the incidents, recalls and safety alerts along with actions taken.

3.2 Documentation

3.2.1 Site Drawings

3.2.1.1 In order to ensure the AP will maintain

- up to date and accurate as fitted record drawings (including valve/key numbers/ TU identification) for all MGPS
- MGPS insurance / statutory documents
- MGPS safety valve replacement schedule (5 yearly)
- MGPS pendent hoses replacement schedule (5yearly)
- Plant history + maintenance records

- Manufacturer's technical data sheets/manuals for all MGPS components

3.2.2 PTWS

3.2.2.1 The AP will maintain the current PTWS record books, and completed books for lifetime of the piped system

3.2.2.2 The QC (MGPS) and DNO/DMO will retain their copies of the PTWS for lifetime of the piped system.

3.2.3 Contractors

- The AP will maintain records of the contractors contracts, ISO9001 certificates, training records, method statements, health and safety policy and equipment calibration certificates

3.2.4 Training Records

3.2.4.1 Are to be kept by the relevant staff and their departmental managers in line with MC training policy and any professional regulations.

3.2.5 Incidents, recalls + audits

3.2.5.1 All incidents and recalls relating to medical gases are to be managed according to the relevant MC policy.

3.2.6 Purchase Orders

3.2.6.1 All purchase orders, delivery documents and invoices are to be kept by the purchasing and supplies department for a minimum of 6 complete tax years**.**

3.3 Systems Elements - see section 3.1.6

3.3.1 Cylinder Store

3.3.1.1 Main store(s)

- Nobles
- Ramsey District and Cottage Hospitals
- Community

3.3.1.2 Ward or clinic areas

3.3.1.3 Residential (patient home or care home)

3.3.2 Medical Vacuum

3.3.2.1 Nobles – 9 vacuum plants located in plant room.

- Vac plant 1 SSD plant room serving SSD, mortuary, estates
- vac plant 2 CCU plant room serving wards 3, 4, ODU, 6, 7, 8, 9, 10, delivery suite + theatre, renal, CCU, NICU, W+C outpatients + outpatients D;
- vac plant 3 – pathology plant room serving pathology

- vac plant 4 – theatre plant room C – serving theatres radiology, ED Major Treatment room, ED resus room, theatre recovery
- vac plant 5 – stairwell 6 – serving, outpatients C, ED Treatment rooms, ward 12 and out pts B
- vac plant 6 surgical plant room A – serving ward 11, outpatients F (ENT), outpatients A, ward 1
- vac plant 7 ITU plant room – serving ward 2, ward 14, ward 19;
- vac plant 8 – ITU plant room serving ITU, Breast & endoscopy
- vac plant 9 Newlands plant room serving DATU and wd20

3.3.2.2 Ramsey – 1 vacuum plant located by the oxygen manifold room serves all areas

3.3.3 Anaesthetic Gas Scavenging System (AGSS)

3.3.3.1 Nobles

- AGSS1 located in SSD plant room, serving SSD
- AGSS2 located in maternity plant room serving maternity theatres;
- AGSS3 located in theatre plant room A serving all theatres;
- AGSS4 located in stairwell 6 serving ED, radiology, and outpatient C;
- AGSS5 located in surgical plant room A serves ITU and endoscopy
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3.3.3.2 Ramsey – AGSS1 located in theatre plant room serving theatres

4. REFERENCES AND/OR RESOURCES

1. Medical Gases – Health Technical Memorandum 02-01 : Medical gas Pipeline systems https://www.england.nhs.uk/publication/nhs-estates-guidance-for-medical-gas-pipeline-systems-htm-02-01/ (accessed April23)

DOCUMENT EQUALITY & STANDARDS ASSESSMENT

Document Title:			
Policy for Medical Gases			
Date/Version:			
version 1	**Nov-23**		
Author:			
ManxCare Medical Gas Group - Chair Sarah Hepburn			
Document Content:			
Are aims/objectives clearly stated?	☑ YES	☐ NO	
Relevant stakeholder involvement?	☑ YES	☐ NO	
Appropriate language/terminology?	☑ YES	☐ NO	
Up-to-date references/guidelines/research?	☑ YES	☐ NO	☐ N/A
Procedural clarity (including algorithms)?	☑ YES	☐ NO	
If **no** selected, provide rational for decision:			
Is the document compliant with IOM Equality & Diversity legislation?	☑ YES	☐ NO	
If **no**, in which area is the document non-compliant?			
☐ Disability ☐ Gender Reassignment ☐ Marriage/Civil Partnership ☐ Race			
☐ Pregnancy/maternity ☐ Sex/Sexual Orientation ☐ Religion/Belief ☐ Age			
Reason for non-compliance:			
Documents failing to achieve one or more of the above CANNOT be ratified.			
Date of initial review:			
See policy for stake holders with final review Nonclinical Quality Group Oct 2023			
Review undertaken by:			
☐ Manx Care Board ☐ Policies & Procedures Committee ☐ Care Group Managers/CQ&S Coordinator ☐ OCQG			
Outcome of initial review:			
☑ Ratified ☐ Ratified pending minor changes ☐ Not ratified (significant changes required) ☐ Not ratified (rejected)			
Review recommendations:			
**If document is ratified pending minor changes:*			
Tick to confirm that changes have since been made as recommended by the ratifying body: ☑			
Ratified by: Non Clinical Quality Group	**Date:**	02-Oct-23	
☐ Manx Care Board ☐ Policies & Procedures Committee			
☐ Care Group Managers/CQ&S Coordinator ☐ OCQG			