

Operational Policy for Medical Gases

Issue Date	Review Date	Version
May 2019	May 2024	3

Purpose

This policy will address the provisions of the Medical Gas Pipeline Systems (MGPS). It will set out roles and responsibilities, and outline the operational management of the MGPS.

Who should read this document?

All persons who have access to, use of, or are responsible for the supply of medical gas in Derriford Hospital.

This includes:

- Estates staff
- Pharmacy staff
- Portering staff (All)
- Nursing staff
- Medical staff
- Physiotherapy Staff
- Operating Department
- Appointed Approved Contractor for MGPS

Key Messages

University Hospitals Plymouth NHS Trust (PHNT) recognises its responsibility to implement in full, the safe management of the MGPS in accordance with the statutory requirements, current guidelines and best practice.

This Operating Policy should be read in conjunction with HTM 02-01 Medical Gas Pipeline Systems

This policy details the following:

- Defines types of medical gas
- Details the roles and responsibilities of the staff who manage the MGPS including; Executive Manager (MGPS), Head of Estates, Authorising Engineer, Estates Authorised Persons (MGPS), Coordinating Authorised Person (MGPS), Competent Persons (MGPS), Quality Controller (MGPS), Pharmacy Department, Designated Medical/Nursing Officer, Designated Porters (MGPS), Project Managers, Engineering Managers, Building Managers, Supervisors, CAD Technician, and the Medical Gases Assurance Group
- Details the parts of the system the Estates Department is responsible for
- Summarises what is included in the Operational Procedure for Medical Gases
- Details the Permit-to-work system
- Details the process for purchasing and the maintenance of MGPS equipment
- Details training requirements
- Provides guidance on records management
- Directs users to information regarding signage
- Discusses limitations of the system
- Directs users to the relevant regulatory legislation, applicable guidelines, and MGPS specific guidance
- Lists MGPS designated personnel, their medical gas role, and their telephone numbers
- Contains Medical Gas Data Sheets for Entonox, Medical Air, Medical Carbon Dioxide, Medical Nitrous Oxide, and Medical Oxygen

Core accountabilities	
Owner	Head of Estates
Review	Health & Safety Committee, Medical Gas Assurance Group
Ratification	Director of Corporate Business
Dissemination (Raising Awareness)	Head of Estates
Compliance	Health and Safety Committee

Links to other policies and procedures

HTM 02-01 Medical Gas Pipeline Systems
 Trust COSHH Policy
 Trust COSHH Risk Assessment and Standard Operating Procedure
 Trust Medical Gas SOP Document
 Hospital Infection Control Manual and Memoranda
 Hospital Fire Procedures
 Permit-to-work system
 Procedure for MGPS failure in Theatres
 Ward Contingency Plans for MGPS failure
 Hospital Environmental Health & Safety Guidance, including Hospital Manual Handling Policy (Hard copy and Intranet circulation)
 Clinical Engineering Equipment Users Guide
 The Management and Use of Medical Devices Policy
 Medical Devices Training Policy
 Plant history records and maintenance log books
 Test equipment calibration certificates
 Training records of all Competent Persons (MGPS) – (Direct labour and Approved Contractor's staff)
 BS EN ISO 9000 certificate of Approved Contractor
 "Emergency actions" training schedule for ODPs etc. (Estates)
 Written Scheme of Examination for medical gas systems
 Insurance and inspection certificates for compressed air plant, PSVs etc.
 Details of ownership and insurance liability for BOC VIE systems
 Business continuity plan – Medical Gas

Version History

V1	13.10.2009	Updated by Phil Tarbuck	
V2.1	20.03.2014	Updated by Phil Tarbuck	
V2.2	02/08/2016	Updated by Phil Tarbuck	
V3	11/04/2019	Updated by Paul Commander	Changes to Supplies and services Page 5. Roles and responsibilities Page 7 & 17. Emergency procedures Appendix 6

The Trust is committed to creating a fully inclusive and accessible service. Making equality and diversity an integral part of the business will enable us to enhance the services we deliver and better meet the needs of patients and staff. We will treat people with dignity and respect, promote equality and diversity and eliminate all forms of discrimination, regardless of (but not limited to) age, disability, gender reassignment, race, religion or belief, sex, sexual orientation, marriage/civil partnership and pregnancy/maternity.

**An electronic version of this document is available on Trust Documents.
Larger text, Braille and Audio versions can be made available upon
request.**

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Operational Policy for Medical Gases

The Operational Policy for Medical Gases addresses the provisions of the Medical Gas Pipeline Systems (MGPS). It sets out the roles and responsibilities of staff, and outlines the operational management of the MGPS.

All staff who have access to, use of, or are responsible for the supply of medical gas at University Hospitals Plymouth NHS Trust should read this policy.

What You Need to Know

Responsibilities of staff who have access to, use of, or are responsible for the supply of medical gas must:

- Be aware of this policy
 - Be aware of their specific roles and/or responsibilities
 - Be up to date with training or certification as per their role and/or responsibilities
 - Ensure that the permit-to-work system is utilised in accordance with HTM 02-01: Medical Gas Pipeline Systems
 - Report any concerns to the Estates Helpdesk on ext. **31300**
 - This policy should be read in conjunction with the Operational Procedure for Medical Gases
-
- MGPS used in the Trust provides the following:
 - Medical Oxygen
 - Nitrous Oxide
 - Carbon Dioxide
 - Entonox (Nitrous Oxide/Oxygen mixture 50% v/v)
 - Medical Air at 4 Bar
 - Surgical Air at 7 Bar
 - Medical vacuum and anaesthetic gas scavenging systems
 - Dental air and dental vacuum
 - Nitrogen Systems IVF

1 Introduction

The Medical Gas Pipeline Systems (MGPS) are defined as central pipeline systems and cylinder supplies, by which University Hospitals Plymouth NHS Trust (hereafter known as the Trust) provides a safe, convenient and cost-effective supply of medical gases to points where these gases can be used by clinical and nursing staff for patient care.

The Operational Procedures for Medical Gas, as defined in section 5 of this policy, should be used in relation to the following:

- Major components of the MGPS and their locations
- Manifold systems
- Alarms and Emergency Procedures including isolation procedures
- Further information about the Permit to Work system
- Cylinder Management
- Deliveries
- Changing bacterial filters
-

2 Purpose

The purpose of this policy is to address the provisions of the MGPS. It sets out the roles and responsibilities of staff, and outlines the operational management of the MGPS.

The Trust has an obligation to adhere to various legislation all of which is detailed in this policy.

3 Definitions

MGPS is used throughout this Policy as a general term to describe systems providing: medical oxygen, nitrous oxide, carbon dioxide, nitrous oxide/oxygen mixture 50% v/v, medical air at 4 Bar and surgical air at 7 Bar, medical vacuum and anaesthetic gas scavenging systems, also include dental air and dental vacuum provided from discrete chair side units and central wet vacuum system is included.

COSHH Regulations

The Control of Substances Hazardous to Health Regulations 1999 (usually called COSHH) state that certain substances which are classified as being hazardous to health, and which employees may be exposed to, must be identified in the workplace and the health risks to employees assessed. These regulations are applicable to medical gases.

Medical Gas Data Sheets (MGDS) are provided in Appendix 4.

4 Duties

The Trust recognises its responsibility to implement in full, the safe management of the MGPS in accordance with the statutory requirements, current guidelines and best practice.

The Trust accepts that safe management of the MGPS requires a high level of commitment, professional competence and adequate resources.

The Trust recognises that it is essential for key personnel to receive appropriate training relevant to their particular roles and activities.

Roles and responsibilities

This policy summarises the roles and responsibilities of staff who maintain the MGPS. A detailed breakdown is found in the Medical Gases Health Technical Memorandum (HTM) 02-01: Medical Gas Pipeline Systems Part B.

Chief Executive:

- Is ultimately accountable for the MGPS, but herein delegates responsibility to the Director of Estates and Facilities

Executive Manager (MGPS):

- Is the Director of Estates and Facilities and has responsibility for MGPS, including the allocation of resources and the appointment of personnel

Head of Estates:

Is responsible for the integrity of the MGPS and ensuring that all work is carried out in accordance with HTM and permit to work procedures

Authorising Engineer:

- Recommends those persons who are suitable to be Authorised Persons and the Coordinating Authorised Person
- Ensures that all Authorised Persons (MGPS) have satisfactorily completed an appropriate training course and attend appropriate re-assessment and refresher training courses
- Conducts audits every two years and review of the management systems of the MGPS, including the permit-to-work system

Estates Authorised Persons (MGPS):

- Assumes responsibility for the day-to-day management and maintenance of the MGPS (these persons are listed in Appendix 2) and ensures that the MGPS is operated safely and efficiently in accordance with the statutory requirements and guidelines listed in Appendix 1

Are responsible for the 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

Coordinating Authorised Person (MGPS)

- Will coordinate the actions of all other Authorised Persons (MGPS) within his/her area of responsibility and will manage the permit-to-work system and other MGPS safety aspects in that area

Competent Persons (MGPS):

- Will carry out the installation and/or maintenance work on the MGPS. The Competent Person (MGPS) will have received the appropriate training

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 Department:

- Overall responsible for the day to day management of medical gas cylinders
- Orders liquid oxygen for the Trust cryogenic bulk storage facility
- Gives guidance on any cylinder safety alerts that have been disseminated
- Records, Reports and monitors any incidents relating to medical gas cylinders

- Receives delivery notes for liquid oxygen and compressed gas cylinders, check against invoices received and pass invoices for payment

- Orders cylinders of medical gases and special gas mixtures for the following areas:
 - i) Wards and departments
 - ii) Manifolds

- Maintains a record of cylinder rental charges and pass rental invoices for payment

- Maintains a record of cryogenic system facilities charges and pass invoices for payment

Designated Medical Officers/Designated Nursing Officer (MGPS):

- Is the person in each department with whom the Authorised Person (MGPS) liaises on any matters affecting the MGPS and who would give permission for a planned interruption to the supply

- Would be the Duty Ward Sisters/Matrons, Staff/Registered Nurse, or the Medical Director or any nominated deputies who will have jurisdiction over MGPS works

- Will give permission for a planned interruption to the supply by signing the relevant sections of the permit-to-work form

Designated Porters (MGPS):

- Have particular responsibilities for medical gases and will have undergone specialist training in the identification and safe handling and storage of medical gas cylinders, including relevant manual handling training
- Must maintain a record of this training with the Clinical Education Manager
- Must assist with the delivery of gas cylinders by BOC where appropriate
- Must deliver full gas cylinders from the Cylinder Stores (as appropriate) to wards, Theatres and manifold rooms and return empty cylinders to the stores
- Must transfer gas delivery notes from the delivery driver to the Portering Manager, who will forward these notes to Pharmacy
- Must attach to and remove from cylinders, medical equipment regulators (or regulator/flowmeter combinations) and manifold tailpipes
- Must ensure cylinders are stored and chained correctly
- Must identify and remove from service faulty (e.g. leaking) cylinders and subsequently notify the Portering Manager of the location of such cylinders
- Must work safely at all times, using the appropriate Personal Protective Equipment, which is provided and maintained by the Portering Contractor
- Must ensure the medical gas stores are kept clean, dry and free from flammable material. Rubbish, chemicals etc. must not be stored with the cylinders. The area should be swept regularly and, where necessary, weeds removed from the immediate vicinity. Flammable weedkillers must not be used
- Must ensure that manual handling equipment is maintained and report immediately to the Portering Manager if any Personal Protective or Manual Handling Equipment is found to be missing, or defective in any way
- Should receive training in operational and safety aspects of the MGPS on an annual basis

Project Managers, Engineering Managers, Building Managers and Supervisors:

- Will provide the CAD technician with any changes or updates to the MGPS. Will have all projects approved by the Coordinating Authorised Person (MGPS) prior to installation

CAD Technician:

- Will maintain up to date master drawings of the MGPS and make drawings readily available on site for use by any Authorised Person

Medical Gases Assurance Group:

- Will be chaired by the Coordinating Authorised Person, and attended by the Authorised Persons (MGPS), the Risk Manager, the Health and Safety Advisor, a Designated Medical/Nursing Officer, the QC (MGPS), the Head of Porter service and the clinical education manager.
- Other signatories to this document shall also be invited to participate as appropriate
- Shall convene on a quarterly basis with the Coordinating Authorised Person (MGPS) being responsible for writing and distributing the minutes of the meeting
- Will review this policy and recommend it for ratification by the Trust Board
- Report to the Chief Executive via the Health & Safety Committee. The Coordinating Authorised Person will produce a quarterly report for the Health & Safety Committee

5 Key Elements (determined from guidance, templates, exemplars etc.)

This policy applies to all persons who have access to, use of, or are responsible for the supply of medical gas at University Hospitals Plymouth NHS Trust.

It applies throughout the Trust to all fixed medical gas pipeline systems, medical gas cylinders, cryogenic medical oxygen storage vessels, and medical vacuum systems as defined in the Health Technical Memorandum 02-01 Parts A and B 2006.

MGPS management responsibility for Derriford Hospital resides with the Estates Department.

Medical gases piped to the Clinical Engineering Department (CED) are included, as is a medical compressed air supply to the Sterilisation and Disinfection Unit (for the express purpose of testing the operation of air-powered surgical tools).

Compressed gas and vacuum supplies to general engineering workshops and Pathology Departments shall be separate from the general MGPS and are NOT included in this Policy.

The carbon dioxide manifold supplying IVF Unit Maternity is included.

The operation of the medical and surgical equipment connected to the terminal units is **NOT** covered by this policy and is the responsibility of MEMS and the Clinical Departments.

Operational Arrangements

Procedures

The Operational Procedures for Medical Gases are as follows:

- Cylinder management – in accordance with HTM 02-B-01 Chapter 8
- Emergency procedures – Appendix 6
- Permit-to-work systems – in accordance with HTM 02-B-01 Chapter 6
- System summaries and access procedures
- Bacteria filter changes – in accordance with HTM 02-B-01 Appendix D
- Deliveries of gas cylinders and liquid oxygen - in accordance with HTM 02-B 01 Chapter 8 and Appendix E

Permit-to-work

In accordance with HTM 02-01: Medical Gas Pipeline Systems, a permit-to-work system is implemented by the Coordinating Authorised Person (MGPS) and operates in Derriford Hospital.

Under no circumstances should any work take place on the MGPS without the knowledge and permission of an Authorised Person (MGPS) and the issue of a relevant permit except for the following:

- Filling of liquid oxygen vessels
- Routine maintenance of liquid oxygen vessels and associated equipment by BOC
- Changing of manifold cylinders
- Or emergency isolation by a member of the Clinical/Nursing staff

Staff should be aware that this system is in place and can challenge staff or contractors who may be working on the system to ensure a permit has been obtained.

Purchase or Replacement of Medical Equipment

Prospective purchasers of medical equipment intended for use by connection to a MGPS are required to contact the Coordinating Authorised Person (MGPS) and the Head of Clinical Technology before such purchases are made to establish whether a viable gas supply is available for that equipment.

Some equipment, such as Continuous Positive Airway Pressure (CPAP) devices and high-flow air tools, impose a heavy demand on gas supplies and patient safety could be compromised if unauthorised equipment is connected to the MGPS.

Damaged equipment such as flow meters and regulators should be sent to CED at the request of the duty Nurse. If beyond repair then replacements can be purchased through CED (Suction controllers are also available through CED).

Damaged equipment found by Porter staff during routine cylinder replacement should be returned to CED with details of origin.

In cases where air tools cannot be operated from the hospital air system due to exceptional flow requirements, dedicated cylinder/regulator combinations will have to be used.

All damage to hoses should be reported to CED immediately so that new hoses can be put in place.

Unauthorised temporary repairs, particularly those involving devices such as jubilee clips, are strictly forbidden, as they may result in patient injury or death.

Training

In order to ensure safety of patients, clinical and nursing staff, maintenance personnel, Porters and other MGPS users, it is essential that no one be allowed to use a medical gas system or equipment unless properly trained or supervised. Each section of this Policy addresses the roles and responsibilities of defined personnel and from these lists training needs can be identified.

Responsibility for ensuring training is carried out is defined below. Records of such training must be kept by the appropriate manager.

Designated Persons	Responsibility for Provision	Refresher training	How
Contract Porter staff (Serco)	Contract Porter Manager (Serco)	Annual	Provided by Contractor (Serco)
Trust Porter staff	Clinical Education Manager	Annual	Face to face training with competency assessment
Competent Persons (Maintenance Staff)	Coordinating Authorised Person	Every Three Years	Organised via Estates. Provided by an external provider
Competent Persons (External Contractors' staff)	Managing Director of Company	Every Three Years	Responsibility of the Competent Persons employer
Authorised Persons (Engineers)	Head of Estates	Every Three Years	Organised via Estates. Provided by an external provider
Designated Nursing Officers	Clinical Education Manager	Every Three Years	Practical Training and competency assessment
Ward and Departmental nursing staff ODP's	Clinical Education Manager	Annual	Practical Training and competency assessment
Designated Medical Officers	Medical Director	Every Three	Practical Training and Competency assessment

		Years	
Quality Controller	Chief Pharmacist	Every Three Years	2 day refresher run by NHS Pharmaceutical Technical Specialist Education and Training
CED staff	Head of Clinical Technology	Every Three Years	Equipment specific training, peer to peer training

Records Management

Records will be kept as per Appendix 4.

Signs

Appropriate identification and safety warnings are displayed in accordance with current requirements. For more detailed guidance please see HMT 02-01 Medical Gas Pipeline Systems- Part A, Appendix K.

System Limitations

The piped medical oxygen distribution system in Derriford Hospital was predominantly designed and installed before the use of CPAP Ventilation became common.

Oxygen flow rates required for CPAP are greater than those required for traditional oxygen usage and a recent survey shows that in most wards, the main distribution pipework is now being used at or beyond its design capacity.

Levels 4 and 6 in the Plateau Building were specifically designed to support 12 CPAP ventilators and will do so without degrading the supply to other areas or being negatively affected by other areas.

All other wards should be able to supply two CPAP ventilators without significant pressure loss if the pressure available at the Area Valve Service Unit (AVSU) is sufficient.

The use of CPAPs should be restricted to well ventilated areas.

6 Overall Responsibility for the Document

The Director of Estates and Facilities is responsible for ratifying this document. The Site Services department has responsibility for the dissemination, implementation and review of this Policy

7 Consultation and Ratification

The design and process of review and revision of this policy will comply with The Development and Management of Trust Wide Documents.

The review period for this document is set as default of five years from the date it was last ratified, or earlier if developments within or external to the Trust indicate the need for a significant revision to the procedures described.

This document will be approved by the Health & Safety Committee and the Medical Gas Assurance Group and ratified by the Director of Estates and Facilities.

Non-significant amendments to this document may be made, under delegated authority from the Director of Estates and Facilities by the nominated author. These must be ratified by the Director of Estates and Facilities and should be reported, retrospectively, to the approving committee.

Significant reviews and revisions to this document will include a consultation with named groups, or grades across the Trust. For non-significant amendments, informal consultation will be restricted to named groups, or grades who are directly affected by the proposed changes

8 Dissemination and Implementation

Following approval and ratification, this policy will be published in the Trust's formal documents library and all staff will be notified through the Trust's normal notification process, currently the Trusts Staff Net page.

Document control arrangements will be in accordance with The Development and Management of Trust Wide Documents.

The document author(s) will be responsible for agreeing the training requirements associated with the newly ratified document with the Director of Estates and Facilities and for working with the Trust's training function, if required, to arrange for the required training to be delivered.

9 Monitoring Compliance and Effectiveness

Monitoring and Audit

Heads of Departments are responsible for providing evidence, at least annually, that the concentrations of pollutants in all areas at risk from medical gas pollution comply with COSHH regulations. Please see the Trust COSHH Policy for further detail.

An audit will be undertaken by the Authorising Engineer every year to ensure that the Trust complies with HTM 02-01 and that the Authorised Persons are appropriately managing the system and implementing the procedures.

The Coordinating Authorised Person (MGPS) will present the key findings of the Audit Report to the Medical Gases User Group so that progress against the action points can be monitored.

The Authorised Persons will inspect installations on a monthly basis to assess areas of high risk and identify any possible breaches of health and safety legislation.

A review of the permit-to-work system will be undertaken on a quarterly basis to ensure its effectiveness.

The Coordinating Authorised Person will organise for AGS Local Exhaust Ventilation annual re-commissioning to take place. A formal report for each system will be provided.

Policy Review

This policy will be reviewed on an annual basis by the Medical Gases Assurance Group and sooner if there is a change in legislation or if there is a significant change in a building or its use.

10 References and Associated Documentation

Regulatory legislation and applicable guidelines

A list of appropriate regulatory legislation is detailed below. (This list is not exhaustive):

- Health and Safety at Work etc. Act, 1974
- Management of Health and Safety at Work Regulations, 1999
- Control of Substances Hazardous to Health (COSHH) Regulations 2002
- Work Place (Health, Safety and Welfare) Regulations 1999
- Provision and Use of Work Equipment Regulations 1998
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995
- Pressure Equipment Regulations 1999
- Pressure Systems Safety Regulations, 2000
- Dangerous Substances and Explosive Atmospheres, 2002
- Manual Handling Operation Regulations 1992
- Personal Protective Equipment at Work Regulations, 1992 (1998)
- Electromagnetic Compatibility Regulations 1992
- Electricity at Work Regulations 1989
- European Pharmacopoeia

Other Guidance Applicable to Medical Gas Pipeline systems:

- Health Technical Memorandum (HTM) 02-01 “Medical Gas Pipeline Systems”, 2006
 - Part A: Design, Installation, Validation and Verification
 - Part B: Operational Management
 - Supplement No 1 “Dental Compressed Air and Vacuum Systems” 2003
 - Supplement No 2 “Piped Medical Gases in Ambulance Vehicles” 1997
- Health Technical Memorandum (HTM) 03-01 “Specialised ventilation for healthcare premises”, 2007
 - Part A: Design and validation
 - Part B: Operational Management and performance verification
- National Health Service Model Engineering Specification, C11, “Medical Gases”, ‘95
- European Pharmacopoeia Standards for medical gases, including medical compressed air

Designated Personnel

Name	Title	Medical Gas Role	Phone No.
Ann James	Chief Executive	Chief Executive	Ext. 39084
Nick Thomas	Deputy Chief Executive and Director of Site Services	Executive Manager	Ext. 37048
Stuart Windsor	Director of Estates and Facilities	Deputy Executive Manager	Ext. 37004
Peter Williams	Authorising Engineer MGPS	Authorising Engineer MGPS	07758 964278
Phil Tarbuck	Head of Estates	Coordinating Authorised Person	Ext. 31297
Bryan Kidger	Engineering Operations Manager	Authorised Person (High Hazard)	Ext. 31296
Paul Commander	Mechanical Services Manager	Authorised Person (High Hazard)	37017
Sally Mayell	Director of Pharmacy	Chief Pharmacist	Ext. 31237
John Hughes	QC Pharmacist	Quality Control Pharmacist	Ext. 37452
Trudy Bown	Procurement Manager, Pharmacy	Procurement Manager	Ext. 32370
Lenny Byrne	Chief Nurse	Designated Nursing Officer	Ext. 31233
Dave Adams	Consultant Anaesthetist	Designated Medical Officer	Ext. 31736
Louise Pelley	Manager, Portering Department	Designated Person	Ext. 32295

Norman Bate	Mechanical Fitters	Competent Persons	Contact the Helpdesk on 31300
Zack Ham			
Steve May			
Brendon Olding	Quality Systems Technician	CAD Technician and Planet FM system	Ext. 39655
Medical Gas Pipelines LTD	Medical Gas Service Engineers	Medical Gas Engineers(CP's)	01246 561053
Medical Gas Pipelines LTD	Medical Gas Engineers	Medical Gas Installation Engineers	01794 515777
Sarah Dormor	Clinical Education Manager	Training Facilitator	Ext. 31756

11 | Site Plan



Derriford Site Utilities & Street Lighting Plan

Dissemination Plan			
Document Title	Operational Policy for Medical Gases		
Date Finalised	May 2019		
Previous Documents			
Action to retrieve old copies			
Dissemination Plan			
Recipient(s)	When	How	Responsibility
All Trust staff		Vital Signs	Information Governance Team
Electronic version on Trust Documents Network Share Folder	Electronic version on Trust Documents Network Share Folder	Electronic version on Trust Documents Network Share Folder	Electronic version on Trust Documents Network Share Folder
Review Checklist			
Title	Is the title clear and unambiguous?	Yes	
	Is it clear whether the document is a policy, procedure, protocol, framework, APN or SOP?	Yes	
	Does the style & format comply?	Yes	
Rationale	Are reasons for development of the document stated?	Yes	
Development Process	Is the method described in brief?	Yes	
	Are people involved in the development identified?	Yes	
	Has a reasonable attempt has been made to ensure relevant expertise has been used?	Yes	
	Is there evidence of consultation with stakeholders and users?	Yes	
Content	Is the objective of the document clear?	Yes	
	Is the target population clear and unambiguous?	Yes	
	Are the intended outcomes described?	Yes	
	Are the statements clear and unambiguous?	Yes	
Evidence Base	Is the type of evidence to support the document identified explicitly?	Yes	
	Are key references cited and in full?	Yes	
	Are supporting documents referenced?	Yes	
Approval	Does the document identify which committee/group will review it?	Yes	
	If appropriate have the joint Human Resources/staff side committee (or equivalent) approved the document?	Yes	
	Does the document identify which Executive Director will ratify it?	Yes	
Dissemination & Implementation	Is there an outline/plan to identify how this will be done?	Yes	
	Does the plan include the necessary training/support to ensure compliance?	Yes	
Document Control	Does the document identify where it will be held?	Yes	
	Have archiving arrangements for superseded documents been	Yes	

	addressed?	
Monitoring Compliance & Effectiveness	Are there measurable standards or KPIs to support the monitoring of compliance with and effectiveness of the document?	Yes
	Is there a plan to review or audit compliance with the document?	Yes
Review Date	Is the review date identified?	Yes
	Is the frequency of review identified? If so is it acceptable?	Yes
Overall Responsibility	Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document?	Yes

Core Information	
Date	May 2019
Title	Operational Policy for Medical Gases
What are the aims, objectives & projected outcomes?	The aim of the policy is to address the provision of the Medical Gas Pipeline Systems (MGPS). It sets out the roles and responsibilities of staff, and outlines the operational management of the MGPS. It is to ensure the appropriate staff are aware and know of their responsibilities and to give the Trust assurance that any hazards are mitigated
Scope of the assessment	
This EIA was undertaken with the Equality Lead and covers all protected characteristics	
Collecting data	
Race	<p>There is no evidence to suggest there is a disproportionate impact on race regarding this policy.</p> <p>However, data collected from Datix incident reporting and complaints will ensure this is monitored.</p> <p>Consideration will be made if information provided is required in a different language for training purposes.</p>
Religion	<p>There is no evidence to suggest there is a disproportionate impact on religion or belief and non-belief regarding this policy.</p> <p>However, data collected from Datix incident reporting and complaints will ensure this is monitored.</p>
Disability	<p>There is no evidence to suggest there is a disproportionate impact on disability regarding this policy.</p> <p>However, data collected from Datix incident reporting and complaints will ensure this is monitored.</p> <p>Consideration will be made for staff requiring reasonable adjustments for training purposes and the use of medical gases.</p>
Sex	<p>There is no evidence to suggest there is a disproportionate impact on sex regarding this policy.</p> <p>However, data collected from Datix incident reporting and complaints will ensure this is monitored.</p>
Gender Identity	<p>There is no evidence to suggest there is a disproportionate impact on gender identity regarding this policy.</p> <p>However, data collected from Datix incident reporting and complaints will ensure this is monitored.</p>
Sexual Orientation	<p>There is no evidence to suggest there is a disproportionate impact on sexual orientation regarding this policy.</p> <p>However, data collected from Datix incident reporting and complaints will ensure this is monitored.</p>

Age	<p>There is no evidence to suggest there is a disproportionate impact on age regarding this policy.</p> <p>However, data collected from Datix incident reporting and complaints will ensure this is monitored.</p>
Socio-Economic	<p>There is no evidence to suggest there is a disproportionate impact on socio-economic regarding this policy.</p> <p>However, data collected from Datix incident reporting and complaints will ensure this is monitored.</p>
Human Rights	<p>There is no evidence to suggest there is a disproportionate impact on human rights regarding this policy.</p> <p>However, data collected from Datix incident reporting and complaints will ensure this is monitored.</p>
What are the overall trends/patterns in the above data?	No comparative data has been used to date which means that no trends or patterns have been identified.

Involving and consulting stakeholders				
Internal involvement and consultation	Health and Safety Committee			
External involvement and consultation	None			
Impact Assessment				
Overall assessment and analysis of the evidence	<p>Consideration will be made if information provided is required in an alternative format or language for training purposes</p> <p>Consideration will be made for staff requiring reasonable adjustments for training purposes.</p>			
Action Plan				
Action	Owner	Risks	Completion Date	Progress update
Specific issues and data gaps that may need to be addressed through consultation or further research	No gaps have been identified at this stage but this will be monitored via data collected from Datix incident reporting and complaints.			

The Coordinating Authorised Person (MGPS) will maintain copies of the following, for the durations stated:

- a) Up-to-date and accurate “as fitted” record drawings (including valve/key numbers) for all MGPS, for the life of the building;
- b) Any necessary MGPS insurance/statutory documentation, for a period of 30 years;
- c) MGPS safety valve replacement schedule (on a 5-yearly basis);
- d) New and completed permit-to-work books for work on the systems, to be retained as specified by the Medical Gas Assurance Group;
- e) Plant history, for the life of the equipment;
- f) Maintenance records, for a period of 6 years from the end of the contract;
- g) Manufacturer’s technical data sheets/manuals for all MGPS components, for the life of the equipment;
- h) Health Technical Memorandum 02, any associated supplements and NHS Model Engineering Specifications C11, all latest editions, for the life of the building;
- i) MGPS contractors’ service contracts and ISO 9000 certificates, staff training records, equipment calibration certificates (copies), for a period of 7 years from the end of the contract;
- j) A list of all personnel associated with the MGPS, especially the permit-to-work system, as detailed in this Policy;
- k) Emergency and other useful telephone numbers, to be updated regularly and retained for the life of the MGPS;
- l) The MGPS Operational Policy staff training records, for a period of 6 years after end of the staff members employment;
- m) Calibration certificates of Trust-held test equipment, for the duration of the life of the equipment;
- n) The storage time for MGPS records shall be as specified by the Medical Gas Assurance Group or relevant legislation.

The QC Pharmacist will maintain copies of the following:

- a) Certificates of analysis for liquid oxygen deliveries, for 5 years or 1 year after expiry of the batch (whichever is longer);

- b) Calibration records of QC test equipment and records of QC tests performed, for a period of 11 years.

Copies of such documentation shall be made available to Estates on request.

Pharmacy will maintain copies of the following:

- a) Delivery notes for liquid oxygen, for 2 years after the end of the financial year to which they relate;
- b) Sales invoices for liquid oxygen, for 6 years after the end of the financial year to which they relate;
- c) Invoice of quarterly facilities charge for cryogenic system, for 6 years after the end of the financial year to which they relate;
- d) Delivery notes for medical gas cylinders, for 2 years after the end of the financial year to which they relate;
- e) Sales invoices for medical gas cylinders, for 6 years after the end of the financial year to which they relate;
- f) Delivery Summary Form (tracks cylinder stock information); for 2 years after the end of the financial year to which they relate;
- g) Cylinder rental invoices, for 6 years after end the of the financial year to which they relate;
- h) Cylinder Rental Reconciliation Form (monitors trends in cylinder use over 6 months), as specified by the Medical Gas Assurance Group;
- i) Delivery notes for special gas, for 2 years after the end of the financial year to which they relate;
- j) Sales invoices for special gas, for 6 years after the end of the financial year to which they relate;
- k) Rental invoices for special gas, for 6 years after the end of the financial year to which they relate.

Emergency Procedure for Interruption of Medical Gas Supply

The most senior Authorised Person will co-ordinate the response to an emergency situation.

1.0 Oxygen system

In the event of failure of the Primary VIE oxygen supply tank, the Secondary VIE oxygen supply tank will provide continued supply.

In the event of failure of the Secondary VIE oxygen supply tank the Reserve VIE oxygen supply tank will provide continued supply.

In the event of failure of the Reserve VIE oxygen supply tank, the Emergency automatic reserve manifold will provide continued supply.

If there has been a local incident meaning a clinical area no longer has access to the oxygen pipeline from the main pipeline, the team coordinating the incident response will need to make the clinical decision on whether to transfer patients on oxygen to another clinical area, or for the Estates team to provide a Back-feed trolley with cylinders to connect to the clinical area pipeline inlet, or lastly, individual cylinders for each patient.

It is the duty of Portering to ensure that sufficient cylinders are available to maintain the gas supply and that there is an emergency procedure in place for handling these cylinders.

2.0 Medical and surgical compressed air

There are three phases of medical air compressor dryer sets on the Derriford site; each set is capable of supplying the entire site through a number of manual link valves.

Each set is also quadruplex in nature with 2 out of the 4 compressors able to satisfy the demand of the phase it is supplying.

In the event of a compressor failure, a plant fault alarm will be generated and the remaining three compressors of that phase will provide continued supply.

In the event of a total plant failure the automatic emergency manifold supporting the medical air plant will come on line automatically and will change banks automatically,

Estates will also open the appropriate link valve to allow one of the other phases to take the load and provide continued supply.

Cylinder replacement will be the responsibility of Portering. Care should be taken to prevent transfer of oil/grease from the compressor plant to the manifold cylinder connections.

3.0 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 emergency supply manifold will come on line automatically; it will not be necessary to open the emergency supply manifold 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 emergency supply manifold.

Detailed instructions identifying which valves to turn and in which order shall be posted adjacent to each emergency supply manifold.

Due to the limited capacity of the emergency supply manifold, 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 cylinder must then replace the empty cylinder.

It is the duty of Portering to ensure that sufficient cylinders are available to maintain the gas supply.

4.0 Medical Vacuum

There are three phases of medical vacuum on the Derriford site; each set is capable of supplying the entire site through a number of manual link valves. Phase 1 and phase 2 are quadruplex systems with 2 out of 4 pumps able to satisfy the demand of each phase. Phase 3 is a triplex system with each of the 3 pumps being able to satisfy the demand of phase 3. With respect to phase 1 and phase 2 in the event of a pump failure a plant fault alarm will be generated and the second set of pumps will take the load to ensure continuous supply. Estates will attend and depending on the nature of fault will if necessary open one of the link valves to allow the load to be taken by an alternative phase. With respect to phase 3, in the event of a pump failure a plant fault alarm will be generated and pumps 2 and then 3 will take the load ensuring continuous supply. Estates will attend and depending on the nature of fault will if necessary open one of the link

valves to allow the load to be taken by an alternative phase. Vacuum systems have no emergency reserve manifold system. Failure of the plant for any reason will result in total failure of the vacuum service.

MEMS hold a small number of portable suction units in the medical equipment library for use in emergency or planned works at a ward/department level.

Outside of normal hours the equipment library is accessible to staff via swipe access to collect portable units as required.

5.0 Carbon Dioxide Manifold

All Carbon Dioxide installations incorporate a duty and reserve manifold arrangement with a number of spare cylinders at each location.

Piped CO₂ is only available in Ocean Suite, should there be a major interruption of Carbon Dioxide supply arising from a fault or incident with the manifolds or connecting pipeline the department will not have CO₂.

6.0 Emergency cylinder ordering procedure

Pharmacy will perform routine cylinder ordering based on required stock levels and weekly use. Porterage will check stocks weekly and report any deficiencies to pharmacy. For emergency ordering, the following procedure should be followed

Pharmacy will telephone the emergency number of the medical gas supplier. 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.

7.0 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 the VIE.
- 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.
- the air compressors will fail, but air will be supplied from the air emergency supply manifold;
- 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/telephonist;
- 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;
- the Authorised Person (MGPS) will monitor the situation and confirm resetting of compressor and vacuum plant and system alarms following restoration of supply

8.0 A serious leak of medical gases

In these events:

- the duty porter and the Authorised Person (MGPS) will be contacted by the telephonist/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 (Designated Nursing Officer) 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 Plymouth Hospitals NHS Trust 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.

9.0 Total or partial failure of a medical gas supply

In these events:

- the person discovering the failure will inform the telephonist and duty nurse immediately;
- the telephonist 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;
- 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 monitor/replenish cylinders at any emergency stations and at plant room emergency supply manifolds;
- 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 Director of Nursing within 24 hours of the incident.

In situations where it is envisaged that there will be long-term loss of oxygen or medical air service, the duty senior manager will liaise with clinical colleagues, including the senior nurse manager, the medical director and the Authorised Person (MGPS) on the need for transfer of critically ill patients to alternative hospital accommodation as department closure may be warranted in extreme events.

10.0 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, the telephonist advises all

Departments of the problem, especially critical care areas.

Contamination of the medical vacuum system 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 should 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 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.

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

11.0 Failure of an Anaesthetic Gas Scavenging System

Failure of an Anaesthetic Gas Scavenging System results in spillage of gaseous/vaporised anaesthetic agents into the area of use of the system.

In theatres, it is likely that staff exposure to the spilled gases will exceed the Occupational Exposure Limits (COSHH)

Recommendations) for exposure when working in the area for extended periods, even though ventilation rates are high.

A local alarm “system fail” warning and failure of the air receiver flow indicator will indicate failure of the system.

Both should be inspected by operating department staff on a regular basis.

The Authorised Person (MGPS) and the theatre manager will be informed of the failure by the theatre technician/operating department practitioners and all attempts should be made to reduce staff exposure, if operations continue with a failed system.

When repairs have been completed (under a permit-to-work signed by the theatre nurse manager, or their nominated deputy), theatre staff should be made aware (by the person signing off the permit-to-work) that the system is back in use

12.0 Over- or under-pressurisation of one or more gas systems

Local alarms are designed to indicate when system pressure(s) is/are outside the normal operating range.

Excessively high or low pressures may cause medical equipment to malfunction. The duty nurse should report all instances of local alarm operation to the telephonist.

13.0 Emergency isolation of a gas Supply

- the duty porter and the Authorised Person (MGPS) will be contacted by the telephonist/duty nurse;
- details of the event 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 (Designated Nursing Officer) to carry out isolation of medical gases to the area after ascertaining that patients will not 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 University Hospitals Plymouth NHS Trust 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.

Fire

Procedures in accordance with the University Hospitals Plymouth NHS Trust fire policy should be followed in the event of a fire involving, or likely to involve, the medical gas pipeline system.

During a fire, the senior brigade officer will assume full control of the area(s) affected.

Under no circumstances should medical gas supplies be isolated until the Designated Nursing Officer has confirmed that all patients likely to be affected have been evacuated and/or have alternative gas provision