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Royal Cornwall Hospitals
NHS Trust

# Management of Entonox® Policy

## V1.0

## May 2023

# Summary

This document defines the procedures for use of Entonox in the Royal Cornwall Hospitals NHS Trust in all clinical areas.

This document lays out the training required for those utilising Entonox as part of their clinical practice.

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**Data Protection Act 2018 (General Data Protection Regulation – GDPR) Legislation**

The Trust has a duty under the Data Protection Act 2018 and General Data Protection Regulations 2016/679 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed, and documented. We cannot rely on opt out, it must be opt in.

Data Protection Act 2018 and General Data Protection Regulations 2016/679 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the Data Protection Act 2018 and General Data Protection Regulations 2016/679 please see the Information Use Framework Policy or contact the Information Governance Team

Royal Cornwall Hospital Trust rch-tr.infogov@nhs.net

# 1. Introduction

1.1. Many procedures or interventions are painful for the patient and the level of discomfort experienced is often underestimated or discounted as being part of a therapeutic or beneficial intervention. Entonox® is a mixture 50% nitrous oxide and 50% oxygen is an inhaled agent that provides effective analgesia that can be self-administered to provide immediate pain relief (there are other brand names for this mixture but for the purposes of this policy the product will be referred to as Entonox®). It is particularly suited for the relief of acute pain as a result of, for example, injury, trauma, therapeutic investigative procedures and maternity. Entonox® was introduced commercially in 1965 and, following acceptance by the Central Midwives Board, became the normal method of pain control in childbirth utilised by the midwifery staff. Soon, Entonox® was being used to control pain for accidents and emergencies and, by the early 1970s, was standard issue in most ambulances.

1.2. Entonox® can be supplied and administered following a prescription by a medical practitioner or via the Royal Cornwall Hospitals NHS Trust Patient Group Directive. The only exception to this is midwifery practice. Midwives can supply and administer Entonox® independently of a medical practitioner (NMC, Midwives rules and standards, 2012)

**Rationale:**

Entonox® is a prescription only medicine and must therefore be given under the instruction of a prescribing practitioner or provided under the guidance laid out in the Royal Cornwall Hospitals NHS Trust Entonox® Patient Group Directive.

1.3. Entonox® can only be administered by a competent Health Practitioner who has successfully completed the Entonox® administration training or other recognised training such as Midwifery.

**Rationale:**

Staff must be aware of the properties of the gas, precautions to be taken and the correct operating procedures and be able to act appropriately in the event of an emergency.

1.4. This version supersedes any previous versions of this document.

# 2. Purpose of this Policy/Procedure

The purpose of this document is to set out the standards and recommendations for practice in Royal Cornwall Hospitals NHS Trust which aim to ensure that Health Practitioners are able to comply with local guidance on the safe supervision of patients receiving Entonox® for short-term pain relief.

# 3. Scope

3.1. This policy applies to all permanent, locum, agency and bank staff at the Royal Cornwall Hospitals NHS Trust. It applies to Entonox® use in maternity (acute and community midwifery), as well as analgesic use in other areas of the hospital.

3.2. This policy covers adults and paediatric patients.

# 4. Definitions / Glossary

4.1. Entonox® is a homogeneous gas mixture containing 50% nitrous oxide (N2O) and 50% oxygen (O2). It is stored in cylinders at 137 bar. This pressurized mixture remains gaseous at temperatures above –6oC.

4.2. Nitrous oxide is a colourless, sweet smelling gas with powerful analgesic properties. Pulmonary transfer of nitrous oxide is rapid, with onset of effect in seconds and full analgesia is achieved within 1-2 minutes. Likewise it is rapidly eliminated from the blood, via the lungs, when inhalation ceases. Entonox® combines the analgesic effect of the nitrous oxide and oxygen.

4.3. A Health Practitioner as used in the policy constitutes a Medical Doctor, Registered Nurse, Registered Midwife, Physiotherapist or Radiographer.

# 5. Ownership and Responsibilities

## 5.1. Role of the Managers

Line managers are responsible for:

- Risk assessing areas in which Entonox is being administered and recording the outcome on the departmental risk register.
- Ensuring staff are trained
- Reporting any issues with the risk assessment to the Health and Safety Team
- Recording any risks associated with Entonox® in their clinical area on the area risk register.
- Clinical groups who wish to use the Entonox® via a PGD will fulfill the responsibilities associated with PGD use.
- Clinical areas which use Entonox® must ensure they report all adverse incidents through normal operational procedures for incident reporting, and review all adverse incidents linked to Entonox® use at least monthly.

## 5.2. Role of the Medical Gas Group/Committee

The Medical Group/Committee is responsible for:

- Keeping policy up to date, the group will review this policy biannually.
- Monitoring incidents

## 5.3. Role of the Health and Safety Department

- To advise on the safe use and monitoring requirements of Entonox® in clinical areas.

## 5.4. Role of Estates

- To advise on and where appropriate install ventilation equipment to allow the safe use of Entonox® in clinical areas.

## 5.5. Role of the Department of Clinical Technology

- Have a representative sitting on the Medical Gas Group/Committee to provide advice.

- Routine servicing, repairs and testing of Entonox® demand valves and regulators

- The Department of Clinical Technology Consumables Store will hold a stock of Entonox® demand valves and regulators for service exchange

- The Department of Clinical Technology Consumables Store will hold a stock of AGSS Adapters

- Investigate incidents relating to Entonox® demand valves and regulators

## 5.6. Role of Individual Staff

- The Health Practitioner is responsible for assessing the patient’s suitability for receiving Entonox® as a form of analgesia.

- The Health Practitioner prescribing Entonox® independently (in the case of medical practitioners and midwives) is responsible for writing a legible prescription or under the guidance of the patient group directive, the health practitioner administering must keep a legible administration record.

- The Health Practitioner must seek and note the patient’s informed consent prior to administering this drug and this must be documented on consent and treatment record. A patient information leaflet is available to facilitate this process.

- The Health Practitioner must be satisfied that the environment in which Entonox® is to be administered is safe as per Control of Substances Hazardous to Health Regulations 2002 As Amended (COSHH, 2002). See COSHH Risk Assessment, Appendix 1.

- The health practitioner is responsible for completing an electronic incident report form in the event of an adverse incident/near miss and processing this through normal operational procedures.

- The health practitioner is responsible for using any protective equipment provided in their area.

- The health practitioner is responsible for completing the Entonox® training.

# 6. Guidance

## 6.1. Storage

Where cylinders are brought into the building directly from outside storage during periods of low external temperature, to ensure gases are properly mixed, cylinders should first be either

a. Stored horizontally for 24 hours at a temperature above 10ºC, or

b. Stored for at least 2 hours at a temperature above 10ºC, then completely inverted three times.

## 6.2. Prescribing and administration

6.2.1. Entonox® must be prescribed by medical staff or non-medical prescribers with responsibility for the care of the patient prior to use and should only be administered by staff who are trained in both its use and the equipment available for its administration.

6.2.2. Entonox® is self-administered using a dedicated Entonox® demand valve which operates by the negative pressure generated by the patient inhaling.

## 6.3. Indications

Entonox® is indicated for the relief of acute moderate to severe pain of any aetiology (see contraindications in section 6.4 for exclusion criteria). The pain or discomfort could be: as the result of injury; due to a procedure carried out in hospital; or that incurred by women in childbirth and labour. For example:

- Fracture manipulation
- Endoscopy (e.g. colonoscopy)
- Suturing of lacerations
- Venopuncture
- Ophthalmic surgery
- Vascular procedures
- Radiological procedures
- Dermatological procedures
- Wound dressing changes
- Burns dressing
- Orthopaedic joint manipulation

- Patient mobilisation
- Childbirth
- Perineal suturing
- Wound drain removal
- Examination of wounds or fractures

## 6.4. Contraindications

| Contraindication | Rationale |
|---|---|
| Pneumothorax, | The nitrous oxide constituent of Entonox® passes into all gas-containing spaces in the body faster than nitrogen passes out. This can cause expansion of the gas space, compressing surrounding structures. |
| Bowel obstruction | |
| Air embolism | |
| Decompression sickness or following a recent underwater dive | |
| Following air encephalography | |
| Severe bullous emphysema | |
| During myringoplasty | |
| Head injuries with impaired consciousness. | Entonox® will cause sedation, which may confound neurological observation of the patient. |
| Drug or alcohol Intoxication | Drowsiness and aspiration would be a hazard in the event of vomiting. |
| Maxillo-facial injuries | The patient may not be able to hold the mask tightly to the face or use the mouthpiece adequately.<br><br>Risk of airway compromise |
| Heavily sedated patients | The patient may be unable to use the equipment properly and increased sedation may be hazardous. |
| Where a patient cannot hold a facemask/mouthpiece. | |

| Contraindication | Rationale |
|---|---|
| Patient receiving Vitamin B12 injections. | |
| First 16 weeks of viable pregnancy | |
| In patients having received recent eye surgery for retinal detachment | |

## 6.5. Drug Interactions

| Drug | Interaction |
|---|---|
| Methotrexate | Entonox potentiates the effects of methotrexate on folate metabolism |
| Bleomycin | Oxygen contained within Entonox can results in the risk of pulmonary toxicity in patients on these drugs. Use Entonox with caution in these patients and keep levels as low as possible. |
| Amiodarone | |
| Nitrofurantoin | |
| Central depressants (eg. Opiates, benzodiazepines and psychotropics) | Additive effects, may cause pronounced sedation and depression of protecting reflexes. |

If Entonox® is used for more than a total of 24hrs, or more frequently than every four days, it must be used with close haematological monitoring, as this may cause vitamin B12 deficiency.

## 6.6. Driving after receiving Entonox

It is recommended that driving and use of machinery should not be undertaken until 12 hours have elapsed since administration of Entonox®. Therefore patients should not be allowed to try Entonox® during parentcraft classes and partners are not allowed to sample the Entonox® whilst they are on the labour ward. This would also be in contravention of NMC Standard for Medicines Management regulations and the NMC Midwives Rules and Standards. (Refer to the guideline for the 'Dissemination of information to patients in Maternity'; register number 10008).

**See Appendices 1-3 for protocols for practice.**

## 6.7. Incidents and Records

Incident reporting via DATIX will be the mechanism used for reporting any problems or deviations from policy.

In high use departments an audit will be expected to be completed yearly to ensure that patients requiring Entonox® have documentation/prescription.

# 7. Training Requirements

## 7.1. Aim

- To provide adequate information and knowledge to ensure the safe delivery of Entonox® therapy to patients with acute pain.

## 7.2. Objectives

Staff will be able to:

- Define the indications for Entonox®
- Describe Entonox® and its effects
- List the contraindications/cautions in the use of Entonox®
- Medical and nursing staff should be trained in the practical use of the system within their clinical areas (including the safe use of the equipment and actions in the event of an emergency).

## 7.3. Training Pack

All staff giving Entonox should complete the free on-line training package provided by BOC at www.boctraining.co.uk

You can enroll for this direction or using the following link:

https://boc.dayonetech.uk/login.aspx

You will need the following course registration code BO20684

On completion of the module please send a copy of your completion certificate to the Learning and Development team on rcht.landdadmin@nhs.net

# 8. Monitoring compliance and effectiveness

| Information Category | Detail of process and methodology for monitoring compliance |
|---|---|
| **Element to be monitored** | Appropriate use of Entonox<br>Staff training in the use of Entonox |
| **Lead** | Ward Manager of the relevant Clinical Areas |

| Information Category | Detail of process and methodology for monitoring compliance |
|---|---|
| **Tool** | Audit the training records for practitioners supervising the use of Entonox.<br>Audit that patients all fulfill the criteria for the administration of Entonox and that there were no contraindications, and the use of Entonox has been fully documented. |
| **Frequency** | Annually |
| **Reporting arrangements** | Report to Medical Gas Committee |
| **Acting on recommendations and Lead(s)** | Manager of Clinical Area |
| **Change in practice and lessons to be shared** | Required changes to practice will be identified and actioned within 1 month. A lead member of the team will be identified to take each change forward where appropriate.  Lessons will be shared with all the relevant stakeholders |

# 9. Updating and Review

9.1. This document will be reviewed every 3 years via the Medical Gas Committee and Medication Practice Committee groups.

9.2. Revisions will be made ahead of the review date when practice changes significantly.

9.3. All revision activity will be recorded in the version control table as part of the document control process.

# 10. Equality and Diversity

10.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the Equality Diversity And Inclusion Policy or the Equality and Diversity website.

10.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 6.

# Appendix 1. Governance Information

| Information Category | Detailed Information |
|---|---|
| **Document Title:** | Management of Entonox Policy V1.0 |
| **This document replaces (exact title of previous version):** | New Document |
| **Date Issued/Approved:** | 3 May 2023 |
| **Date Valid From:** | May 2023 |
| **Date Valid To:** | May 2026 |
| **Directorate / Department responsible (author/owner):** | Alison Hill, Principal Pharmacist Supply Services |
| **Contact details:** | 01872 252593 |
| **Brief summary of contents:** | Use of Entonox in clinical areas. |
| **Suggested Keywords:** | Entonox, nitrous oxide. |
| **Target Audience:** | **RCHT:** Yes<br>**CFT:** No<br>**CIOS ICB:** No |
| **Executive Director responsible for Policy:** | Chief Nurse Officer |
| **Approval route for consultation and ratification:** | Care Group Governance Meeting.<br>Medication Practice Committee. |
| **General Manager confirming approval processes:** | Richard Andrzejuk |
| **Name of Governance Lead confirming approval by specialty and care group management meetings:** | Kevin Wright |
| **Links to key external standards:** | HTM02-01 |
| **Related Documents:** | Medical Gas Pipeline and Cylinder Management Policy.<br>Entonox Use on Delivery Suite and Truro Birth Centre Standard Operating Procedure.<br>Use of Entonox in Children Clinical Guideline. |

| Information Category | Detailed Information |
|---|---|
| | Nitrous Oxide Monitoring Standard Operating Procedure.<br>• BOC Medical Gas Data Sheet HLC/401840/JIG/APUK/0410/3M (PL 00735/5001R) © 2009.<br>• BOC Educational on-line material: www.boctraining.co.uk<br>• Department of Health (2006) Hospital Technical Memorandum 02-01: Medical Gas Pipeline Systems - Part B Operational Management. Leeds: Department of Health.<br>• Entonox® Medical Gas Data Sheet: HLC/401840/JIG/APUK/0410/3M<br>• Entonox®:; everything a parent-to-be needs to know: HLC/402620/JIG/APUK/0609/3M<br>• Entonox®; the natural choice for rapid and controlled pain relief during childbirth: HLC/402610/JIG/APUK/0609/3M<br>• Entonox®; conquering procedural pain in children: HLC/402615/JIG/APUK/0609/3M<br>• Entonox®; conquering procedural pain: HLC/402605/ JIG/APUK/0609/3M<br>• Entonox®; controlled pain relief reference guide: HLC/401955/JIG/APUK/0409/2M<br>• Royal Marsden Manual of Clinical Nursing Procedures. J Mallet and L Dougherty, 8th Edition 2011.- |
| **Training Need Identified?** | Yes, as detailed in policy. |
| **Publication Location (refer to Policy on Policies – Approvals and Ratification):** | Internet and Intranet |
| **Document Library Folder/Sub Folder:** | Clinical / Pharmacy |

**Version Control Table**

| Date | Version Number | Summary of Changes | Changes Made by |
|---|---|---|---|
| 5 May 2023 | V1.0 | Initial issue | Alison Hill, Principal Pharmacist Supply Services, Medical Gas Lead |

**All or part of this document can be released under the Freedom of Information Act 2000**

**All Policies, Strategies and Operating Procedures, including Business Plans, are to be kept for the lifetime of the organisation plus 6 years.**

**This document is only valid on the day of printing.**

**Controlled Document**

This document has been created following the Royal Cornwall Hospitals NHS Trust The Policy on Policies (Development and Management of Knowledge Procedural and Web Documents Policy). It should not be altered in any way without the express permission of the author or their Line Manager.

# Appendix 2. Equality Impact Assessment

## Section 1: Equality Impact Assessment (EIA) Form

The EIA process allows the Trust to identify where a policy or service may have a negative impact on an individual or particular group of people.

For guidance please refer to the Equality Impact Assessment Policy (available from the document library) or contact the Equality, Diversity and Inclusion Team rcht.inclusion@nhs.net

| Information Category | Detailed Information |
|---|---|
| **Name of the strategy / policy / proposal / service function to be assessed:** | Management of Entonox Policy V1.0 |
| **Directorate and service area:** | All Clinical Areas |
| **Is this a new or existing Policy?** | New |
| **Name of individual completing EIA** (Should be completed by an individual with a good understanding of the Service/Policy): | Alison Hill |
| **Contact details:** | 01872 252593 |

| Information Category | Detailed Information |
|---|---|
| **1. Policy Aim - Who is the Policy aimed at?** (The Policy is the Strategy, Policy, Proposal or Service Change to be assessed) | Nursing and medical staff. |
| **2. Policy Objectives** | To ensure that all patients requiring Entonox are managed safely in the Trust. |
| **3. Policy Intended Outcomes** | Ensure safe clinical management of Entonox in the Trust.<br>Ensure use of Entonox within the Trust meets Health and Safety requirements for safe use. |
| **4. How will you measure each outcome?** | As defined in monitoring and compliance section for audit<br>Workplace exposure testing for use of Entonox. |
| **5. Who is intended to benefit from the policy?** | Patients<br>Clinical staff |

| Information Category | Detailed Information |
|---|---|
| **6a. Who did you consult with?**<br>(Please select Yes or No for each category) | • Workforce: Yes<br>• Patients/ visitors: No<br>• Local groups/ system partners: No<br>• External organisations: Yes<br>• Other: No |
| **6b. Please list the individuals/groups who have been consulted about this policy.** | **Please record specific names of individuals/ groups:**<br>Maternity<br>Health and Safety |
| **6c. What was the outcome of the consultation?** | Accepted |
| **6d. Have you used any of the following to assist your assessment?** | **National or local statistics, audits, activity reports, process maps, complaints, staff or patient surveys:**<br>No |

**7. The Impact**

Following consultation with key groups, has a negative impact been identified for any protected characteristic? Please note that a rationale is required for each one.

Where a negative impact is identified without rationale, the key groups will need to be consulted again.

| Protected Characteristic | (Yes or No) | Rationale |
|---|---|---|
| **Age** | No | |
| **Sex** (male or female) | No | |
| **Gender reassignment** (Transgender, non-binary, gender fluid etc.) | No | |
| **Race** | No | |
| **Disability** (e.g. physical or cognitive impairment, mental health, long term conditions etc.) | No | |
| **Religion or belief** | No | |
| **Marriage and civil partnership** | No | |

| Protected Characteristic | (Yes or No) | Rationale |
| --- | --- | --- |
| **Pregnancy and maternity** | No | |
| **Sexual orientation** (e.g. gay, straight, bisexual, lesbian etc.) | No | |

**A robust rationale must be in place for all protected characteristics. If a negative impact has been identified, please complete section 2. If no negative impact has been identified and if this is not a major service change, you can end the assessment here.**

I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.

Name of person confirming result of initial impact assessment: Alison Hill

**If a negative impact has been identified above OR this is a major service change, you will need to complete section 2 of the EIA form available here:**
Section 2. Full Equality Analysis

# Appendix 3: Protocol for Practice -Adults Short Term Pain

| **Initial Assessment** | **Rationale** |
|---|---|
| Assess the degree of pain likely for the procedure being performed | To determine whether Entonox® is required |
| Ensure that Entonox® is not contra-indicated for the patient | To reduce the likelihood of complications |
| Assess individual patient for the ability to use Entonox®.  The patient should be able to:<br><br>Understand simple instructions (via an interpreter if necessary)<br><br>Hold the demand valve and inhale the gas through the mask or mouthpiece while breathing normally. | To ensure the patient is able to use Entonox® effectively |
| If Entonox® is considered inappropriate for either the patient or the procedure, alternative analgesia should be prescribed. | |
| **PREPARATION** | |
| Ensure the Entonox® has been prescribed on patients drug chart | Not required in Maternity |
| If Entonox® is to be administered more frequently than every four days or for more than 6-12 hours, routine blood cell counts should be performed | To observe for:<br><br>• evidence of megaloblastic change in red cells<br><br>• reduced production of leucocytes |
| The area should be well ventilated to prevent the accumulation of nitrous oxide.<br><br>AGSS should be use where this is installed. | To maintain a safe environment. The occupational exposure standard for long term exposure is 100 parts per million (ppm) |
| Staff should be trained in the use and applications of Entonox® | To allow staff to be aware of the side effects and occupational exposure limits of Entonox® |
| Gather and prepare the following equipment:<br><br>1. Turn Entonox® cylinder on and prime the | To ensure immediate availability of Entonox® once inhalation |

| Initial Assessment | Rationale |
|---|---|
| administration set by pressing the test button on the back of the demand valve.<br>2. Check the cylinder to ensure it is at least a quarter full. If it is not, ring the porter to change the cylinder.<br>3. Do not use grease, oils or moisturiser on hands prior to handling medical gas regulators and cylinders.<br>4. Attach the filter to mask or mouthpiece before attaching this to the demand valve | commences<br>To reduce risk of infection. |
| Entonox® cylinders should be checked carefully before use to ensure they contain the correct mix of 50% nitrous oxide and 50% oxygen<br>Ensure that an Oxygen saturation monitor is available if the patient has respiratory or cardiac problems | To prevent drug errors as stronger concentrations of nitrous oxide are available in the hospital in similar cylinders<br>To prevent using a cylinder that is at temperatures lower than -6ºC and has not been left to homogenise at 10ºC |
| To prepare the patient:<br>• Explain the procedure to be carried out and how Entonox® will be used, including information about the side effects. Patients should be advised not to use/wear paraffin products whilst using Entonox®.<br>• Reassure them that if side-effects occur they wear off quickly once they stop inhaling the gas | To relieve anxiety and determine level of co-operation |
| The patient should not eat anything for an hour before procedure. Not applicable to pregnant women in maternity. | To reduce the likelihood of nausea and vomiting. |
| To prepare the patient: continued | |
| Give supplementary analgesia as prescribed:<br>• Oral or rectal drugs should be given some time before starting the procedure, to allow full effect.<br>• The patient may continue to use their Patient- | To provide additional pain relief |

| Initial Assessment | Rationale |
|---|---|
| Controlled Anagesia (PCA) if one is in progress<br>• A bolus of intravenous opiate may be given if a high degree of pain is anticipated | |
| The patient should be allowed to practice using the Entonox® before the procedure is started | To ensure an effective technique is established. |
| If the patient is unable to maintain an effective seal or inhale the gas effectively the use of Entonox® should be abandoned and alternative analgesia and/or sedation should be prescribed | |
| **ADMINISTRATION** | |
| To administer the Entonox®:<br>• Explain the procedure to the patient. Try to reassure them and explain that they should concentrate on breathing normally.<br>• Offer the demand valve to the patient<br>• If they have chosen to use a mask they should hold it over their mouth and nose, maintaining an airtight seal, and breathe normally<br>• If they have chosen the mouthpiece they should hold it between their teeth and breath through their mouth only<br>• Inhalation should commence for at least four breaths before the procedure starts | To establish an effective inhalation technique.<br>To ensure Entonox® has taken effect before introduction of painful stimuli. |
| The patient may need considerable encouragement to start inhaling the gas. It is worth persevering as any initial reluctance usually disappears once the patient realises that the Entonox® is working | |
| **MONITORING** | |
| Once administration has commenced:<br>• The patient should continue to use the Entonox® as required throughout the procedure and should be encouraged to breathe slowly and deeply. | To provide effective analgesia with minimal side-effects.<br>To prevent hyperventilation. |

| Initial Assessment | Rationale |
|---|---|
| If the patient hyperventilates, they should be encouraged to exhale slowly. | |
| Observe the patient throughout the procedure to determine:<br>• Level of pain.<br>• The presence of any side-effects.<br>• Whether they are using the Entonox® effectively.<br>Oxygen saturation should be monitored throughout the procedure if patients have an underlying cardiac or respiratory condition. | To ensure that adequate pain relief is provided with minimal side-effects. |
| If use of Entonox® is unsatisfactory at any stage, it may be necessary to stop the procedure until alternative analgesia and/or sedation has been prescribed and given | |
| • If the patient experiences any Entonox® related side-effects they should be reassured and cease inhalation until the side-effects wear off and the sensation of pain starts to return.<br>• For particularly painful procedures it may be advisable to wait for the patient to recommence inhalation before continuing. | |
| Entonox® related side-effects include:<br>• Earache.<br>• Dry mouth.<br>• Dizziness or disorientation.<br>• Over sedation.<br>• Nausea and vomiting.<br>• Parasthesia in hands and nose. | |
| If the patient complains of earache inhalation should be stopped and alternative analgesia prescribed | To prevent perforation of the eardrum. |
| A dry mouth is a common side effect but is not | To provide effective analgesia. |

| Initial Assessment | Rationale |
|---|---|
| usually distressing. The patient should be encouraged to continue inhaling the Entonox®. | |
| If the patient starts to feel dizzy or disorientated they may cease inhalation until the sensation starts to wear off and the sensation of pain starts to return.<br><br>The patient may choose to put up with these sensations and continue inhalation to maintain effective pain relief. | To provide effective analgesia with minimal side-effects. |
| If the patient becomes drowsy the seal around the mask or mouthpiece is lost and they will no longer inhale the gas.<br><br>It is essential that only the patient holds the mask/mouthpiece | To prevent the onset of deeper stages of analgesia and sedation and loss of protection of the laryngeal reflex |
| If the patient complains of nausea they should be encouraged to cease inhalation if they wish.<br><br>Less commonly the patient may vomit. If so:<br><br>• Remove the demand valve immediately<br><br>• Reassure the patient and clear any obstruction to breathing<br><br>• Clean and replace face mask/mouthpiece<br><br>• Clear vomit from the demand valve by vigorously shaking it using a “flicking” downward action. Demand valves may nt work correctly if vomit enters the diaphragm mechanism.<br><br>The patient may then recommence administration if they wish | The side-effects of Entonox® wear of quickly once inhalation ceases.<br><br>To prevent inhalation of vomit.<br><br>The side-effects of Entonox® wear off quickly once inhalation ceases. |
| **TECHNICAL PROBLEMS** | |
| If any of the following technical problems occur the equipment should be removed from clinical use and reported to Department of Clinical Technology immediately. Equipment should be decontaminated before sending for repair. Examples of problems requiring technical | To ensure equipment is safe and in good working order. A Fault and decontamination form should be completed and attached to the equipment to confirm its status. |

| Initial Assessment | Rationale |
|---|---|
| assistance include<br>• Equipment not delivering gas.<br>• Leak at joint between regulator and cylinder valve.<br>• Demand valve leaks or does not shut cleanly.<br>• Demand valve does not stop giving flow after test button is released.<br>• Patient safety incident - Consideration should be given to reporting on Datix (Retain the equipment and any consumables for inspection). | |
| **COMPLETING PROCEDURES** | |
| After use:<br>• Ensure the patient is comfortable<br>• Check the cylinder gauge for contents:<br>If less than ¼ full, ring porter to replace the cylinder (cylinders are supplied on a one-for-one exchange basis)<br>• Turn off the cylinder and depressurise the system fully by operating the test button | To ensure that there is an adequate supply of Entonox® for the next patient<br>To prevent misuse and to maintain a safe ward environment |
| Monitoring should continue for 30 minutes to ensure that the effects of the Entonox® have completely worn off. Accordingly, patients should not walk around unaided until any dizziness or disorientation has gone and should be advised to avoid driving or operating machinery for 30 minutes following administration. Not applicable in Maternity where there may be the ambulant use of Entonox®. | To maintain patient safety |
| If the patient has respiratory or cardiac problems they may benefit from oxygen therapy for 10-15 minutes after using Entonox® | To prevent post administration hypoxia. |
| To clean the equipment: | To maintain a safe environment. |

| Initial Assessment | Rationale |
|---|---|
| • Depressurise the system.<br><br>• The external surfaces of the demand valve must be cleaned with an alcohol-impregnated wipe.<br><br>• If any contamination is suspected between the hose connection and the demand valve it must be sent to HSDU to be autoclaved.<br><br>• Multi-use face masks and mouthpieces must be autoclaved at 121ºC. Single use face equipment must be discarded.<br><br>• The external surfaces of the administration set must be cleaned with an alcohol-impregnated wipe.<br><br>• Filters are for single patient use and must be discarded. They may be kept by the patient's bed if they are going to use Entonox® again within the next day. | To minimise the risk of cross infection. |
| Document details of Entonox® administration, how effective it was and any side effects experienced by the patient. | To provide an accurate record of efficacy and total duration received by the patient |
| Entonox® cylinders should be kept in a secure environment, attached to a wall or trolley and away from patients when not in use. | To maintain safe environment.<br><br>To ensure equipment is in good working order. |
| If the Entonox® is used infrequently the cylinder should be checked weekly and its contents recorded. The expiry date should also be checked (Entonox® has a 3 year shelf-life from date of fill). | To maintain a safe environment.<br><br>To ensure equipment is kept in good working order. |
| **RE-ORDERING EQUIPMENT** | |
| Entonox® cylinders follow internal procedures.<br><br>product code : 211 size F (QAH), Piped and F size for the Labour Wards. | To ensure that there is an adequate supply on the ward and within the hospital. |
| Masks disposable or reusable follow internal procedures. | To ensure that there is an adequate supply on the ward. |

| Initial Assessment | Rationale |
|---|---|
| Filters follow internal procedures. | To ensure that there is an adequate supply on the ward. |
| Demand valves and regulators. | These are available on a service exchange basis from Department of Clinical Technology. |

# Appendix 4: Protocol For Practice - Paediatrics Short Term Pain

Please refer to the Use of Entonox in Children Clinical Guideline available on the intranet.

Use of Entonox in Children Clinical Guideline

# Appendix 5. Protocol for Practice - Maternity

To be used alongside the Entonox Use on Delivery Suite and Truro Birth Centre Standard Operating Procedure.

Entonox Use on Delivery Suite and Truro Birth Centre Standard Operating Procedure

| INITIAL ASSESSMENT | RATIONALE |
|---|---|
| Assess the degree of pain likely for the procedure being performed. | To determine whether Entonox® is required |
| Ensure that Entonox® is not contra-indicated for the patient. | To reduce the likelihood of complications |
| Assess individual patient for the ability to use Entonox®. The patient should be able to:<br>• Understand simple instructions (via an interpreter if necessary).<br>• Hold the demand valve and inhale the gas through the mask or mouthpiece while breathing normally. | To ensure the patient is able to use Entonox® effectively |
| If Entonox® is considered inappropriate for either the patient or the procedure, alternative analgesia should be prescribed. | |
| **PREPARATION** | |
| Ensure the Entonox® has been prescribed on patient's drug chart. | Not required in Maternity |
| If Entonox® is to be administered more frequently than every four days or for more than 6-12 hours, routine blood cell counts should be performed. | To observe for:<br>• evidence of megaloblastic change in red cells<br>• reduced production of leucocytes |
| The area should be well ventilated to prevent the accumulation of nitrous oxide. | To maintain a safe environment. The occupational exposure standard for long term exposure is 100 parts per million (ppm) |
| Staff should be trained in the use and applications of Entonox®. | To allow staff to be aware of the side effects and occupational |

| INITIAL ASSESSMENT | RATIONALE |
| --- | --- |
| | exposure limits of Entonox®. |
| Gather and prepare the following equipment:<br><br>1.Turn Entonox® cylinder on and prime the administration set by pressing the test button on the back of the demand valve.<br><br>2. Check the cylinder to ensure it is at least a quarter full. If it is not, ring the porter to change the cylinder.<br><br>3. Attach the filter to mask or mouthpiece before attaching this to the demand valve.<br><br>4. Where using piped Entonox connect the AGSS system. | To ensure immediate availability of Entonox® once inhalation commences.<br><br>To reduce risk of infection. |
| Entonox® cylinders should be checked carefully before use to ensure they contain the correct mix of 50% nitrous oxide and 50% oxygen.<br><br>Ensure that a saturation monitor is available if the patient has respiratory or cardiac problems. | To prevent drug errors as stronger concentrations of nitrous oxide are available in the hospital in similar cylinders.<br><br>To prevent using a cylinder that is at temperatures lower than -6ºC and has not been left to homogenise at 10ºC. |
| To prepare the patient:<br><br>• Explain the procedure to be carried out and how Entonox® will be used, including information about the side effects.<br><br>• Reassure them that if side-effects occur they wear off quickly once they stop inhaling the gas.<br><br>• Patient should be made aware not to use/wear paraffin based products whilst using Entonox. | To relieve anxiety and determine level of co-operation. |
| The patient should not eat anything for an hour before procedure. Not applicable to pregnant women in maternity. | To reduce the likelihood of nausea and vomiting. |
| To prepare the patient: continued. | |

| INITIAL ASSESSMENT | RATIONALE |
|---|---|
| Give supplementary analgesia as prescribed:<br><br>• Oral or rectal drugs should be given some time before starting the procedure, to allow full effect.<br><br>• The patient may continue to use their PCA if one is in progress.<br><br>• A bolus of intravenous opiate may be given if a high degree of pain is anticipated. | To provide additional pain relief. |
| The patient should be allowed to practice using the Entonox® before the procedure is started. | To ensure an effective technique is established. |
| If the patient is unable to maintain an effective seal or inhale the gas effectively the use of Entonox® should be abandoned and alternative analgesia and/or sedation should be prescribed. | |
| **ADMINISTRATION** | |
| To administer the Entonox®:<br><br>• Explain the procedure to the patient. Try to reassure them and explain that they should concentrate on breathing normally.<br><br>• Offer the demand valve to the patient.<br><br>• If they have chosen to use a mask they should hold it over their mouth and nose, maintaining an airtight seal, and breathe normally.<br><br>• If they have chosen the mouthpiece they should hold it between their teeth and breath through their mouth only.<br><br>• Inhalation should commence for at least four breaths before the procedure starts. | To establish an effective inhalation technique.<br><br>To ensure Entonox® has taken effect before introduction of painful stimuli. |
| The patient may need considerable encouragement to start inhaling the gas.  It is worth persevering as any initial reluctance usually disappears once the patient realises that the Entonox® is working. | |
| **MONITORING** | |
| Once administration has commenced: | To provide effective analgesia |

| INITIAL ASSESSMENT | RATIONALE |
| --- | --- |
| • The patient should continue to use the Entonox® as required throughout the procedure and should be encouraged to breathe slowly and deeply.<br><br>• If the patient hyperventilates they should be encouraged to exhale slowly. | with minimal side-effects.<br><br>To prevent hyperventilation. |
| Observe the patient throughout the procedure to determine:<br><br>• Level of pain.<br><br>• The presence of any side-effects.<br><br>• Whether they are using the Entonox® effectively.<br><br>Oxygen saturation should be monitored throughout the procedure if patients have an underlying cardiac or respiratory condition. | To ensure that adequate pain relief is provided with minimal side-effects. |
| If use of Entonox® is unsatisfactory at any stage it may be necessary to stop the procedure until alternative analgesia and/or sedation has been prescribed and given. | |
| • If the patient experiences any Entonox® related side-effects they should be reassured, and cease inhalation until the side-effects wear off and the sensation of pain starts to return.<br><br>• For particularly painful procedures it may be advisable to wait for the patient to recommence inhalation before continuing. | |
| Entonox® related side-effects include:<br><br>• Earache.<br><br>• Dry mouth.<br><br>• Dizziness or disorientation.<br><br>• Over sedation.<br><br>• Nausea and vomiting.<br><br>• Parasthesia in hands and nose. | |

| INITIAL ASSESSMENT | RATIONALE |
|---|---|
| If the patient complains of earache inhalation should be stopped and alternative analgesia prescribed. | To prevent perforation of the eardrum. |
| A dry mouth is a common side effect but is not usually distressing. The patient should be encouraged to continue inhaling the Entonox®. | To provide effective analgesia. |
| If the patient starts to feel dizzy or disorientated, they may cease inhalation until the sensation starts to wear off and the sensation of pain starts to return.<br><br>The patient may choose to put up with these sensations and continue inhalation to maintain effective pain relief. | To provide effective analgesia with minimal side-effects. |
| If the patient becomes drowsy the seal around the mask or mouthpiece is lost and they will no longer inhale the gas.<br><br>It is essential that only the patient holds the mask/mouthpiece. | To prevent the onset of deeper stages of analgesia and sedation and loss of protection of the laryngeal reflex. |
| If the patient complains of nausea they should be encouraged to cease inhalation if they wish.<br><br>Less commonly the patient may vomit. If so:<br><br>• Remove the demand valve immediately.<br><br>• Reassure the patient and clear any obstruction to breathing.<br><br>• Clean and replace face mask/mouthpiece.<br><br>• Clear vomit from the demand valve by vigorously shaking it using a “flicking” downward action.<br><br>The patient may then recommence administration if they wish. | The side-effects of Entonox® wear of quickly once inhalation ceases.<br><br>• To prevent inhalation of vomit.<br><br>The side-effects of Entonox® wear off quickly once inhalation ceases. |
| **TECHNICAL PROBLEMS** | |
| If any of the following technical problems occur, they should be reported to biomedical | To ensure equipment is safe and in good working order. |

| INITIAL ASSESSMENT | RATIONALE |
|---|---|
| engineering immediately:<br>• Equipment not delivering gas.<br>• Leak at joint between regulator and cylinder valve.<br>• Demand valve leaks or does not shut cleanly.<br>• Demand valve does not stop giving flow after test button is released. | |
| **COMPLETING PROCEDURES** | |
| After use:<br>• Ensure the patient is comfortable.<br>• Check the cylinder gauge for contents:<br>If less than ¼ full, ring porter to replace the cylinder (cylinders are supplied on a one-for-one exchange basis).<br>• Turn off the cylinder and depressurise the system fully by operating the test button. | • To ensure that there is an adequate supply of Entonox® for the next patient.<br>• To prevent misuse and to maintain a safe ward environment. |
| Monitoring should continue for 30 minutes to ensure that the effects of the Entonox® have completely worn off. Accordingly, patients should not walk around unaided until any dizziness or disorientation has gone and should be advised to avoid driving or operating machinery for 30 minutes following administration. Not applicable in Maternity where there may be the ambulant use of Entonox®. | • To maintain patient safety. |
| If the patient has respiratory or cardiac problems they may benefit from oxygen therapy for 10-15 minutes after using Entonox®. | • To prevent post administration hypoxia. |
| To clean the equipment:<br>• Depressurise the system.<br>• The external surfaces of the demand valve must be cleaned with an alcohol-impregnated wipe. | • To maintain a safe environment.<br>• To minimise the risk of cross infection. |

| INITIAL ASSESSMENT | RATIONALE |
|---|---|
| • If any contamination is suspected between the hose connection and the demand valve it must be sent to HSDU to be autoclaved.<br><br>• Multi-use face masks and mouthpieces must be autoclaved at 121$^{o}$C. Single use face equipment must be discarded.<br><br>• The external surfaces of the administration set must be cleaned with an alcohol-impregnated wipe.<br><br>• Filters are for single patient use and must be discarded. They may be kept by the patient's bed if they are going to use Entonox® again within the next day. | |
| Document details of Entonox® administration, how effective it was and any side effects experienced by the patient. | To provide an accurate record of efficacy and total duration received by the patient. |
| Entonox® cylinders should be kept in a secure environment, attached to a wall or trolley and away from patients when not in use. | To maintain safe environment.<br><br>To ensure equipment is in good working order. |
| If the Entonox® is used infrequently the cylinder should be checked weekly and its contents recorded. The expiry date should also be checked (Entonox® has a 3 year shelf-life from date of fill). | To maintain a safe environment.<br><br>To ensure equipment is kept in good working order. |
| **RE-ORDERING EQUIPMENT** | |
| Entonox® cylinders follow internal procedures.<br><br>product code : 211 size F (QAH), Piped and F size for the Labour Wards. | To ensure that there is an adequate supply on the ward and within the hospital. |
| Masks disposable or reusable follow internal procedures. | To ensure that there is an adequate supply on the ward. |
| Filters follow internal procedures. | To ensure that there is an adequate supply on the ward. |

## 9.0. Community Midwifery and the Use and Storage of Entonox®

9.1. Green hazardous gas Entonox® sticker should be displayed on rear windscreen of community midwife's car when Entonox® cylinders are being transported.

9.2. Entonox® portable cylinders should be stored in the cases provided. Secure, and not knocking into each other.

9.3. The cylinders should be in a separate compartment from the driver.

9.4. The cylinders should not be subjected to extremes of heat or cold. Community Midwives storing cylinders in the car should take extra care overnight during freezing weather. Cylinders should be stored under cover, preferably inside, kept dry and clean.

9.5. When transporting the cylinders they should be turned off. E size cylinders and smaller should be stored horizontally. Ensure the cylinder valve is properly closed, that the tubing is disconnected and that the equipment is carried securely in the cases provided, in the vehicle.

9.6. Midwives using their own cars for transporting Entonox® must ensure they inform their car insurance company of this fact.

# Appendix 6. Control of Substances Hazardous to Health Regulations as Amended 2002 (COSHH) Risk Assessments

1. **COSHH assessments concentrate on the use and production of hazardous substances.**

   This means in practice looking for the potential within the task for exposure and harm to occur by:

   - Inhalation
   - Skin contact
   - Skin absorption
   - Injection via a sharps injury
   - Eye contact
   - Ingestion.

   The COSHH risk assessment can be found on the Trust's Alcumus system.

2. **Grounds for concluding that exposure is not a significant risk to health are:**

   - quantities or rate of use/production of the substance(s) are too small to constitute any risk to health under foreseeable circumstances of use, even if control measures break down.

   OR

   - There is no available route of exposure

   If you are not sure if exposure is significant or not, contact your Health and Safety Advisor, who will be able to give you an opinion or arrange for measurements to be taken to help you decide.

   A generic risk assessment form is included in this part. You should store your risk assessments in your ward/department along with your staff training records.

   In the event of a fire – warn the emergency services of the presence of Entonox® cylinders.

   In the event of a leak/suspected leak evacuate for the location of the leak/suspected. Ensure that the area is adequately ventilated before any re-entry to the location.

3. **Disposal Procedure**

   Cylinders should be returned to the supplier with the valves in a closed position.

   Cylinders containing Entonox® which is no longer required should not be vented but returned to the supplier for venting.

## 4. Standard First Aid Procedures

**Eyes:** Irrigate thoroughly with water (at least 10 min). If splashed with anything corrosive or irritant, alcohol/solvents, anything toxic or if discomfort persists - Medical Attention.

**Lungs:** Remove from exposure. If exposure severe - Medical Attention.

**Skin:** Wash thoroughly with soap and water. If extensive area exposed - Medical attention.

**Mouth -** Wash out mouth thoroughly. If exposed to anything corrosive, alcohols/solvents, anything toxic or if exposure is severe - Medical Attention.

## 5. Risk Assessment Process

All clinical areas MUST undertake a risk assessment when using Entonox® in their areas using the risk assessment template in this appendix.

5.1. To explore options for mitigation of Entonox® use clinical areas should liaise with:

Health and Safety via rch-tr.healthandsafety@nhs.net

Estates via the MiCAD system on the intranet.

5.2. A risk MUST be recorded on the area's risk register.

# Appendix 7. Risk Assessment - Entonox Use in Clinical Departments

| **Hospital:** | **Activity:** | **Ward/Dept:** | **Assessor:** | **Assessment Date:**<br><br>**Review Date:** |
|---|---|---|---|---|

| **Item No** | **Hazard** | **Persons at risk** | **Risk Type** | **Existing control measure** | **Risk Ranking** | **Proposed added control measures** | **Revised Risk Ranking** |
|---|---|---|---|---|---|---|---|
| **1.** | **Preparation of Entonox**<br>Entonox® cylinders must be stored at a temperature above 10ºC for at least 24 hours before use otherwise there is a risk that the nitrous oxide and oxygen parts of the mix will separate and the patient will get different portions of the gas than anticipated. | Patient | Staff / Patient / Visitor Injury | 1. | Consequence x likelihood = risk | 1. | Consequence x likelihood = risk |

| Item No | Hazard | Persons at risk | Risk Type | Existing control measure | Risk Ranking | Proposed added control measures | Revised Risk Ranking |
|---|---|---|---|---|---|---|---|
| **2.** | **Storage of Entonox in clinical areas**<br>There is a risk that inappropriate storage of Entonox could result in musculoskeletal injury for staff, in appropriate gas or pressure release resulting in asphyxiation, explosion, fire or physical injury.<br>Cylinders must be stored under cover and kept clean and dry.<br>Cylinders must not be stored near stocks of combustible materials.<br>Cylinders must not be subjected to extremes of hot or cold.<br>Cylinders should be stored in a well ventilated location.<br>Cylinders should be stored out of direct sunlight. | Patient | Patient Injury | 2. | Consequence x likelihood = risk | 2. | Consequence x likelihood = risk |

| Item No | Hazard | Persons at risk | Risk Type | Existing control measure | Risk Ranking | Proposed added control measures | Revised Risk Ranking |
|---|---|---|---|---|---|---|---|
| | F size cylinders should be stored vertically, D and ED size cylinders and should be stored horizontally.<br>Cylinders must be stored in suitable racks, brackets or trollies at all times.<br>No smoking or use of naked flames must be allowed near to where cylinders are stored.<br>Cylinders should be stored away from reach of children and the public.<br>Warning signage should be displayed where cylinders are stored so that emergency services are aware of their use. | | | | | | |

| Item No | Hazard | Persons at risk | Risk Type | Existing control measure | Risk Ranking | Proposed added control measures | Revised Risk Ranking |
|---|---|---|---|---|---|---|---|
| **3.** | **Transportation of Entonox**<br>There is a risk of physical injury, explosion, fire or asphyxiation if Entonox cylinders are not transported safely.<br>Cylinders must be restrained effectively during transportation to prevent damage.<br>Cylinders must be checked to ensure they are not leaking before they are transported.<br>All cylinder valves must be closed prior to transportation.<br>No oils or greases must be allowed to come into contact with the gas cylinders. | Patient | Patient Injury | | Consequence x likelihood = risk | 1. | Consequence x likelihood = risk |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **4a.** | **Administration of Entonox**<br><br>Patients may be harmed if they are offered Entonox while suffering from a contraindicated condition.<br><br>Artificial, traumatic or spontaneous pneumothorax.<br><br>Air embolism.<br><br>Decompression Sickness.<br><br>Following a recent dive.<br><br>Following air encephalography.<br><br>Severe bullous emphysema.<br><br>Use during Myringoplasty.<br><br>Gross abdominal distension.<br><br>Patients who have recently received intraocular injection of gas (such as SF6).<br><br>Patients could also be harmed if they have | Patient | Staff/Patient/ Visitor Injury | 1. Staff training on use of Entonox<br>2. Prescribing of Entonox | Consequence x likelihood = risk | | Consequence x likelihood = risk |

| Item No | Hazard | Persons at risk | Risk Type | Existing control measure | Risk Ranking | Proposed added control measures | Revised Risk Ranking |
|---|---|---|---|---|---|---|---|
| | been having Entonox® for pain relief over a longer period of time (greater than 24 hours or repeated more frequently than every 4 days). | | | | | | |
| **4b.** | **Administration of Entonox**<br>There is a risk that staff who undergo repeated, long term exposure to high levels of nitrous oxide above WEL 100ppm could develop myeloneuropathy or fertility issues.<br>Entonox® must only be used in environments which have adequate ventilation. 15 air changes per hour is the standard required for use of Entonox. | Staff | Staff/Patient/ Visitor Injury | 1. Ventilation in clinical area | Consequence x likelihood = risk | | Consequence x likelihood = risk |

| Item No | Hazard | Persons at risk | Risk Type | Existing control measure | Risk Ranking | Proposed added control measures | Revised Risk Ranking |
|---|---|---|---|---|---|---|---|
| **5.** | **Managing emergencies with Entonox**<br>There is a risk if staff do not know how to deal with emergencies arising from use of Entonox that patients, staff or the buildings may become damaged.<br>Entonox® is a compressed gas stored in a pressured cylinder. This could rupture if damaged or heated to high temperatures (e.g. in a fire)<br>Entonox® will intensify fire as it is an oxidising agent<br>Entonox® may react violently with combustible materials such as oils and grease. | Equipment | Staff/Patient/ Visitor Injury | 1. Staff training on Medical Gases<br>2. Staff training on use of Entonox | Consequence x likelihood = risk | | Consequence x likelihood = risk |

# Appendix 8. Possible Control Measures for Safe Use of Entonox in Clinical Areas

To be used in conjunction with the Nitrous Oxide Monitoring Standard Operating Procedure available on the intranet.

| Consider the following | Comments |
|---|---|
| Elimination | Entonox® will be used as one option with regard to pain relief. Not all patients will be suitable for the use of Entonox® to manage their pain. It is not possible to eliminate the use of Entonox® as a method for pain relief as in some cases it will be the best option for the individual patient. |
| Substitution | Entonox® will be used as one option with regard to pain relief. Not all patients will be suitable for the use of Entonox® to manage their pain. It is not possible to substitute the use of Entonox® completely as a method for pain relief as in some cases it will be the best option for the individual patient. |
| Control at Source | Entonox® will be self –administered by the patient and as it is administered through a demand valve will only provide Entonox® when patient inhalation occurs.<br>Entonox® will only be used where ventilation is adequate. Recommended to only be used in areas where air handling provides 15 air changes per minute.<br>(e.g. scavenging system, boost ventilation, air changes checked to determine suitability, facility has means of improving general ventilation etc) |
| Detailed Systems of Work | Staff complete the Entonox® training pack for safe administration of Entonox®.<br>Staff follow the procedures outlined in the Royal Cornwall Hospitals NHS Trust Entonox® Policy<br>Clinicians assess patients for suitability for use of Entonox®.<br>Patients are continuously monitored by staff during procedures |
| Reduction in quantity | The volume of Entonox® used during procedures will be determined by pain relief requirement of the patient. The demand valve of the Entonox® will close off as soon as the patient ceases to inhale the gas. |
| Limiting access | Only clinical staff involved in the procedure will be present during the process when the patient is in receipt of Entonox® for pain control<br>Staff who are pregnant or actively trying to become pregnant should avoid exposure |
| Limiting exposure time | Not all patients will opt for Entonox® as a method of pain relief |

| Consider the following | Comments |
|---|---|
| Suitable PPE | Use of gas scavengers |
| Workplace monitoring | Monitoring could be carried out if deemed appropriate. |
| Health surveillance | Undertaken by Occupational Health where a monitoring scheme in place in a clinical area |
| Information, instruction, training,<br>supervision | Staff complete the Entonox® Training Package for safe administration of Entonox®.<br>Staff follow the procedures outlined in the Royal Cornwall Hospital Trust Management of Entonox Policy<br>Patients should receive a Patient Information Leaflet<br>Staff should have access to the Hazard Data Sheet for Entonox® when using within their clinical areas |