



Bronllys Hospital, Bronllys, Brecon, Powys, LD3 0LU

This protocol must only be used by registered health professionals who have been named and authorised by their organisation to practice under it. The most recent and in date final signed version of the protocol should be used. Health professionals should always access the protocol via the PTHB internet to ensure that they are always working to the most up to date version

**Protocol**

for the administration of Pharmacy (P) classified

**Entonox® (Nitrous Oxide and Oxygen)**

**as short-term pain relief**

by registered nurses and midwives

to **adults and children 5 years of age or over**

in Powys Teaching Health Board (PTHB) and Powys community settings.

<b>Document Reference No:</b>	PTHB/ MMP406	
<b>Version No:</b>	2	
<b>Issue Date:</b>	14/07/2025	
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<b>Author:</b>	Medicines Management Pharmacist	
<b>Document Owner:</b>	Chief Pharmacist	
<b>Accountable Executive:</b>	Medical Director	
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<b>Document Type:</b>	Protocol	Clinical
<b>Scope:</b>	Registered Healthcare Professionals in PTHB	

Do not print this document. The latest version will be accessible via the internet. If the expiry date has passed please contact the Author for advice.

## Change history




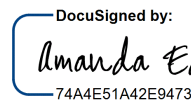
Version number	Change details	Date
1 (MMP010)	Initial issue to replace PGD 0003-C to enable administration of Entonox <sup>®</sup> without supply and to guide administration of Entonox <sup>®</sup> to manage pain in labour and during perineal repair and for short term pain relief.	July 2022
MMP406v2	Review- Document transferred into PTHB medicines protocol format and contents updated in line with current reference sources- clinical changes made throughout. Link to BOC e-learning 'Integral Valve Cylinder for Entonox <sup>®</sup> ' added.	July 2025

For advice on protocol use in practice/advised supporting governance please refer to [When not to use a PGD.](#)

This protocol provides a clear framework to support registered nurses and midwives to administer Pharmacy (P) Entonox<sup>®</sup> gas, for the relief of pain.

The objective of this protocol is to provide a standardised clinical pathway for safe provision of care during the administration of Entonox<sup>®</sup> gas to individuals 5 years of age or older in PTHB and Powys community settings. Refer to the PTHB Medicines policy ([MMP 001](#)) for information regarding transportation of medical gases.

## Protocol authorisation

Name	Job title and organisation	Signature	Date
<b>Senior doctor Dr Kate Wright</b>	Lead doctor for PTHB	 <p>DocuSigned by: <i>Kate Wright</i> 1F267952823F473...</p>	7/8/2025
<b>Chief Pharmacist Jonathan Boyd</b>	Chief Pharmacist for PTHB	 <p>Signed by: <i>Jon Boyd</i> 6D8ECFE8C9EB423...</p>	7/8/2025
<b>Senior representative of professional group using the Protocol Claire Roche</b>	Executive Director of Nursing and Midwifery for PTHB	 <p>DocuSigned by: <i>Claire Roche</i> F07413E114E04B1...</p>	7/15/2025
<b>Clinical Governance Lead Amanda Edwards</b>	Clinical Governance Lead for PTHB – Assistant Director for Innovation and Improvement	 <p>DocuSigned by: <i>Amanda Edwards</i> 74A4E51A42E9473...</p>	7/15/2025

[Appendix A](#) provides a Staff permitted to use protocol Signature Sheet. Individual practitioners must be authorised by name to work to this protocol.

The final authorised copy of this protocol should be kept by Powys Teaching Health Board (PTHB) for 25 years after the protocol expires.

<b>Competencies of registered nurse or midwife working under the protocol</b>	
<b>Qualifications and professional registration</b>	<p>Practitioners must only work under this protocol where they are competent to do so. Practitioners working under this protocol must be a nurse or midwife currently registered with the Nursing and Midwifery Council (NMC), with a current contract of employment with PTHB.</p> <p>Every registered healthcare professional must adhere to their appropriate professional code of conduct and the <a href="#">Royal Pharmaceutical Society Professional Guidance on the Administration of Medicines</a> (2019).</p> <p>The practitioners must also fulfil the training and additional requirements detailed below.</p> <p>Check <a href="#">Appendix A</a>: Staff permitted to use the protocol to confirm whether all practitioners listed above have organisational authorisation to work under this protocol.</p>
<b>Initial training</b>	<ul style="list-style-type: none"> <li>• The assessment and management of pain.</li> <li>• The administration of Entonox<sup>®</sup> gas including knowledge of its actions and uses, contraindications, adverse effects and hazards. Must have adequate knowledge of properties of the gas.</li> <li>• Must be competent to administer Entonox<sup>®</sup>, to monitor the effect of Entonox<sup>®</sup> and review the individual's response to treatment.</li> <li>• The practitioner should also be alert to changes in the <a href="#">BNF</a> and <a href="#">Data sheet</a></li> <li>• The practitioner must be competent in the recognition, management and reporting of adverse drug reactions, including anaphylaxis. Must be competent in the administration of adrenaline 1 in 1000 and have a minimum of up to date Basic Life Support (BLS) skills (or level relevant to the role).</li> <li>• Completion of the e-Learning for Healthcare course: The safe use, storage and set up of medical gases and cylinders</li> </ul>

	<p>used in healthcare. This can be found on the <a href="https://www.nhs.uk/e-learning-for-healthcare">NHSE e-Learning for Healthcare hub</a> (e-lfh.org.uk) and should be included as part of the induction process for new appointees.</p> <ul style="list-style-type: none"><li>• Completion of the BOC e-learning 'Integral Valve Cylinder for Entonox®' via this link <a href="https://voc.dayonetech.uk/login.aspx?registrationcode=PO2871008">https://voc.dayonetech.uk/login.aspx?registrationcode=PO2871008</a></li><li>• Correct operating procedures for the cylinder. Refer to BOC 'Entonox IFU' available via <a href="https://www.bocgases.co.uk/pages/healthcare">https://www.bocgases.co.uk/pages/healthcare</a></li><li>• Precautions and actions to be taken in the event of an emergency.</li><li>• The practitioner must work in line with professional guidelines and standards.</li><li>• Must be competent to discuss the treatment to be administered with the individual and/or the carer and obtain consent.</li><li>• Must have current competence in assessing capacity and follow the <a href="#">Mental Capacity Act 2005</a> guidance regarding consent to treatment.</li><li>• Must have undertaken appropriate training for working under protocols for supply/administration of medicines (Team leaders may access 'Protocol and guideline awareness training' by sending a request to <a href="mailto:info.medicinesmanagement.powys@wales.nhs.uk">info.medicinesmanagement.powys@wales.nhs.uk</a> ; the team leader will then train their team)</li><li>• Must have undertaken and completed Safeguarding of Children, Young People and Vulnerable Adults, as applicable to the role.</li><li>• Must have access to the most recent version of the protocol online and associated online resources.</li><li>• Must recognise their limitations and seek medical advice if they are concerned about the individual's overall condition or if the medication has been ineffective.</li></ul>
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	<p><b>THE PRACTITIONER MUST BE AUTHORISED BY NAME, UNDER THE CURRENT VERSION OF THIS PROTOCOL BEFORE WORKING ACCORDING TO IT</b></p> <p><b>These tasks cannot be delegated and so the practitioner making the decision to administer a medicine under this protocol must carry out the administration to the individual.</b></p>
<p><b>Competency assessment</b></p>	<ul style="list-style-type: none"> <li>• Evidence of ongoing protocol training to be submitted to Line Manager annually.</li> <li>• Practitioners must be competent, recognise their own limitations and personal accountability and act accordingly.</li> <li>• Practitioners operating under this protocol must be assessed as competent under the current terms of this Protocol before working to it (see <a href="#">Appendix A</a>), this should be recorded using the competency checklist in <a href="#">Appendix A</a>. Practitioners must make a self-declaration of competency in their PADR– the personal development plan (yellow) section of the PADR booklet should be used to record completion of annual protocol training.</li> <li>• ESR records of mandatory NHS training.</li> </ul>
<p><b>Ongoing training and competency</b></p>	<ul style="list-style-type: none"> <li>• Update at least every year, on the use of protocols and Entonox<sup>®</sup>, or earlier in response to new local/national guidance (practitioners should be constantly alert to any sources of medicines information).</li> <li>• Practitioners must ensure they are up to date with relevant issues and clinical skills and management of anaphylaxis, BLS or ILS (relevant to their role), safeguarding at level relevant to their role, with evidence of appropriate Continued Professional Development (CPD), which must be retained and made available on request.</li> </ul>

	<ul style="list-style-type: none"> <li>• Compliance with all mandatory NHS training.</li> </ul> <p><b>It is the responsibility of the healthcare professional to maintain their own competency to practice within this protocol. If any training needs are identified these should be discussed with the senior individual responsible for authorising practitioners to act under the protocol and further training provided as required.</b></p>
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<b>Clinical condition or situation to which this protocol applies</b>	
<b>Clinical condition or situation</b>	<p>Entonox® can be administered using this protocol:</p> <ul style="list-style-type: none"> <li>• as a short-term relief of acute pain associated with acute trauma or</li> <li>• to manage the pain associated with procedures or</li> <li>• for individuals who are in pain awaiting the attention of a member of medical staff or</li> <li>• for management of pain in women in labour or requiring perineal repair.</li> </ul> <p>Entonox® may be used alone or in combination with other analgesics, however, please refer to <a href="#">interactions</a> section.</p> <p><b>It is the responsibility of the administering healthcare professional to ensure that the individual is within the inclusion criteria, and that there are no reasons for exclusion before proceeding with the treatment. If there is any reason for concern, seek medical advice.</b></p>

<p><b>Inclusion criteria</b></p>	<ul style="list-style-type: none"> <li>• Individual, aged 5 years of age or over, requiring immediate relief of acute moderate and severe pain:             <ul style="list-style-type: none"> <li>○ associated with acute trauma, for example broken bones or burns</li> <li>○ during procedures such as wound debridement, the application or change of dressings or suturing</li> <li>○ for individuals who are in pain awaiting the attention of a member of medical staff or</li> <li>○ for management of pain in women in labour or requiring perineal repair</li> </ul> </li>   <li>• Informed consent obtained from the individual or a person legally able to act on the person’s behalf. Refer to <a href="#">PTHB Consent to Treatment and Examination Policy</a>.</li>   <li>• Individual must be able to follow the instructions to self-administer             <p><b>NB.</b> Self-administration using a demand valve may be used in children who are able to self-regulate their intake (usually over 5 years of age) with consent from the person with parental responsibility.</p> </li>   <li>• Medical and drug history taken, no reason for exclusion</li>   <li>• In case of any doubt, contact <a href="#">medical team</a>.</li> </ul>
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<p><b>Exclusion criteria</b> (Exclusion under this protocol does not necessarily mean the medication is contraindicated, but it would be outside its remit and another form of authorisation will be required)</p>	<ul style="list-style-type: none"> <li>• Conditions outside of the clinical situations criteria</li> <li>• No valid consent or individual/representative refuses treatment. Individuals for whom valid consent, or 'best-interests' decision, in accordance with the Mental Capacity Act 2005, has not been obtained or received. Refer to sections "<a href="#">Action to be taken if individual is excluded</a>" or "<a href="#">Action to be taken if individual declines treatment</a>"</li> <li>• Children under 5 years of age</li> <li>• Individuals unwilling or unable to self-administer (including those with impaired consciousness or who are heavily sedated, those who may be intoxicated due to alcohol, confused, or uncooperative)</li> <li>• Any condition where gas is trapped within the body and where its expansion may be dangerous, e.g.             <ul style="list-style-type: none"> <li>○ Artificial, traumatic or spontaneous pneumothorax- which may enlarge to compromise respiration</li> <li>○ Air embolism</li> <li>○ Lung disease or breathing difficulties such as emphysema</li> <li>○ Decompression sickness (the bends)</li> <li>○ Following a recent dive (within 48 hours)</li> <li>○ In the presence of intracranial air after head injury</li> <li>○ Use during myringoplasty/middle ear surgery where injections of gas have been used</li> <li>○ Gross abdominal distension</li> <li>○ Severe bullous emphysema</li> <li>○ Following air encephelography</li> <li>○ Individuals having received recent intraocular injection of gas (such as SF6).</li> </ul> </li> <li>• Individual with:             <ul style="list-style-type: none"> <li>○ Suspected or known increased pressure on the brain</li> <li>⊖ Maxillofacial injuries or head injuries</li> <li>○ Exposure to agents which are toxic to the lungs such as Paraquat (a type of weedkiller)</li> <li>○ Known hypersensitivity to nitrous oxide</li> <li>○ Previous use of Entonox<sup>®</sup> within the last 4 days- individual would need to be referred to a haematologist for close clinical supervision and haematological monitoring.</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>Individual taking Methotrexate (The nitrous oxide constituent of Entonox<sup>®</sup> inactivates vitamin B<sub>12</sub> and potentiates the effects of methotrexate on folate metabolism, potentially increasing the risk of Methotrexate toxicity)</li> </ul>
<p><b>Cautions /reasons for seeking further advice from a prescriber</b></p>	<ul style="list-style-type: none"> <li>Individuals with a known vitamin B12 deficiency</li> <li>The nitrous oxide constituent of Entonox<sup>®</sup> causes inactivation of vitamin B12, which is a co-factor of methionine synthase. Folate metabolism is consequently interfered with and DNA synthesis is impaired following prolonged administration of Entonox<sup>®</sup>. Prolonged or frequent use of Entonox<sup>®</sup> may result in megaloblastic marrow changes, myeloneuropathy and sub acute combined degeneration of the spinal cord.</li> <li>Assessment of plasma-vitamin B<sub>12</sub> concentration should be considered in those at risk of deficiency, including the elderly, those who have a poor, vegetarian, or vegan diet, and those with a history of anaemia.</li> <li>Individuals with undiagnosed subclinical deficiency of vitamin B<sub>12</sub>, neurological toxicity has occurred after single exposures to nitrous oxide during general anaesthesia.</li> <li>Caution should be exercised before using Entonox<sup>®</sup> in individuals who have known Chronic Obstructive Pulmonary Disease (COPD) or other conditions where compromised chemoreceptor sensitivity/function may be present. This is due to the relatively high concentration of oxygen contained in Entonox<sup>®</sup> and as such may cause respiratory depression and increases in PaCO<sub>2</sub>.</li> <li>Use with caution in individuals with a known history of drug/medication abuse.</li> <li>Repeated administration or exposure to nitrous oxide may lead to addiction. Caution should be exercised in patients with a known history of substance abuse or in healthcare professionals with occupational exposure to nitrous oxide.</li> <li>Pregnancy:             <ul style="list-style-type: none"> <li>- may depress neonatal respiration if used during delivery</li> <li>- there is no absolute contra-indication to its use in the first 16 weeks of pregnancy- see <a href="#">SPC</a> for further details</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• Entonox® can be used during the breast-feeding period, but should not be used during breast-feeding itself. Breast-feeding can be resumed as soon as the mother has recovered sufficiently.</li> <li>• Check for any other medications that the individual is taking, including topical or inhaled products, food supplements and herbal or homeopathic products – see <a href="#">interactions</a>.</li> <li>• Individuals with complex multiple pathologies, polypharmacy or multiple allergies.</li> <li>• If there are any concerns, seek medical advice and document advice given and action taken.</li> </ul> <p>Under Section 128 and 130 of the Social Services and Wellbeing (Wales) Act 2014, staff have a duty to inform the Local Authority if they have reasonable cause to suspect that an adult or child is at risk. Any vulnerable adult or child protection concerns should be referred to <a href="#">Safeguarding</a> and the <a href="#">PTHB safeguarding policies</a> followed. Consider discussing with GP.</p> <p>Any safeguarding concerns need to be directed to Safeguarding Hub:</p> <ul style="list-style-type: none"> <li>• To generic email address: <a href="mailto:PowysTHB.Safeguarding@wales.nhs.uk">PowysTHB.Safeguarding@wales.nhs.uk</a></li> </ul> <p>And</p> <ul style="list-style-type: none"> <li>• Central Safeguarding number: 01686 252806</li> <li>• Out of hours: 0345 0544847</li> </ul> <p>Advice can also be sought from <a href="#">local Safeguarding leads</a>.</p>
<b>Arrangements for referral for medical advice</b>	Record reason, contact medical team or the emergency on-call service and document advice given.
<b>Action to be taken if individual excluded</b>	<ul style="list-style-type: none"> <li>• Explain reason to the individual, if possible</li> <li>• Offer alternative analgesia appropriate to the condition being treated</li> <li>• Record reason, along with any advice obtained from GP/DGH/OOH or prescriber as appropriate</li> </ul>
<b>Action to be taken if individual/</b>	<ul style="list-style-type: none"> <li>• Explain consequences of refusing treatment.</li> <li>• The patient information leaflet (<a href="#">PIL</a>) should be available to inform consent.</li> </ul>

<p><b>carer declines treatment</b></p>	<ul style="list-style-type: none"> <li>• Make individual or representative aware of alternative sources of treatment.</li> <li>• If individual has capacity to consent and refuses treatment, then follow locally agreed pathway.</li> <li>• Document refusal and any advice given. Complete a Discharge Against Advice Form if appropriate/ complete a discharge summary of care on the WPAS system. If urgent, contact GP surgery</li> <li>• Inform or refer to medical team/follow local procedures as appropriate.</li> </ul>
<p><b>Details of the medicine</b></p>	
<p><b>Name, form and strength of medicine</b></p>	<p>Entonox<sup>®</sup> (nitrous oxide 50% and oxygen 50%). Medicinal gas, compressed.</p> <p>The colour coding of the shoulder of ENTONOX<sup>®</sup> cylinders is blue and white. The colour coding of the cylinder body is white. Cylinders also carry the ENTONOX name on the body of the cylinder (for a limited period, cylinders may have blue bodies. These cylinders do not have the name ENTONOX on the body of the cylinder. The programme to convert all Entonox cylinders to white bodies will be completed by 2025).</p>
<p><b>Legal category</b></p>	<p>P Pharmacy</p>

<p><b>Dose and frequency, route/ method of administration</b></p>	<ul style="list-style-type: none"> <li>• Entonox<sup>®</sup> is self-administered, when needed, through a facemask or mouthpiece, which is connected to an Entonox<sup>®</sup> supply through a demand valve system (containing a microbial filter). The individual inhales the dose sufficient for pain relief. The demand valve is operated by the act of inhalation by the individual and it closes down when the individual ceases to inhale. If inhalation continues, light anaesthesia occurs and the mask or mouthpiece drops away as the individual relaxes.</li> <li>• Entonox<sup>®</sup> should only be administered under the direct supervision of a registered practitioner experienced in its use, with adequate training in the use of Entonox<sup>®</sup> and airway management, and when resuscitation equipment is available. <b>NB.</b> The healthcare professional should evaluate the effectiveness of Entonox<sup>®</sup> with the individual throughout, by verbally questioning and encouraging the individual to self-assess the analgesic effect. Monitoring should continue for 30 minutes after the procedure to ensure the effects have completely worn off. Check for excess sedation.</li> <li>• Entonox<sup>®</sup> may be administered for the duration of time specified <a href="#">below</a> - authorisation is invalid after this time.</li> <li>• <b>Information for administration – refer to SPC and PIL</b> available via <a href="#">MHRA Products   Home</a> for instructions on preparing the cylinder for use. Refer to 'Entonox<sup>®</sup> IFU' available via <a href="https://www.bocgases.co.uk/pages/healthcare">https://www.bocgases.co.uk/pages/healthcare</a> for instructions for use of Integral Valve Cylinders. The D, F, G and EW size cylinders need to have a regulator attached to the cylinder valve before the gas can be used. The other cylinders are supplied with an integral pressure regulator built into the cylinder valve.</li> <li>• Check expiry date, then ensure the cylinder is set up and tested before placing near the individual for use. Do not place the cylinder on the individual's bed unless there is no suitable alternative for retaining the cylinder.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Ensure that the Entonox<sup>®</sup> cylinder cannot fall when stored and when in use.</li> <li>• The gas should be inhaled for at least 2 minutes prior to starting any procedure for optimum pain relief.</li> <li>• Staff should be aware of the risks of occupational exposure and safe working recommendations – see <a href="#">HSE: New guidance to protect those using gas and air safely in hospitals:</a> <ul style="list-style-type: none"> <li>○ ensure a good seal is maintained around mouthpiece.</li> <li>○ use in a well ventilated area to maintain the average occupational exposure level of the healthcare professional to less than 100ppm (over an 8 hour period).</li> <li>○ risk of exposure to nitrous oxide should be established through a COSHH risk assessment of each space in which it is used.</li> <li>○ reduced fertility in healthcare personnel has been reported where they have been repeatedly exposed to levels of nitrous oxide above the specified occupational exposure limits in inadequately ventilated rooms.</li> </ul> </li> <li>• Entonox<sup>®</sup> is non flammable but strongly supports combustion and should not be used near sources of ignition.</li> <li>• Smoking is prohibited when using Entonox<sup>®</sup>.</li> <li>• If moisturising preparations are required for use with a facemask or in nasal passages, oil based creams should not be used.</li> <li>• Where alcohol gels are used to control microbiological cross-contamination ensure that all alcohol has evaporated before handling Entonox<sup>®</sup> cylinders or equipment.</li> <li>• Check that hands are clean and free from any oils or grease</li> <li>• Under no circumstances should oils or grease be used to lubricate any part of the Entonox<sup>®</sup> cylinder or associated equipment used to deliver the gas to the individual.</li> <li>• At the end of the procedure, observe the individual until the effects of the gas have worn off and allow to mobilise when safe.</li> </ul>
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<p><b>Maximum dose to be administered under this protocol</b></p>	<p>Maximum of 24 hours inhalation</p> <p>Inhalation must not be repeated more frequently than every 4 days.</p>
<p><b>Off-label use</b></p>	<p>Not applicable</p>
<p><b>Storage</b></p>	<ul style="list-style-type: none"> <li>• Warning notices prohibiting smoking and naked lights must be posted clearly in the cylinder storage area and the Emergency Services should be advised of the location of the cylinder store.</li> <li>• It is essential that cylinders are stored in accordance with manufacturer’s instructions- refer to <a href="#">datasheet</a> for further information.</li> <li>• Comply with guidance contained in <a href="#">NHS: Guidance on the security and storage of medical gas cylinders</a></li> <li>• Entonox® cylinders:             <ul style="list-style-type: none"> <li>○ should be stored in a well-ventilated, under cover area, preferably inside, kept dry and clean</li> <li>○ should be stored away from oil, grease, flammable materials or combustible materials</li> <li>○ should not be subjected to extremes of heat or cold</li> <li>○ should be stored separately from industrial and other non-medical and other medical cylinders within the store</li> <li>○ should be stored to maintain separation between full and empty cylinders</li> <li>○ should be used in strict rotation so that cylinders with the earliest filling date are used first</li> <li>○ when not in use, F size cylinders and larger should be stored vertically. D size cylinders and smaller may be stored horizontally</li> <li>○ must be stored appropriately so that they are unable to fall over and cause injury</li> <li>○ are labelled- ensure labels remain clearly visible at all times and not removed or covered. Unauthorised labels/tags must not be fitted</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ if the cylinder requires cleaning, do not use any materials which contain ammonium or chlorine compounds</li> <li>● Ensure that Entonox<sup>®</sup> cylinders are maintained at a temperature above 10°C for at least 24 hours before use to ensure the gases are mixed correctly. If this is not possible, EA, D and ED size cylinders may be used immediately if inverted three times before use to ensure mixing.</li> <li>● Precautions should be taken to protect cylinders from theft.</li> <li>● Care is needed when handling and using Entonox<sup>®</sup> cylinders.</li> <li>● ED (Entonox<sup>®</sup>) size cylinder or equivalent, must NOT be transported by any member of PTHB staff, transport must be undertaken by a recognised medical gas courier (e.g. BOC).</li> </ul> <p>See the MMP 001 <a href="#">medicines policy</a> for further information on transport of medical gases.</p>
<p><b>Drug Interactions</b></p>	<p>Check for any other medications that the individual is taking, including topical or inhaled products, food supplements and herbal or homeopathic medications.</p> <ul style="list-style-type: none"> <li>● Methotrexate (The nitrous oxide constituent of Entonox<sup>®</sup> inactivates vitamin B<sub>12</sub> and potentiates the effects of methotrexate on folate metabolism)- see <a href="#">exclusion criteria</a></li> <li>● Other centrally acting depressant medicinal products, such as opiates, benzodiazepines, and/or other psychotropics. Concomitant administration of Entonox<sup>®</sup> may increase the risk for pronounced sedation and depression of protective reflexes. If Entonox<sup>®</sup> is to be used in such patients, this should take place under the supervision of appropriately trained personnel</li> </ul>

	<ul style="list-style-type: none"> <li>• Bleomycin, Amiodarone and Nitrofurantoin or similar antibiotics: The use of higher levels of oxygen can increase the risk of pulmonary toxicity in patients who have been administered Bleomycin, Amiodarone and Nitrofurantoin or similar antibiotics. In these cases Entonox<sup>®</sup> should be administered with caution and at levels kept as low as possible.</li> </ul> <p><b>NB.</b> Refer to <a href="#">BNF/datasheet</a> for full list of potential interactions.</p> <p>Refer for medical advice as appropriate and document advice given.</p>
<p><b>Identification management and reporting of adverse reactions</b></p>	<ul style="list-style-type: none"> <li>• Euphoria, disorientation, sedation, nausea, vomiting, dizziness and generalised tingling are commonly described- generally minor and rapidly reversible.</li> <li>• Prolonged or frequent use of Nitrous Oxide, including heavy occupational exposure and addiction, may cause inactivation of vitamin B12 and result in megaloblastic anaemia. Agranulocytosis has been reported following prolonged nitrous oxide administration. Neurological toxic effects can occur without preceding overt haematological changes.</li> <li>• Myeloneuropathy and sub-acute combined degeneration have also been reported following prolonged or frequent use.</li> <li>• Risk of addiction.</li> <li>• Prolonged exposure may result in bowel distension, middle ear damage and rupture of ear drums, because nitrous oxide passes into all gas containing spaces in the body faster than nitrogen passes out.</li> <li>• Staff who are pregnant or planning to conceive may wish to reduce exposure to Entonox<sup>®</sup> -this can be discussed with occupational health and their line manager.</li> </ul>

- Inappropriate, unwitting or deliberate inhalation of Entonox<sup>®</sup> will ultimately result in unconsciousness, passing through stages of increasing light-headedness and intoxication. The treatment is removal to fresh air and follow resuscitation procedures as appropriate and refer to medical team.
- Adverse psychometric effects will normally cease shortly after administration of Entonox<sup>®</sup> has stopped.
- May depress neonatal respiration if used during delivery.

Seek medical advice if the symptoms persist or worsen or if there is an actual or potential reaction to the treatment.

**Note:** Staff who administer Entonox<sup>®</sup> have a duty of care to ensure that those in the immediate vicinity, including the individual and family members where appropriate, are aware of these risks, and have the opportunity to remove themselves from the immediate area discreetly if they choose.

NB. This list is not exhaustive. Refer to [BNF](#) or [datasheet](#) for complete list.

Report any suspected adverse reactions to a prescriber and record in the individual's medical record.

All significant adverse drug reactions, any administration errors or untoward incidents, and all Entonox<sup>®</sup> cylinder incidents must be recorded via the [Once for Wales Reporting System](#) incident reporting system and alerted to the MHRA through the yellow card scheme (found in the BNF) or submit online through the MHRA website at: <http://yellowcard.mhra.gov.uk> or search for MHRA Yellow Card in the Google Play or Apple App Store. For established medicines, serious adverse events in adults that may be attributable to the medication should be reported. All suspected adverse reactions in children that may be attributable to the medication should be reported.

	<p>In case of an acute anaphylactic reaction occurring, adequate treatment provision must be available for immediate use: Anaphylaxis and resuscitation equipment including adrenaline (1 in 1000) injection and a working telephone to summon assistance if required. In case of anaphylaxis:-</p> <ul style="list-style-type: none"> <li>• Refer to <a href="#">adrenaline (epinephrine) PGD0017</a> and <a href="#">anaphylaxis procedure</a></li> <li>• Request medical assistance urgently. If the GP is not immediately available dial 999 to transfer to A&amp;E</li> <li>• Ensure reaction is fully documented in individual's notes</li> <li>• Ensure all patient records are marked ALLERGIC TO <b>ENTONOX</b><sup>®</sup> administered via:.....</li> <li>• The individual may be advised to wear a MedicAlert or similar device to alert other healthcare providers</li> <li>• Report via the <a href="#">Once for Wales Reporting System</a></li> </ul>
<p><b>Records to be kept</b></p>	<p>Administration of any medication must be clearly recorded on the individual's medication record. Record consultation details as required by local procedures.</p> <p>In addition, record:</p> <ul style="list-style-type: none"> <li>• Name, address and date of birth of individual and GP contact details, where appropriate</li> <li>• Symptoms allowing the individual to be treated under this protocol</li> <li>• Examination findings, where relevant</li> <li>• Relevant past and present medical history, including medication history (if possible), including any known allergies or previous adverse events and nature of reaction</li> <li>• Any reasons for exclusion or referral, including advice given and actions taken</li> <li>• Advice given about the medication including side effects, benefits, and when and what to do if any concerns</li> </ul>

	<ul style="list-style-type: none"> <li>• Any advice received from medical cover and advice given to individual/carer (including recommendations for ongoing symptoms and when and who to refer to if symptoms are ongoing or worsen)</li> <li>• That valid informed patient consent to treatment was obtained. Record name of representative who gave consent if appropriate- refer to <a href="#">PTHB Consent to Treatment and Examination Policy</a></li> <li>• If the individual refused treatment, any advice given in this circumstance</li> <li>• Arrangements made for review</li> <li>• Date and time Entonox® therapy started</li> <li>• Form, route, delivery system (if mask, specify type used) flow rate, frequency and duration of Entonox® use in minutes</li> <li>• For inpatients record administration in the 'once only' section of the medication administration record</li> <li>• Batch number and expiry date</li> <li>• If there is handover to any external services - that medication has been given in accordance with this protocol and details of what was given</li> <li>• Any advice given to the individual, including self-care/OTC recommendations for ongoing symptoms and when and who to refer to if symptoms are ongoing or worsen</li> <li>• Details of any adverse reactions and actions taken</li> <li>• Record that medication was administered via a protocol, record protocol title and version number</li> </ul> <p>The record must include the printed name and signature (which may be electronic) of the healthcare professional responsible for administration. Records should be signed and securely kept for a defined period in line with local policy.</p> <p>All records should be clear, legible and contemporaneous. A record of all individuals receiving treatment under this protocol should be kept for audit purposes in accordance with local policy.</p> <p>The head of department must arrange an annual retrospective audit of a minimum of 5 records over a</p>
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	<p>12-month period. This audit should sample 10% of individuals who have been treated according to this protocol in each location where the protocol has been used, to monitor compliance. The records must be reviewed for rationale behind administering the medication, to check this was in accordance with the protocol, that clear documentation is in place and that the competency checklist has been completed when authorising individuals to work to this protocol. The results should be available for review by the medicines management team upon request.</p>
<b>Information for individual</b>	
<p><b>Written/verbal information to be given to individual or carer</b></p>	<ul style="list-style-type: none"> <li>• Provide patient information leaflet.</li> <li>• Provide the following if relevant: <b>Medicines for Children leaflet: Nitrous oxide for pain</b>  <a href="https://www.medicinesforchildren.org.uk/medicines/nitrous-oxide-for-pain/">https://www.medicinesforchildren.org.uk/medicines/nitrous-oxide-for-pain/</a></li> <li>• Explain indication, contraindications, cautions, possible adverse reactions and management of these.</li> <li>• Provide advice on self-administration and how to hold the facemask or mouthpiece and how to breathe to operate the demand valve (it is essential that only the individual holds the mask/mouthpiece)</li> <li>• Explain that pain relief is rapid with Entonox®.</li> <li>• The gas should be inhaled for at least 2 minutes prior to starting any procedure for optimum pain relief.</li> <li>• When Entonox® is used as a sole analgesic, driving or use of machinery is not recommended until:             <ul style="list-style-type: none"> <li>○ The healthcare professional has judged that the individual has returned to their normal mental status</li> <li>○ The individual feels that they are competent to drive after the relevant procedure is completed</li> <li>○ At least 30 minutes has elapsed after the administration of Entonox® has ceased.</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• Advise that additional care is needed if individual has received other sedating drugs</li> <li>• Where Entonox<sup>®</sup> is to be used in the Outpatient setting, all individuals should receive information prior to the day of procedure regarding the possible effects of Entonox<sup>®</sup> on driving to allow them to make an informed choice as to whether they wish to drive their own motor vehicle. Should an individual choose to do this, it is done entirely at their own risk. Individuals should be reminded of this on the day prior to the start of the procedure.</li> </ul>
<p><b>Written/verbal information to be given to individual or carer</b></p>	<ul style="list-style-type: none"> <li>• Should an individual seek reassurance about their ability/fitness to drive from a medical professional, then whilst a Doctor may be able to assess competence to drive after such a procedure, this will not necessarily be the case and no Doctor should act beyond their competence. Where such a reassurance is requested by the individual, then the outcome of such request must be clearly documented in the medical notes prior to discharge.</li> <li>• Advise that smoking is prohibited when using Entonox<sup>®</sup></li> <li>• If relevant, advise that Entonox<sup>®</sup> can be used during the breast-feeding period, but should not be used during breast-feeding itself. Breast-feeding can be resumed as soon as the mother has recovered sufficiently.</li> <li>• Refer the individual/carer to self-care options for ongoing pain relief</li> <li>• Inform individual that they are being treated within a protocol.</li> </ul>

<b>Follow-up and advice to be given to individual or carer</b>	<ul style="list-style-type: none"><li>• Refer to local procedures if medical review required / arrange appropriate transfer if required.</li><li>• Document advice given.</li><li>• Prior to discharge, ensure:<ul style="list-style-type: none"><li>▪ vital signs have returned to normal</li><li>▪ the person is awake and there is no risk of further reduced levels of consciousness</li><li>▪ nausea, vomiting and pain have been adequately managed</li></ul></li><li>• Inform individual of possible side effects and their management.</li><li>• Advise them to seek medical advice immediately if they have any unexpected reaction or other cause for concern. Contact 111 for advice or attend A&amp;E.</li></ul>
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## 0Key references

- [BNF](#) online edition and BNFC accessed 23/06/2025
- SPC Entonox® available via [MHRA Products | Home](#), revised 13/03/2024
- Entonox® Medicinal Gas, Compressed. Package Leaflet: Information for the user available via [MHRA Products | Home](#), last approved 02/2024
- BOC 'Entonox® IFU' available via <https://www.bocgases.co.uk/pages/healthcare> accessed 23/06/25
- <https://press.hse.gov.uk/2025/02/06/new-guidance-to-protect-those-using-gas-and-air-safely-in-hospitals/> accessed 14/06/25
- [NICE Guidance 235](#) Intrapartum care

**Appendix A** Staff Permitted to use Protocol Signature Sheet

**Authorising Manager:** I confirm that the practitioners named below have declared themselves suitably trained and competent to work under this protocol. I give authorisation on behalf of Powys Teaching Health Board for the named healthcare professionals below who have signed the protocol to work under it.

*The authorising manager must use the competency checklist (below).*

**Practitioner:** By signing this protocol you are indicating that you agree to its contents and that you will work within it. Protocols do not remove inherent professional obligations or accountability. It is the responsibility of each professional to practise only within the bounds of their own competence and professional code of conduct.

I confirm that I have read and understood the content of this protocol and that I am willing and competent to work to it within my professional code of conduct.

<b>Printed name of health professional</b>	<b>Signature of health professional</b>	<b>Printed name of senior representative authorising health professional (Authorising Manager)</b>	<b>Signature of senior representative authorising health professional (Authorising Manager)</b>	<b>Date</b>

The authorising manager should retain a copy of the list, which should be kept by PTHB for 25 years after the protocol expires. This list must be made available to the medicines management department for audit purposes. The healthcare professional should retain a copy of the document after signing.

**Competency check list for manager or senior team lead to use as part of the authorising process for health professionals to work to a protocol.** Review of authorisation will take place on each protocol update and at the individual’s annual PADR.

<b>Name:</b> <b>Role:</b> Current contract with PTHB (please circle): YES / NO		Sign / Initial	Further training identified (Y/N) Specify in “comments”	Comments
1	The protocol sign off is for the following protocol: MMP406v2 Administration of Entonox as short-term pain relief to adults and children aged 5 years of age or over in PTHB			
2	We have discussed the expiry of the protocol and are using a version accessed electronically			
3	The member of staff has the appropriate qualifications and professional registration as outlined in the protocol			
4	The protocol has been read in full by the staff member			
5	The identified training has been completed as specified in the protocol and is in date			
6	We have discussed some examples of inclusion criteria and exclusion criteria			
7	The staff member is confident in the administration method and doses			

Staff member print & sign name		Date
Manager or senior team lead to print & sign name		Date

Please send a copy of this completed form to individual’s line manager and to the staff member. A copy of this form should be kept by service lead in the training file- this will be subject to audit.