

SESLHD PROCEDURE COVER SHEET



Health
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Local Health District

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KEY TERMS	Methoxyflurane, Procedural Pain, Inhalational Analgesia
SUMMARY	Use of methoxyflurane inhalational analgesia for the short-term management of acute procedural pain.

COMPLIANCE WITH THIS DOCUMENT IS MANDATORY

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Pain Management - Methoxyflurane Inhaler for Adult Patients

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1. POLICY STATEMENT

This standard refers to the use of methoxyflurane inhalational analgesia for the short-term management of acute procedural pain.

2. BACKGROUND^{1,2,3}

Methoxyflurane is an inhalation agent providing analgesia at low concentrations. It is designed to alleviate short-term pain with minimal sedative effect where rapid onset and offset is desired. It is self-administered via hand-held inhalation device by a conscious patient.

3. RESPONSIBILITIES / IMPLEMENTATION

- Medical Officers (MO)
- Registered Nurses (RN)
- Enrolled Nurses without notation
- Pharmacists

3.1 Employees will:

- Adhere to the procedure.

3.2 Line Managers will:

- Monitor adherence to the procedure.

3.3 District Managers/ Service Managers will:

- Monitor IIMS reports related to this document.

3.4 Medical staff will:

- Adhere to the procedure.

4. PROCEDURE

4.1 Indications, Contraindications, Precautions^{4,5}

Indications

Short-term management of acute pain, including:

- Painful dressings for wounds, burns, ulcers etc
- Removal of drains
- Diagnostic procedures including fine needle aspirations and sentinel node biopsies
- Incident pain in oncology patients e.g. transfers for radiotherapy.

Methoxyflurane should only be administered by inhalation using the equipment as specified in this procedure. It must **not** be injected or swallowed.

Contraindications

- Use as an anaesthetic agent
- Renal impairment, including reduced glomerular filtration rate (GFR), urine output and reduced renal blood flow.
- Renal failure
- Hypersensitivity to fluorinated anaesthetics or any ingredients in PENTHROX
- Cardiovascular instability
- Respiratory depression, airway obstruction or airway burns
- Head injury or loss of consciousness
- A history of possible adverse reactions in either patient or relatives
- Malignant hyperthermia: patients with known or genetically susceptible to malignant hyperthermia
- Patients unable to hold the inhaler due to impaired consciousness/cooperation
- Patients who are intoxicated with alcohol or illicit drugs.

Precautions

- Liver disease
- Diabetic patients
- Daily use of methoxyflurane is not recommended because of nephrotoxic potential
- In patients under treatment with enzyme inducing drugs (e.g. barbiturates) the metabolism of methoxyflurane may be enhanced resulting in increased risk of nephrotoxicity
- Intravenous adrenaline or nor-adrenaline should be employed cautiously during methoxyflurane administration
- Caution should be exercised in the elderly due to possible reduction in blood pressure or heart rate
- Pregnancy (Category C) and lactation
- Concurrent use of tetracycline and other antibiotics of known nephrotoxic potential are not recommended as it may result in fatal renal toxicity
- Use with beta blockers may cause hypotension
- Methoxyflurane must be administered in a well ventilated area to reduce occupational exposure to its vapour.

Refer to [MIMS for full Product Information](#)

4.2 Prescribing and Recommended Doses^{4,5}

- The decision to prescribe methoxyflurane should be made after consultation with Pain Management team⁶
- A Medical Officer must prescribe the methoxyflurane on the PRN section of the National Inpatient Medication Chart (NIMC) or approved electronic medication management (eMM) system
- The prescription must ensure that the recommended dose is not exceeded e.g. *“Methoxyflurane, via inhaler, 3-6 mL, max 15mL/week and once only in 48 hours, for pain with dressing change”*.

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- The maximum dose of methoxyflurane via the inhaler is:
 - 3mL to 6 mL for a single episode of severe pain
 - 15mL in any 7 day period (5 x 3mL bottles)
 - Can only be used once in 48 hours (alternate day administration)
- 3 mL of methoxyflurane will provide approximately 25 – 30 minutes of analgesia
- It must not be given on consecutive days due to the potential for accumulation of toxic metabolites
- Exceeding maximum doses or use on consecutive days could cause renal toxicity (Methoxyflurane nephrotoxicity is dose dependant and irreversible).

4.3 Equipment

- A disposable methoxyflurane inhaler
- Methoxyflurane 3 mL bottle
- Activated Carbon (A/C) Chamber
- Oxygen tubing/mask (optional)

4.4 Preparation and Administration of Methoxyflurane Inhaler ^{4,5,7}

- **Ensure the Activated Carbon (A/C) Chamber is inserted into the dilution hole on the top of the inhaler. A new Activated Carbon Chamber and inhaler MUST be used for each bottle.**
- Tilt the methoxyflurane inhaler and pour the contents of one 3mL bottle into the base whilst rotating the inhaler. Do not use a plastic syringe to transfer bottle contents into the inhaler.
- Shake gently to ensure that methoxyflurane is evenly dispersed within the inhaler and wipe the mouthpiece before giving it to the patient
- The patient must be on a bed or trolley when using methoxyflurane
- The methoxyflurane inhaler is not to be used between the times of the painful procedure for which it was prescribed. For example: it is not to be used to manage pain while ambulating
- **The methoxyflurane inhaler should be self-administered** and should not be held to the face/mouth by anybody other than the patient
- The methoxyflurane inhaler can be attached to a standard facemask. If a facemask is used, it must be held by the patient i.e. not fastened on the face
- Advise the patient to aim for relief of discomfort rather than completely eliminating pain
- Place wrist loop over patient's wrist. Identify the mouthpiece and the "diluter" hole for the patient
- Instruct the patient to inhale through mouthpiece:
 - Firstly, to take a couple of gentle breaths to get used to the fruity smell/taste
 - After this, breathe normally through the inhaler, analgesia will take effect in approximately 6-10 breaths
 - The patient exhales into the inhaler. The exhaled vapour passes through the A/C chamber to absorb any exhaled methoxyflurane
 - If the analgesia is inadequate, the patient should be instructed to occlude the diluter hole in order to inspire a higher concentration

- Instruct the patient to use the inhaler intermittently as required, using deep breaths to prolong the analgesia. This also allows the patient to have control over their analgesic requirements.
- Self-administration ensures that if the patient becomes drowsy then they will no longer be able to hold the mouthpiece and will cease to receive any further methoxyflurane. It will then begin to wear off and drowsiness will resolve
- A second dose of 3mL methoxyflurane bottle, if required and prescribed, can be added to extend the analgesia to approximately 50-60 minutes. **NB. Ensure a new A/C chamber and inhaler is used for the second dose**
- Pain relief should continue for a few minutes after cessation of use of methoxyflurane inhaler.

4.5 Concurrent Oxygen Therapy

If the patient is currently requiring oxygen due to their clinical condition, it should continue to be administered during the use of the methoxyflurane inhaler. Oxygen tubing can be attached to the nipple of the base cap of the inhaler and run at the appropriate flow that the patient was previously on.

Alternatively, if the patient is currently receiving oxygen via nasal prongs, then they may continue to do so and use the inhaler without additional oxygen being attached to the inhaler.

4.6 Monitoring

Observations **pre and post procedure** are to be recorded on the Between The Flags (BTF) on eMR or on the Standard Adult General Observation Chart (SAGO chart):

- pain score
- respiratory rate
- sedation score
- oxygen saturation levels
- blood pressure
- pulse rate
- Constant visual observation of the patient's level of consciousness, airway patency, respirations, oxygen saturation levels, nausea and pain levels throughout procedure.
- Maintaining constant verbal contact to ensure the patient is receiving adequate analgesia and is rousable
- If the patient's consciousness level deteriorates remove the methoxyflurane inhaler. Ensure the patient's airway is supported until they are able to maintain by themselves, consider administering supplemental oxygen
- Activate PACE system if observations meet calling criteria or other clinical condition of concern⁸
- If nausea occurs, discontinue and administer antiemetic as prescribed
- The patient is **not** to be left unattended during methoxyflurane use
- If patient is known to have respiratory disease, use continuous pulse oximetry
- The patient must not leave the ward or unit with the methoxyflurane inhaler
- Renal function should be monitored in patients who have frequent use and/or at risk of renal impairment.

4.7 Side Effects ⁵

Possible common side effects include:

- Dizziness
- Euphoria
- Nausea
- Diaphoresis
- Distortion of the sense of taste
- Flushing
- Hypertension
- Anxiety
- Drowsiness
- Headache
- Coughing
- Amnesia

Possible rare side effects include:

- Hepatic toxicity
- Malignant hyperthermia is a rare condition that can be induced by volatile anaesthetics.

Management of Side Effects:

- Cease the use of methoxyflurane inhaler
- Contact relevant MO

4.8 Record of Administration

- Administration of methoxyflurane must be **clearly** recorded on the NIMC or approved electronic medication management (eMM) system to ensure the patient does not receive more than the recommended dose within a 48 hour and 7 day period (see 4.2)
- Entry in patient's medical record.

4.9 Disposal

- Dispose the used inhaler and chamber in a sealed zip-lock style plastic bag (to prevent evaporation) into a contaminated waste non-sharp rubbish container
- Methoxyflurane glass bottles must be sealed with a lid and disposed of in the sharps container.

4.10 Guidelines for Specific Patient Populations

- Only in exceptional circumstances the inhaler may be held to the patient's mouth by a person other than the patient (e.g. severe arthritis or arm burns/injuries). In this situation, the operator must continually assess the patient's level of consciousness
- Methoxyflurane is nephrotoxic in high doses and renal function should be monitored in patients who have frequent use and/or are at risk otherwise of renal impairment.

4.11 Information for Patients

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- The decision as to when patients may again engage in activities requiring complete mental alertness, operate hazardous machinery or drive a motor vehicle must be individualised
- Patients should be warned to take extra care as a pedestrian and not to drive a vehicle or operate a machine until the patient has completely recovered from the effects of the drug, such as drowsiness
- The treating medical officer should decide when activities such as driving a vehicle or operating a machine may be resumed.

5. DOCUMENTATION

- Prescription (National Inpatient Medication Chart or approved electronic medication management (eMM) system)
- Patient's medical record.

6. AUDIT

Clinicians prescribing methoxyflurane must regularly review patients receiving this form of inhalational analgesia as exposure can cause renal impairment even in normal individuals.

7. REFERENCES

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8. REVISION AND APPROVAL

Date	Revision No.	Author and Approval
August 2010	Draft	Developed by Grazyna Jastrzab, Jaswin Henderson and Bernadette Bugeja in consultation with SESIAHS pain management clinicians and other members of the working party.
December 2010	0	Endorsed by Area Patient Safety & Clinical Quality Committee Noted by Area Clinical Council
January 2014	1	Revised by Grazyna Jastrzab NM Pain Management in consultation with relevant SESLHD Senior Management Nursing and Medical Staff
February 2014	1	Re-formatted by Scarlett Acevedo, District Policy Officer.
February 2014	1	Approved by SESLHD Drug & QUM Committee
March 2016	2	Revised by Grazyna Jastrzab, NM Pain Management in consultation with relevant clinicians across SESLHD. Main changes: <ul style="list-style-type: none"> • Updated information related to indications and contraindications • References updated
September 2016	2	Reviewed and approved with minor changes by SESLHD Drug and Quality Use of Medicine Committee for publishing
June 2019	3	Reviewed by David Begley NM Pain Management in consultation with relevant clinicians across SESLHD, minor changes to wording and an updated reference. Approved by Executive Sponsor.
August 2019	3	Formatted by Executive Services prior to tabling at September 2019 Quality Use of Medicines Committee for approval to publish.
September 2019	3	Approved by Quality Use of Medicines Committee. Published by Executive Services.

Appendix A – see instructions below

How the inhaler works¹²

The inhaler consists of:

- a cylindrical whistle-like tube with a hole near the mouthpiece
- an attached scavenger unit that absorbs exhaled vapour.



Methoxyflurane is supplied separately in a 3 mL bottle.

Pour the methoxyflurane into the base cap and tap gently. A wick absorbs the liquid and allows vaporisation during inhalation.

Instruct the patient to inhale and exhale into the mouthpiece, with the diluter hole open at first.



After 6–8 breaths the patient can:

- inhale intermittently as required for pain relief. This may help extend the 3 mL charge and limit overuse
- cover the diluter hole to increase the concentration for stronger pain relief if needed.



The patient holds the device so that it will drop away if they become drowsy or unconscious (this occurs rarely).

Note: full instructions are available from the manufacturer.