Patient Controlled Analgesia (PCA)
Intravenous Policy

Policy Statement:

This document specifies the **minimum** standards and procedures for the safe management of patients receiving Patient Controlled Analgesia.

All Registered Nurses (RNs), Registered Midwives (RMs) and Enrolled Nurses (ENs) working within their scope of practice, **Post Anaesthetic Care Unit (PACU) ENs only**, who are involved in the preparation and administration of Patient Controlled Analgesia (PCA) devices must achieve annual competency in PCA management. This policy is to be read in conjunction with the PCA Learning Package.

Authorised staff include:

- Two RNs/ RMs
- One RN and one EN working within their scope of practice
- An AMP and a RN, RM or EN working within their scope of practice
- A pharmacist and a RN/ RM or EN working within their scope of practice

**NOTE:** ENs who are not endorsed to prepare and administer the PCA infusion may still be involved in the care of a patient who has a PCA in a team nursing model with an authorised RN/RM being responsible for the PCA.

**Definitions:**

PCA refers to a method of pain relief that allows a patient to self administer small doses of an analgesic agent as ordered and may include a continuous infusion. A lockable, programmable pump is utilised to deliver the medication.

**Adults - Alaris® PCAM pump Terminology**

Clinician Over-Ride- An entry code protected facility allows the clinician to administer an additional PCA dose at any time including during the normal lock-out period. Both the PCA dose, and the duration over which it is to be administered can be programmed. This function is for **PACU only**.

Loading dose - Initial dose of the medication prescribed by the AMP at the commencement of the infusion.

PCA dose - amount of medication the patient will receive with each dose. This is measured in mLs.
Continuous - basal rate dose. A continuous infusion of medication is administered intravenously. This may be set in combination with a PCA.

Lockout period - programmed time elapse between availability of PCA doses. 4 hour dose limit - maximum dose of medication the patient may receive in 4 hours.

**Paediatrics - Alaris® PCA module attached to Alaris® PC unit.** (Refer to MED 09 000 Alaris™ infusion pump with Guardrails® Protocol)

Alaris PCA module - attaches to PC module and utilises Guardrails pre set hard and soft limits.

PCA Dose - amount of medication the patient will receive for each dose. This is measured in mgs.

Bolus dose - additional nurse initiated dose programmed after initiation of continuous or PCA infusion as ordered by the AMP.

Continuous - basal rate dose. A continuous infusion of medication is administered intravenously. This may be set in combination with a PCA.

Lockout interval - programmed time elapse between availability of PCA doses.

4 hour dose limit - maximum dose of medication the patient may receive in 4 hours.

Clinical advisories – An advisory alert to notify the user of special requirements for the drug they are programming to infuse.

**ADULT PATIENTS**

**Patient Suitability - Adult**

The patient is assessed pre operatively as to their suitability for PCA by the Accredited Medical Practitioner (AMP).

Pre-operative education on PCA use is given to the patient by a Registered Nurse (RN)/Registered Midwife (RM) or Enrolled Nurse (EN) working within their scope of practice. This is in the form of a verbal explanation and an educational handout.

**Guidelines for ordering of medications - Adult**

PCA is ordered by an AMP, documented on the appropriate order chart and complies with the Ordering of Medications (including Telephone Orders) Policy.

**Medications that can be administered via PCA - Adult**

Morphine, Fentanyl and Oxycodone will be used almost exclusively.

Occasionally, Tramadol may be used only if other drugs are contraindicated or if the AMP regards its use as essential.
Pethidine is NOT routinely used due to the concern for norpethidine toxicity. In some circumstances, patients may have pethidine prescribed but this will only be for a short duration (up to 24 hours).

<table>
<thead>
<tr>
<th>DRUG</th>
<th>Concentration</th>
<th>Diluent</th>
<th>4 hour dose limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>50mg in 50mL</td>
<td>Normal Saline</td>
<td>40mg</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>50mg in 50mL</td>
<td>Normal Saline</td>
<td>40mg</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>500mcg in 50mL</td>
<td>Normal Saline</td>
<td>300microg</td>
</tr>
<tr>
<td>Tramadol</td>
<td>500mg in 50mL</td>
<td>Normal Saline</td>
<td>100mg</td>
</tr>
<tr>
<td>Pethidine</td>
<td>500mg in 50mL</td>
<td>Normal Saline</td>
<td>250mg</td>
</tr>
</tbody>
</table>

**Cease Pethidine at 24 hours**

Concentrations of medication in PCAs should follow a uniform concentration to reduce the incidence of error e.g. Morphine 1mg/mL, Fentanyl 10microg /mL.

**Programming the pump - Adult**

Two authorised staff program the PCA machine. This includes:

- Selecting correct brand and size of syringe
- Selecting correct pre-programmed drug protocol

**Preparation and Administration of the PCA - Adult**

The following is checked against the infusion order by 2 authorised staff: (refer to the Checking and Administration of Medications Paediatric Patient Inclusive policy)

- Patient identity and Unit Record (UR) number
- Patient allergies
- Drug amount
- Drug expiry date
- Diluent volume and expiry date
- Route
- Mode of delivery e.g. PCA, continuous or both
- PCA dose
- Lockout time
- Four hourly dose limit (if ordered)
- Loading dose order (if ordered) - can only be administered in Post Anaesthetic Care Unit (PACU)
- Anti emetic (should be ordered on separate medication chart)
- Date and time of administration
- Printed Name, signature and contact details of the AMP

**Pre operative PCA education for patient and carer/parent (Adult and Paediatric):**

Patient education includes an explanation that:

- PCA is an individualised method of pain relief
- If the patient is in pain the patient can push the PCA button, which delivers a small dose of pain relieving medication into their intravenous (IV) cannula
- The education includes:
1. A constant green light indicates the drug is available
2. A flashing green light indicates a dose is being delivered
3. No light indicates the lock out period where they cannot obtain a further dose. This will last 5 minutes
   - If their pain is unresolved the patient may push the button again, a dose will be available following the lockout time which is 5 minutes
   - No-one else pushes the button
   - When increased activity is required by the patient e.g. deep breathing, coughing or moving, they increase the frequency of demands
   - Observations as per protocol including assessments of pain, respiratory rate and sedation level are made during therapy
   - The likely duration of therapy
   - Other analgesic drugs e.g. paracetamol may be given
   - As an adjunct other opioids or drugs of dependence are ordered at the discretion of the treating AMP
   - If the patient is experiencing increasing pain, nausea or itchiness report to NUM/AMP.
   - Reinforcement of this information may be required upon return to ward to ensure maximum benefit

**PAEDIATRIC PATIENTS**

**Patient Suitability - Paediatric**

The child must have the cognitive ability to understand the concept of pressing a button to self-administer analgesia when required (most children over 7 years of age). This assessment is made by the anaesthetist in conjunction with the authorised staff and in consultation with the parent/carer.

Paediatric patients deemed not appropriate for PCA may be ordered a continuous analgesic/narcotic infusion. The Alaris® PCA module is utilised for this infusion in continuous mode.

**Guidelines for ordering of medications – Paediatric**

Medications must be ordered in milligrams or micrograms according to the set weight ranges and concentrations as per below.

Four Hourly Dose Maximum must be ordered for PCA and/or continuous infusion

Special note: Anaesthetists, at their discretion, may utilise lean weight rather than actual weight when selecting weight range.

**Drug concentrations for less than 50kg patients**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Drug amount</th>
<th>Volume of diluent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>0.5mg/kg</td>
<td>to 50mLs 0.9% sodium chloride</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>15microg/kg</td>
<td>to 50mLs 0.9% sodium chloride</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>0.5mg/kg</td>
<td>to 50mLs 0.9% sodium chloride</td>
</tr>
<tr>
<td>Ketamine</td>
<td>5mg/kg</td>
<td>to 50mLs 0.9% sodium chloride</td>
</tr>
</tbody>
</table>
Ketamine bolus doses may only be administered by the AMP on the ward.

Set Weight ranges for Paediatric PCA/Continuous infusion

- 5-6.9kg - continuous infusion only
- 7-8.9kg - continuous infusion only
- 8-9.9kg - continuous infusion only
- 10-14.99kg - continuous infusion only
- 15-19.99kg - PCA and/or continuous infusion
- 20-29.99kg - PCA and/or continuous infusion
- 30-50kg - PCA and/or continuous infusion
- greater than 50kg - PCA and/or continuous infusion

Preparation and Administration of the PCA - Paediatric

The following is checked against the infusion order by 2 authorised staff: (refer to MED 07 010 Checking and Administration of Medications (Paediatric patient inclusive) Policy)

- Patient identity and Unit Record (UR) number
- Patient allergies
- Patient weight (ensure weight category is correct)
- Drug amount (mg, microg)
- Drug expiry date
- Diluent volume and expiry date
- Route
- Mode of delivery e.g. PCA, continuous or both
- PCA dose/continuous dose (mg, microg)
- Lockout time
- Four Hourly Dose Maximum MUST be ordered and set
- Continuous background rate (if ordered)
- Bolus dose order (if ordered for continuous infusion)
- Anti emetic (should be ordered on separate medication chart)
- Date and time of administration
- Printed Name, signature and contact details of the AMP

Labelling

Refer to MED 04 060 User-Applied Labelling of Injectable Medicines, Fluids and Lines Policy.

Programming the pump - Paediatric

- Ensure the pump is set in the paediatric profile
- Select the correct brand and size of syringe (50mL)
- Select the correct infusion mode (PCA, continuous)
- Select the correct weight range, drug profile and settings
- Four houly Dose Maximum must be set
- Observe and respond to clinical advisories

Change in PCA settings – Adult and Paediatric

To administer a loading dose / bolus or any change in PCA pump settings the written instruction of the relevant AMP are followed and checked by two authorised staff.
Nurse initiated bolus doses must be administered greater than 10 minutes apart. (Paediatrics)

**Safety measures – Adult and Paediatric**

- The PCA machine must always remain locked when in use and the key kept on the ward key to schedule 8 medications
- The following items must be available on the ward:
  - Emergency medication (Naloxone)
  - Oxygen at the bedside
  - An air viva and oropharyngeal airway in the emergency management kit/trolley

**Special Points and Precautions - Adult and Paediatric**

- PCA must be delivered via IV extension tubing that contains a one way anti reflux valve and a clamp e.g. Heidelberg extension tubing
- To prevent cannula occlusion and maintain drug flow to the patient, the patient MUST have IV fluids running at a minimum of 5mIs per hour via an infusion pump with PCA sideline. A dedicated line is only required if there is no maintenance IV fluid running. The PCA can be run off an existing infusion if compatible.
- The PCA must not be run through the same IV line as a blood transfusion. NB: It may be necessary to allow this to happen if a patient has poor venous access making it difficult or impractical to insert another catheter. The AMP must use their clinical discretion and consider that these problems outweigh the risks of mixing blood and the analgesic drug.
- The PCA line change and syringe change should occur when IV fluid line is changed in accordance with hospital guidelines (Refer: Intravenous Cannula Insertion and Management policy).
- Pump settings, medication orders and infusion label must be checked and documented at each change of shift/staff, when the syringe is replaced or when the patient is transferred between departments. The Registered Nurse who is taking over the care of a patient with a PCA checks the settings with the Registered Nurse handing over the patient.
- If the patient reaches the four hour dose limit, assess the patient for signs of narcosis and conduct a pain assessment. Provide supplemental oxygen if required, notify the nurse in charge and the relevant AMP (refer Escalation of Care Policy). **Paediatrics**- Refer to Management and Administration of Oxygen Therapy Policy. **An order is required for oxygen therapy unless it is deemed an emergency.**
- Patients being transferred between departments with a PCA should be accompanied by an authorised staff member.

**Provisional PCA – Adult and Paediatric**

A provisional PCA may be prescribed by an AMP to be commenced on the ward if the patient has pain and it is not relieved by alternate analgesia. Prior to commencing the PCA, the authorised staff must complete a pain assessment including a complete set of vital signs.

Upon completion of this assessment and if it is determined that the patient requires PCA therapy, two authorised staff will prepare and commence the PCA as per policy.
Observations – Adult and Paediatric

Reportable observations are to be communicated to the relevant AMP and/or anaesthetist.

In the event of a patient on PCA experiencing any detrimental changes in their clinical condition or side effects, the ISBAR tool is completed, the relevant AMP is informed, and the patient treated as ordered.

The following observations are performed hourly for 6 hours

- Sedation score *patient is woken to obtain score
- Pulse rate
- Respiratory rate
- Blood Pressure
- Oxygen saturation (SpO2) (continuous for paediatric patients)
- Pain Score
- Functional Activity Score
- Any nausea/vomiting experienced by the patient
- Document: Syringe level, infusion rate, PCA doses Good/Total, Progress total

Then after 6 hours

The following observations are performed hourly whilst on the PCA

- Sedation Score *patient is woken to obtain score
- Respiratory rate
- SpO2 (continuous for paediatric patients)
- Document: Syringe level, Infusion rate, PCA doses Good/Total, Progress total

The following observations are performed 2 hourly whilst on PCA:

- Pulse
- Pain Score
- Functional Activity Score
- Any nausea/vomiting experienced by the patient

The following observations are performed 4 hourly whilst on PCA:

- Temperature
- Blood Pressure

**NB: In special circumstances continuous SpO2 may be requested by the anaesthetist:** for example, patients with sleep apnoea or severe respiratory disease.

**Potential Complications:**

These possible complications depend on the analgesic prescribed, but may include:

- Respiratory depression
- Sedation
- Urinary retention
- Nausea and vomiting
- Pruritus
- Seizure (tramadol)
- Emergence Phenomenon (ketamine)

**Cessation of PCA – Adult and Paediatric**

Cessation of PCA occurs if the patient has not used the PCA in the last 12 hours and is able to move, deep breath and cough without excessive discomfort. The relevant AMP is consulted and alternative pain relief arranged. There must be a documented order from the AMP to cease PCA. The patient receives education in relation to their new pain control regime. Prior to ceasing PCA, commence adjuvant compatible analgesics to maintain patient comfort.

In the event of a PCA being ceased, two authorised staff are to observe and document the volume remaining. The contents are then discarded down the sink in the presence of two authorised staff.

When the PCA is ceased the syringe and tubing should be disposed of. The PCA pump is turned off and cleaned and then returned to PACU’s point of storage.

**Outcome:**

The patient is informed and confident about using Patient Controlled Analgesia.

The patient’s pain is well controlled and is able to do deep breathing, coughing, able to move and is satisfied with their pain relief.

**Appendices:**

- [Drugs and Protocols - IVAC PCAM Syringe Pump form](#)
- [Opioid/PCA Infusion (MR30B)](#)
- [PCA Patient Information Sheet Chinese](#)
- [PCA Patient Information Sheet English](#)
- [PCA Patient Information Sheet Greek](#)
- [PCA Patient Information Sheet Italian](#)

**Standard:**

1. Drug, Poisons and Controlled Substances At 1981 (vic)
2. Drug, Poisons and Controlled Substances Regulations 2006 (vic)

**References:**

Guidelines and Assessment Framework for the Registration Standards for Eligible Midwives and Endorsement for Scheduled Medicines. The Nursing and Midwifery Board of Australia: 2010

ANMC National Competency Standards for the Registered Nurse: 2010

The Joanna Briggs Institute, Woodward E., Patient Controlled Analgesia: Hypoxemia 2011

Royal Children's Hospital Melbourne, Clinical Guidelines October 2012

Australian Medication Handbook, Children’s Dosing Companion 2014

Care Fusion, *Directions for Use Alaris System Model 8015 December 2011*

**Focus Area(s):**

- 4. NSQHS Medication Safety

**Revision History:**

Date Issued: 1/11/2003  
Date of Last Review: 24/5/2016  
Date of Next Review: 23/5/2019