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SUMMARY	This document is a guideline containing information for the safe and effective prescribing and delivery of opioids and to guide in the management of women receiving intravenous opioid via a patient-controlled analgesia (PCA) programmable pump for the control of acute pain.
Key Words	PCA, APS, B. Braun pump, bolus dose, default, soft limit, hard limit.

Patient Controlled Analgesia - Intravenous

RHW CLIN138

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This Clinical Business Rule (CBR) is developed to guide safe clinical practice at the Royal Hospital for Women (RHW). Individual patient circumstances may mean that practice diverges from this Clinical Business Rule. Using this document outside RHW or its reproduction in whole or part, is subject to acknowledgement that it is the property of RHW and is valid and applicable for use at the time of publication. RHW is not responsible for consequences that may develop from the use of this document outside RHW.

Within this document we will use the term woman, this is not to exclude those who give birth and do not identify as female. It is crucial to use the preferred language and terminology as described and guided by each individual person when providing care.

1 BACKGROUND

The aim of this CBR is to provide a framework for the safe and effective prescribing and delivery of opioids (Morphine, Fentanyl, HYDROmorphone and Oxycodone) and to guide in the management of women receiving intravenous opioid via a patient-controlled analgesia (PCA) programmable pump for the control of acute pain.

2 RESPONSIBILITIES

2.1 Staff

Role	Responsibilities
Anaesthetists (Authorised Prescribers)	• Decisions relating to the commencement and management of intravenous patient-controlled analgesia (PCA) are only to be made by Anaesthetists/Acute Pain Service (APS). Anaesthetists are the authorised prescribers of PCA in RHW. • Prescribe PCA in accordance with this RHW Business Rule on the NSW Health Patient Controlled Analgesia (PCA) Adult form (SMR130.025) and add additional chart placeholder in eMR. • Manage any complications and adverse effects.
All Medical Officers	• Manage any complications and adverse effects with appropriate escalation to Anaesthetics/APS.
Registered Nurse (RN) Registered Midwife (RM)	• Have completed Patient Controlled Analgesia (PCA) competency. • Prepare, administer, and discard opioid as outlined in this Clinical Business Rule. • Attend to observations and manage complications and adverse effects of PCA as outlined in this Clinical Business Rule. • Document appropriately and escalate concerns.

Acute Pain Service (APS)	• Commence/make changes/discontinue PCA • Review patients on PCA daily • Staff education • Audit PCA Charts for compliance, quality assurance • Review IMS+ relating to PCA.
Pharmacists	• Review patient's medication/quality assurance • Facilitate supply of opioids to be used for PCA

2.2 Steps to attain competency (Nursing and midwifery):

- Step 1 – Read PCA CBR.
- Step 2 – Completion of My Health Learning PCA for Adults – course code 40063903; Print course certificate as evidence of eLearning completion.
- Step 3 – Attend an in-service on PCA management & obtain accreditation/competency to use the dedicated PCA pump provided by APS CNC.

Completion of the above steps are mandatory before caring for patients with intravenous Patient Controlled Analgesia[1].

3 PROCEDURE

3.1 Patient education

- The woman receiving the PCA is the only person who can press the PCA button.
- Ensure the woman is familiar with the principles of PCA and can activate the pump.
- For written patient information on PCA refer to PCA fact sheet this can be given to the patient at all points of care.
- For non-English/limited English speakers or patients with impaired capacity, it is crucial to ensure that the patient completely understands the PCA concepts to enable safe and effective use.
- Ongoing PCA education should be given by patient clinicians in each unit and the APS teams on the round.

3.2 Precautions

The following factors may increase the risk of respiratory depression in patients receiving PCA:

- History of sleep disordered breathing[2]
- Co-existing diseases e.g. obesity, pulmonary disease, renal impairment[2]
- >65 years old and opioid naive
- Concurrent opioid or sedative medications
- Previous sensitivity to opioids resulting in the patient having episodes of apnoea

3.3 PCA Prescription

- Anaesthetists are the authorised prescribers of PCA in RHW
- **No opioid medications should be simultaneously prescribed by any other route, unless explicitly endorsed by an anaesthetist or pain medicine specialist.**
- PCA must be prescribed on the NSW Health Patient Controlled Analgesia (PCA) Adult form (SMR130.025). The prescriber must complete all sections on page 2.

PCA (Patient Controlled Analgesia) (ADULT)

Prescription is valid for a maximum of 4 days unless ceased earlier.
Refer to local hospital policy for standardised PCA drug solutions

Route	Primary drug	Amount (mg or microgram)	Diluent	Total volume	Primary drug Concentration (mg or microgram per mL)
IV	Morphine	50mg	Sodium chloride 0.9%	50 mL mL	1 mg/mL per mL
	Additional drug NIL	Amount (mg or microgam)			

Date:	Prescriber's signature	Print your name:	Contact:	Pharmacy
4/4/17	Smith	SMITH	Page 44351	

- HYDROmorphone is a high-risk medicine. Refer to SESLHD procedure, SESLHDPR/669Management of HYDROmorphone in Adult patients in SESLHD acute care facilities for prescribing requirements
- Additional Chart Placeholder to be added in eMR so that clinicians are appropriately alerted to the existence of the paper charts.
- The PCA prescription is valid for a maximum of 4 days unless ceased earlier[3].
- Opioids used for PCA in RHW are morphine, fentanyl, oxycodone and HYDROmorphone. The concentrations are:
  - **Morphine 50mg in 50mL sodium chloride 0.9%**
  - **Fentanyl 500microgram in 50mL sodium chloride 0.9%**
  - **Oxycodone 50mg in 50mL sodium chloride 0.9%**
  - **HYDROmorphone 10mg in 50mL sodium chloride 0.9%**
- **PCA bolus dose**: the dose the patient receives when he/she activates the syringe driver successfully. PCA bolus dose must be prescribed in unit of drug (mg or microgram) and volume e.g., 1mg = 1mL.
- **Lockout interval (minutes):** the length of time that the demand function is disabled following a bolus even if the button is pushed (minimum & default - 5-minute interval).
- **Background infusion:** DO NOT prescribe background infusions, any exceptions to this MUST be managed in the Close Observation Unit and in discussion with the Consultant Anaesthetist. The addition of a continuous background infusion significantly increases the risk of respiratory depression [2].
- NO additional drugs are to be added into the pre-loaded syringe with the primary drug of PCA in RHW

- There are two further rows provided in PCA program for subsequent changes to the PCA program. If the PCA program is changed it must be rewritten and signed on the next line. The current order is the most recently prescribed order.

PCA PROGRAM:

Date	Time	PCA bolus dose (mg or microgram)	Lockout interval (minutes)	Background infusion (mg or microgram per hr)	Prescriber's signature	Print your name	Contact
19.5.2017	0900hrs	1mg = 1 mL	5 minutes	NIL = mL per hr	Rivers	Rivers	44351
20.5.2017	1030hrs	1mg = 1 mL	5 minutes	1mg = 1 mL per hr	Rivers	Rivers	44351
		= mL	minutes	= mL per hr			

- If changing one opioid to another, a new PCA chart must be commenced.
- **PCA+ Neuraxial opioid single dose** section to be completed for patients who have had a STAT dose of Neuraxial morphine.
- **Naloxone** to be prescribed for administration where sedation score is 3 OR when sedation score is 2 and respiratory rate is less than or equal to 5 breaths per minute[3]. For more information on Naloxone administration refer to the SESLHD Medicine Guideline
  Naloxone for treatment of opioid induced over-sedation and respiratory depression
- **Oxygen therapy** must be prescribed for each patient who is on a PCA[3].

3.4 Staff Education

- Patients on PCA should only be managed in wards/areas where the nursing staff have received training in PCA management.
- **Each relevant ward/area should aim to have at least 80% of RNs assessed as competent in managing patients with PCA[1].**
- Only a RN/RM who has completed competency assessment, as per section 2.2 of this document may set up and program the PCA syringe driver, operate the syringe driver including change of PCA syringe or change of PCA program and load/discard PCA syringes.

3.5 Equipment

- Deliver all PCAs via a dedicated pain management pump, B. Braun Perfusor ® Space - PCA - lockable, programmable PCA syringe driver which is available in RHW recovery.
- The pump must be contained in a lock box. The key must be kept with the Schedule 8 medication keys.
- Approved PCA administration set with Y-site, anti-syphon valve and anti-reflux (backcheck) valve. If a ketamine infusion is prescribed to run concurrently with PCA use a "triple lumen 3 valve peripheral set" instead.
- Prescribed opioid either preloaded or made up to 50mL with sodium chloride 0.9% in a Terumo® syringe, as per Appendix A (*Note: Preloaded syringes of morphine 50mg in 50mL sodium chloride 0.9%, fentanyl 500microgram in 50mL sodium chloride 0.9%*

and oxycodone 50mg in 50mL sodium chloride 0.9% are available; HYDROmorphone 10mL in 50mg sodium chloride 0.9% must be prepared as per Appendix A)

3.6 Set up, priming, programming and commencing PCA

- Check the prescription, medication preparation, program settings and woman with two RN/RMs who is accredited to commence PCA and follow the medication – schedule 4D and Schedule 8 RHW CBR.
- Complete an IV additive label and attach to the syringe (both premixed or prepared), as per National Standard for User-applied Labelling of Injectable Medicines, Fluids and Lines.
- Connect the PCA administration set to the preloaded or made-up syringe.
- Advance plunger allowing solution to purge air from tubing.
- Close slide clamp on PCA side which is attached to the syringe.
- Prime Y-adapter of PCA set with 2 mL of sodium chloride 0.9% or with compatible IV solution for administration via Y-site.
- Load the syringe to the pump and program the PCA pump according to the prescription. All PCA pumps are pre-programmed with RHW protocols. When the pump asks, “Use drug library?”. You **MUST** answer **YES** by using the arrow key otherwise the pump wont function as a PCA.
- Check the medication and program settings with the two PCA accredited RNs/RMs before connecting the PCA to the patient.
- Ensure the woman is familiar with the principles of PCA and can activate the pump. The woman receiving the PCA is the only person who may press the PCA button.
- Check that naloxone for sedation has been prescribed on the PCA chart and is available in the clinical area.
- Administer oxygen therapy via mask or nasal prongs for the duration of the therapy.
- Record PCA syringe administration on NSW PCA Prescription chart with commencement of PCA.
- The PCA syringe driver settings must be checked at the commencement of each shift, on patient transfer and when the syringe or program is changed.
- **DO NOT** administer other opioids or sedatives unless ordered by the APS or equivalent medical officer.
- Call APS or Anaesthetist if there is any concern about the appropriateness of PCA analgesia for a woman.
- ***All syringes must be changed every 24 hours[1].***
- Change syringe and giving set and reprogram pump when changing solutions (e.g. from Morphine to Fentanyl).

3.7 Co-administration with other drugs

- PCA (morphine, fentanyl, oxycodone, HYDROmorphone) and ketamine can run concurrently via same access device using “triple lumen 3 valve peripheral set”.
- Other medications need to be checked for compatibility and may need to run via another access[1].

3.8 Cessation of PCA

- There is no recommended maximum time limit for treatment of acute pain with PCA. Patients on PCA will be reviewed by APS/Anaesthetist in the daily APS rounds.
- A PCA can be ceased when instructed by the APS or an on-call Anaesthetist by documenting date and time on the PCA chart plus documenting in the patients’ health care record**.**
- When PCA is ceased, appropriate analgesia must be prescribed by the Anaesthetist who ceased the PCA.
- Any remaining opioid to be discarded, must be checked and disposed of by two RN/RMs and documented on NSW PCA Prescription chart.
- PCA syringe driver, power cord and handset must be cleaned and returned to RHW Recovery

3.9 Observations – Refer to Appendix B

3.10 Possible complications and Management - Refer to Appendix C

3.11 Adverse Events and Management – Refer to Appendix D

3.12 Documentation

- NSW Health Patient Controlled Analgesia (PCA) Adult form (SMR130.025)
- Between the Flags (BTF) Observation Chart in eMR/eRIC (SAGO/SMOC charts)
- eMEDs/eRIC

3.13 Education Notes

- Patient-controlled Analgesia is an effective method for controlling acute pain resulting from surgery, trauma, labour or chronic and malignant pain[4].
- The goal of PCA is to effectively deliver pain relief at a patient's preferred dose and schedule giving them the flexibility to use as needed, but also as a pre-determined bolus dose of medication[5].
- PCA usually voids the gap between pain sensation and analgesics administration, especially in the early post-operative period, aiding better recovery[4].
- PCA is more effective in older people than conventional opioid regimens[2,p.79].
- Individual opioid requirements may vary widely between patients.
- Small opioid doses should be used for elderly or very sick patients.
- The RN must confirm that the patient is familiar with the principles of PCA and is able to activate the PCA button.
- The key to the PCA device must be kept securely with the Schedule 4D/Schedule 8 drug cupboard keys.
- Naloxone must be prescribed on the PCA chart and available in the clinical area where PCA is used.

KEY SAFETY POINTS

Contact Acute Pain Services in-hours (#44937) / Anaesthetic Reg after- hours (#44084), if any issues with PCA
Patients on PCA are to be seen daily by APS
PCA must be prescribed on the NSW Health Patient Controlled Analgesia (PCA) Adult form (SMR130.025).
DO NOT administer other opioids or sedatives unless ordered by the APS or Anaesthetist
The patient receiving PCA is the only person who may press the PCA button.

3.14 Related Policies/procedures

1. Accreditation of staff to give drugs in specific units, RHW LOP 2015
2. SESLHD Procedure. August 2023. Management of HYDROmorphone in Adult patients in SESLHD acute care facilities (SESLHDPR/669)
3. SESLHD Medicine Guideline. August 2023. Naloxone for treatment of opioid induced over-sedation and respiratory depression
4. Medication - Schedule 4D and Schedule 8 -RHW CBR 2022
5. National Standard for User-applied Labelling of Injectable Medicines, Fluids and Lines

3.15 References

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5. Pastino Alexander & Lakra Akshay, 'Patient-Controlled Analgesia', National Library of Medicine, accessed 4th March 2025, https://www.ncbi.nlm.nih.gov/books/NBK551610/
6. POWH Business Rule. April 2023. Management of Deteriorating Patient – Clinical Emergency Response System (CERS) (POWH CLIN005)

4 ABORIGINAL HEALTH IMPACT STATEMENT DOCUMENTATION

- Considerations for culturally safe and appropriate care provision have been made in the development of this Business Rule and will be accounted for in its implementation.
- When clinical risks are identified for an Aboriginal and/or Torres Strait Islander woman or family, they may require additional supports. This may include Aboriginal health professionals such as Aboriginal Liaison Officers, health workers or other culturally specific services

5 CULTURAL SUPPORT

- For a Culturally and Linguistically Diverse CALD woman, notify the nominated cross-cultural health worker during Monday to Friday business hours
- If the woman is from a non-English speaking background, call the interpreter service: NSW Ministry of Health Policy Directive PD2017_044-Interpreters Standard Procedures for Working with Health Care Interpreters.

6 NATIONAL STANDARDS

- Standard 4- Medication Safety

7 REVISION AND APPROVAL HISTORY

Date	Revision No.	Author and Approval
15/03/2004		Author- Acute Pain Services; Approved by Quality Council
16/06/2009	1	Reviewed and endorsed Therapeutic & Drug Utilisation Committee
17/09/2015	2	Reviewed and endorsed Therapeutic & Drug Utilisation Committee 11/08/2015
July 2017	3	Reviewed and endorsed Therapeutic & Drug Utilisation Committee 13/06/2017
18/06/2020	4	Reviewed and endorsed Therapeutic & Drug Utilisation Committee 26/03/2020
March 2025	5	Author-Acute Pain Services
14.4.25	5	RHW BRGC

8 APPENDIX A

B. Braun Perfusor ® Space - PCA pre-programmed settings

Drug	Prescription	Concentration	PCA Dose	Infusion rate
Morphine	50mg/50mL sodium chloride 0.9%	1mg/mL	Default:1mg Soft limit:0.5mg Soft limit high: 2mg Hard high limit:3mg	Default: 0mg/hr Hard high limit: 3mg/hr
Fentanyl	500microg/50mL sodium chloride 0.9%	10microg/mL	Default: 20microg Soft limit low: 5microg Soft limit high: 30microg Hard high limit: 40microg	Default: 0microg/hr Hard high limit: 30microg/hr
Oxycodone	50mg/50mL sodium chloride 0.9%	1mg/mL	Default:1mg Soft limit:0.5mg Soft limit high: 2mg Hard high limit: 3mg	Default: 0mg/hr Hard high limit: 3mg/hr
HYDROmorphone	10mg/50mL sodium chloride 0.9%	200microg/mL	Default: 200microg Soft limit: 100microg Soft limit high: 400microg Hard high limit: 500microg	Default: 0microg/hr Hard high limit: 500microg/hr

9 APPENDIX B

Observations[3]

OBSERVATION	FREQUENCY
Pain Score	Hourly for 6 Hours Then every TWO hours for duration of PCA
Sedation	
Respiratory Rate	
Oxygen	
Nausea, vomiting, pruritus	
PCA Delivery (History) – cumulative	
The PCA syringe driver settings must be checked at the commencement of each shift, on patient transfer and when the syringe or program is changed.	

SpO2 must be monitored and documented in eMR/eRIC along with the observations/any changes to O2 therapy or any signs of deterioration

10 APPENDIX C

Possible Complications and Management[1,6]

Pain **7** or above	The nurse must assess the current clinical pain management plan: • Have pain scores previously been in the White Zone (0 to 6)? • Does the patient understand how to use the PCA and is using accordingly? • Have additional prescribed analgesics been administered? • Has the patient been reviewed by the treating team? • Has the patient been reviewed by the APS? • **Activate** Clinical Review **and** contact the APS
Sedation score **2**	• Ensure oxygen therapy in progress. • Remove the PCA button from the patient and stop background infusion if in progress • Activate Clinical Review and contact the APS
Respiratory rate **6 to 10** breaths per minute	• Ensure oxygen therapy in progress. • Remove the PCA button from the patient and stop background infusion if in progress • Activate Clinical Review and contact the APS
Sedation score **2 and respiratory rate less than or equal 5** breaths per minute	• Remain with the patient and call for help. • Ensure oxygen therapy in progress. • Remove the PCA button from the patient and stop background infusion if in progress. • Activate Code Blue and contact the APS. • Initiate naloxone as prescribed on the NSW Health PCA form
Sedation score **3**	• Remain with the patient and call for help. • Ensure oxygen therapy in progress. • Remove the PCA button from the patient and stop background infusion if in progress • Initiate Code Blue and contact APS. • Initiate naloxone as prescribed on the PCA form. • Commence ventilatory assistance if required

11 APPENDIX D

Possible side effects and their management[1]

SIDE EFFECT	MANAGEMENT
Persistent nausea and/or vomiting	• Administer PRN antiemetic medication as prescribed on eMEDs or eRIC. • If adverse effect continues contact the Acute Pain Service or equivalent medical officer.
Pruritus (itch)	• If patient is distressed by pruritus contact the Acute Pain Service or equivalent medical officer. • DO NOT use sedative antihistamines e.g. promethazine- consider low dose naloxone.
Urinary retention	• Contact the patient's surgical/ medical team.
Constipation	• Prophylactic aperient therapy is beneficial. Contact the patient's medical/surgical team.