Local Guideline

Intravenous opioid infusions (PCA or NCA or Continuous)

Sites where Local Guideline applies	All areas JHCH and JHH ED & Recovery
Target audience:	All clinical staff that provide care to paediatric patients
Description	
This Local Guideline applies to:	
1. Adults	No
2. Children up to 16 years	Yes
3. Neonates – less than 29 days	No
Keywords	PCA, NCA, Patient-controlled, Nurse-controlled Analgesia, Continuous opioid infusion, Alaris IVAC PCAM, CADD Solis Ambulatory Infusion, Pain
Replaces Existing Local Guideline and Procedure	Yes
Registration Number(s) and/or name and of Superseded Documents	13.17

Related Legislation, Australian Standards, NSW Health Policy Directive, NSQHS Standard/EQuIP Criterion and/or other, HNE Health Documents, Professional Guidelines, Codes of Practice or Ethics:

- National Standard 4 and 9
  NSW Health Policy Directive 2014_036 Clinical Procedure Safety
  http://www0.health.nsw.gov.au/policies/pd/2014/pdf/PD2014_036.pdf
- NSW Health Policy PD 2005_406 Consent to Medical Treatment
  http://www.health.nsw.gov.au/policies/PD/2005/pdf/PD2005_406.pdf
- NSW Health Policy Directive PD 2007_036 Infection Control Policy
  http://www.health.nsw.gov.au/policies/pd/2007/pdf/PD2007_036.pdf
- N.S.W. Health Policy Directive PD2013_043 Medication Handling in NSW Public Hospitals
  http://www0.health.nsw.gov.au/policies/pd/2013/pdf/PD2013_043.pdf
- N.S.W. Health Policy Directive PD2012_007 User applied Labelling of Injectable Medicines, Fluids and Lines http://www0.health.nsw.gov.au/policies/pd/2012/pdf/PD2012_007.pdf
- NSW Health PD2011_077 Recognition and Management of the Patient who is Clinically Deteriorating http://www.health.nsw.gov.au/policies/pd/2011/pdf/PD2011_077.pdf
- JHCH Guideline 3.19 Recognition of the deteriorating paediatric patient in JHCH/JHH/RNC

Prerequisites (if required)	Prescribers must understand the pharmacology and pharmacokinetics of the opioid used, the administration method and the clinical indications, contraindications, monitoring and management of adverse effects. Nursing staff involved in the preparation of medication syringes, programming of pumps, administration of opioid boluses (via any

	means including NCA), must understand the pathophysiology of pain and the principles of pain assessment in infants, children and adolescents as well as the principles of safe medication administration in this setting.
Local Guideline Note	This document reflects what is currently regarded as safe and appropriate practice. The guideline section does not replace the need for the application of clinical judgment in respect to each individual patient but the procedure/s **requires mandatory compliance**. If staff believe that the procedure/s should not apply in a particular clinical situation they must seek advice from their unit manager/delegate and document the variance in the patients' health record.
Position responsible for the Local Guideline and authorised by	Lynn Walker, Manager Co-Director of John Hunter Children's Hospital
Contact Person	Elizabeth Newham
Contact Details	Elizabeth.newham@hnehealth.nsw.gov.au
Date authorised	July 2014
This Local Guideline contains advice on therapeutics	Yes Approval gained from Local Quality Use of Medicines Committee on 11/12/2014
Date of Issue	11/12/2014
Review due date	11/12/2017

Note: Over time links in this document may cease working. Where this occurs please source the document in the PPG Directory at: http://ppg.hne.health.nsw.gov.au/

RISK STATEMENT

The use of intravenous opioid infusions is associated with significant risk requiring unplanned care as described by the Clinical Excellence Commission[10] including:

- *Poor patient selection*
- *Inadequate pain relief*
- *Errors in administration*
- *Ineffective clinical reviews*
- *Inadequate prescribing*
- *Poor response to patient changes*
- *Use of non-standard equipment and protocols*
- *Unnecessary duplication of charts and prescriptions*
- *Poor parent/family education*
- *Minimizing adverse effects*

These risks will be reduced by using this clinical guideline to inform care.

OUTCOMES

1. The safe and effective management of pain with the use of Patient-Controlled Analgesia (PCA) or Nurse-Controlled Analgesia (NCA) or Continuous Opioid Infusion (COI)
2. To minimize the risk of clinical deterioration of the patient

ABBREVIATIONS & GLOSSARY

CERS	**Clinical Emergency Response System**
IV	**Intravenous**
NCA	**Nurse-controlled analgesia** is an infusion that allows a Registered Nurse to administer pre-programmed small doses of an opioid agent by pressing a button attached to a programmable pump. The nurse-administered boluses are used to supplement a background infusion as clinically indicated. NCA should only be employed in cases where the child is not developmentally or physically able to operate a PCA
COI	**Continuous opioid infusion** is an infusion that may be, but not regularly supplemented by additional opioid boluses. The additional doses are administered either from a separate syringe or by temporarily altering the setting of the infusion pump. This should only be employed when PCA and NCA are not feasible
PCA	**Patient-controlled analgesia** An infusion that allows a patient to self-administer intermittent small doses of an opioid agent as required by pressing a button attached to a pre-programmed pump.
SPOC	**Standard Paediatric Observation Chart**
PEDOC	**Paediatric Emergency Department Observation Chart**

CONTENTS

This Guideline does not replace the need for the application of clinical judgment in respect to each individual patient.

This Policy Compliance Procedure contains the following sections:

1. SCOPE OF THIS DOCUMENT

This document does not aim to instruct clinicians in managing acute pain. For guidance in making clinical decisions about analgesic drugs and modalities, refer to:

- John Hunter Children's Hospital Guideline for Managing Acute Pain in Children (http://www.kaleidoscope.org.au/site/content.cfm?page_id=356550&current_category_code=8337&leca=930)
- OR contact the Acute Pain Service

Effective delivery and monitoring ensures serum opioid concentrations are maintained at the optimal analgesic level for the individual patient, whilst minimizing side effects. PCA/NCA provides greater dosing flexibility and can be more effective for managing incidental pain compared with intramuscular injections and continuous infusions.[3]

When intravenous opioid analgesia is indicated, initial bolus doses are used to establish analgesia. Thereafter, analgesia is usually maintained using one of the 3 modalities:

1) **Patient-controlled analgesia (PCA)**
2) **Nurse-controlled analgesia (NCA)**
3) **Continuous opioid infusion (COI)**

Prescribers must understand the pharmacology and pharmacokinetics of the opioid used, the administration method, the clinical indications, contraindications, monitoring and management of adverse effects.

Nursing staff involved in the preparation and management of opioid infusions must:

- Have knowledge of pain and pain assessment in infants, children and adolescents of varying cognitive development
- Have knowledge of the monitoring requirements needed while an opioid infusion is running
- Have knowledge and skills in the use of the delivery devices
- Maintain safe medication administration practice
- NB: A self-directed learning package with competency assessment tool 'Management of pain using opioids in JHCH' is available to assist nurses to be prepared for either of these treatment modalities

Children and their parents must be informed and educated about the medication and delivery method

2. INITIAL PATIENT ASSESSMENT

Before an intravenous opioid is prescribed for the maintenance of analgesia, the patient should have a full medical assessment including:

- consideration of the presenting condition and level, expected duration and type of pain
- level of organ function (e.g. renal and hepatic function will affect drug dosage and response)
- concurrent health problems and medications
- allergies and past reactions and responses to opioids
- level of consciousness
- airway, respiratory and cardiovascular status
- compliance of the family

Criteria for PCA include:	**CRITERIA FOR NCA INCLUDE:**
Patient's developmental age ≥ 5 years	Patient's development age ≤ 5 years
Patient physically able to press the button	Patient unable to press the button
Patient able to understand the concepts of pain and the PCA	Patient unable to understand the concepts of pain and the PCA
An undertaking by the family not to press the button on behalf of their child under any circumstances	An undertaking by the family not to press the button on behalf of their child under any circumstances

SAFETY ALERT
Do not commence an intravenous opioid infusion if the child has any signs of respiratory depression or is heavily sedated

During assessment of the patient and family they should receive instruction on the:

- Rationale for using PCA/NCA/COI
- Use of PCA/NCA machine and its safety features and monitoring involved
- Explanation and reinforcement of the need for frequent observations including pain assessment
- The symptoms and signs of relevant adverse reactions and instruction for parents to notify nursing staff if they have any concerns regarding their child's condition
- A parent fact sheet on PCA/NCA is available on the Kaleidoscope webpage at: http://www.kaleidoscope.org.au

A continuous opioid infusion should only be considered if there are factors excluding the use of either a PCA or NCA infusion, for example non-compliance.

3. PRESCRIBING A PCA/NCA OR COI

A medical officer using the following charts prescribes opioid infusions:

Paediatric PCA/NCA chart GNS79 B2	Paediatric Opioid Infusion GNS79 A2

The prescriber (medical officer) must ensure:

- An ***adequate loading dose*** of opioid is provided prior to commencing maintenance analgesia, as this has been demonstrated to lead to improved pain scores
- The ***opioid chart*** includes:
  - The correct patient identification label with the patients name printed and initialed, and the patient's allergies and weight documented
  - Indication of whether the concentration being prescribed is standard or not
  - Indication of the mode to be used on the PCA/NCA chart i.e. PCA or NCA
  - Prescribed drug and concentration
  - Prescribed parameters of the infusion according to the mode of delivery
  - Signature, date, and ***clearly*** printed prescriber's name and contact number
- ***Anti-emetic medication*** is charted for nausea and vomiting
- ***Aperients*** are charted as per Bowel Management- Opiate Induced Constipation Guideline 13.33 (**http://www.kaleidoscope.org.au/site/content.cfm?page_id=352316&current_category_code=8337&leca=930**)
- ***Ceasing*** of any pre-existing charted opioids, or document the decision to continue these in consultation with the Admitting Paediatric Specialist or Acute Pain Service
- ***Notification*** and consultation with the medical staff who will monitor and manage the child with the ongoing infusion (i.e. Admitting Paediatric Team and/or the Acute Pain Service)
- ***Suitability*** for transfer out of an acute area such as the Emergency Department

The prescription does NOT need to be recharted each day. Only rechart when:

1) More space is required to document syringe loading and programming (after the fourth syringe); or
2) The concentration or other program parameters need to be altered

The Acute Pain Service will review all ***referred*** patients with an opioid infusion daily and as needed.

SAFETY ALERT

Patients receiving an opioid infusion should not receive opioids by any other route, unless in consultation with the Admitting Paediatric Specialist or the Acute Pain Service.

4. INFUSION PREPARATION

Only Doctors (Dr) & Registered Nurses (RN) may prepare and commence an opioid infusion:

- Follow the NSW Health Policy Directive PD2013_043 for obtaining the prescribed opioid
- The 5 moments of Hand Hygiene are to be maintained throughout
- ***Two clinicians*** *(see above)* must independently check the reconstitution of the syringe against the order as prescribed
- The prescribed opioid is then loaded into a 50 mL leur-lock syringe. The syringe volume should be made up to total of 50 mL with the prescribed diluent
- A blue Intravenous syringe label (NSW Health PD2012_007) must be completed and signed by the two clinicians and be secured to the syringe ***ensuring*** that the label and syringe markings are legible
- All intravenous opioid infusions in JHCH are administered as a sideline infusion via a syringe pump. Only dedicated administration sets that have integrated anti-siphon and anti-reflux valves are to be used. This line also needs to be labelled according to the NSW Health PD2012_007 with an appropriate blue label and white medication label
- A maintenance infusion ≥ TKVO (to keep vein open) must be infused past the anti-reflux valve when the patient is receiving an opioid infusion via syringe pump
- Replace the syringes every 24 hours to ensure drug stability and sterility

5. MANAGEMENT OF THE INFUSION SYSTEMS

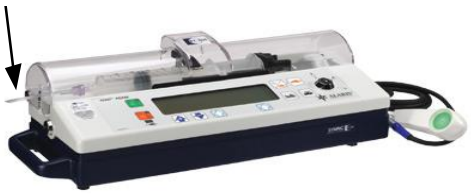
SAFETY ALERT
Two clinicians (Dr/RN) must independently check any opioid infusion parameters when the infusion is commenced, reloaded, reprogrammed or ceased.

- The key for the syringe pumps for infusion pumps are kept on the "DD" keys on each ward (Recovery ward carry spares)
- The preferred infusion pumps in the JHCH are:

PCA/NCA	COI
Alaris® IVAC® PCAM® infusion system	CADD® Solis ambulatory infusion system
	

5.1 PROGRAMMING AN ALARIS® IVAC® PCAM® INFUSION SYSTEM

- After priming the lines ***clamp*** the administration set with slide clamp
- Connect Alaris® IVAC® PCAM® to the AC power supply
- ***Open*** the Alaris® IVAC® PCAM® pump cover by inserting the key in the lock located on the left side of the pump and turning the key clockwise. ***Then remove the key***



- ***Load syringe*** into the pump ensuring the syringe plunger is correctly located in the slots on the plunger holder. Squeeze the finger grips on the plunger holder and slide the mechanism until the finger flanges on the syringe barrel locate in the slot. Gently advance the syringe until the finger flanges touch the front of the slot closest to the syringe tip. This action will prevent delay at the start of the treatment. Rotate the syringe clamp anticlockwise until it locks onto the syringe barrel
- Place key into keyhole on the front face of the pump, turn key to the ***first*** position (Set Mode)

- The pump will now turn on and conduct a self-test

- The pump will then ask you various questions that need to be answered using the arrow keys at the bottom of the panel as indicated on the LCD screen
- The first question is **"NEW PATIENT?"**
  - **"YES"** to reset the patient history to zero for a new patient
  - **"NO"** will retain all previous patient history-> It will ask you to **"Confirm"** before you can proceed to the next step
- **"MODIFY PROTOCOL?"**
  - Carefully select the protocol. (**"PROTOCOL SUMMARY A"** will appear automatically)
- Use the **"Next Protocol"** button to scroll down t until the desired drug protocol appears. This is based on the drug prescribed (morphine or fentanyl) and the child's weight. For children who weigh more than 50 kg select the relevant adult protocol

The ALARIS® IVAC® PCAM® default pump protocols are

	Protocols A-J	Patient Group	Drug	Default Concentration	Default Lockout	Default Bolus Dose
A	ADULT MORPH	> 50 kg - adults	morphine	1 mg/mL	5 min	1mg
B	ADULT FENT	> 50 kg - adults	fentanyl	10 microgram/mL	5 min	15 microgram
C	ADULT HYDROM	> 50 kg - adults	hydro-morphone	200 microgram/mL	5 min	200 microgram
D	MORPH 3-9 kg	3 - 9 kg	morphine	30 microgram/mL	15 min	60 microgram
E	MORPH 10-19kg	10 - 19 kg	morphine	100 microgram/mL	15 min	200 microgram *
F	MORPH 20-49kg	20 - 49 kg	morphine	200 microgram/mL	5 min	400 microgram
G	FENT 3-9 kg	3 - 9 kg	fentanyl	1 microgram/mL	15 min	1 microgram
H	FENT 10-19kg	10 - 19 kg	fentanyl	2 microgram/mL	15 min	3 microgram *
I	FENT 20-49kg	20 - 49 kg	fentanyl	3 microgram/mL	5 min	6 microgram
J	SPEC PROG 5mg/mL	Adults only	tramadol or high dose morphine	5 mg/mL	5 min	5 mg

* Also has continuous background infusion as part of the default setting

SAFETY ALERT
Two clinicians (Dr/RN) must independently check the drug protocol selected to avoid confirmation bias

For each protocol summary, a ***default*** drug concentration will appear – for safety reasons this is set as the lowest dose for the lowest weight in the selected weight band. It will need to be modified for most children

- Once you have selected the appropriate protocol select **"MODIFY PROTOCOL".**

SAFETY ALERT
NEVER change the drug name because the dosing units will stay as for the original drug and may result in over or under dosage

- To ***change*** the parameters of the protocol select **"MORE ↓"** until the required parameter is highlighted.
  - When the required prescribed parameter is highlighted, select **"ALTER"**
  - Select the + or – button until the correct dose or unit is entered
  - Select **"CONFIRM"**
  - If you need to change any other parameter, repeat the above steps
  - Once the protocol has been modified to match the prescription select **"OK"**
- When the displayed protocol ***matches*** the prescription, turn the key to the green position (Run Mode) and ***remove*** key

- "**CONFIRM PROTOCOL"->**Two RNs must carefully review the protocol -> to do this select **"OK"**
- **"CONFIRM SYRINGE"** The pump will default to the BD PLASTIPAK syringe type, which is the most common stock->Select **"OK"**
- If you are using a different type of syringe-> select **"CHANGE TYPE"** until the correct syringe appears ->select **"OK"**
- **"COVER OPEN"** will flash-> ***Close*** the syringe cover

- ***Connect*** the giving set to the patient's IV line and secure appropriately
- ***Unclamp*** the PCA administration set side-clamp
- ***Press*** the green **"start"** button located toward the left face of the pump

- ***If PCA*** is prescribed; give the hand piece to the patient to begin PCA administration and ***educate*** the patient on its use.

The patient handset is suitable for all ages

The green light (administration button) in the handset will indicate the following:

- It will shine constantly when bolus doses are available.
- It will flash when a bolus dose is being delivered successfully
- It will be extinguished during the lockout periods after PCA/NCA doses

SAFETY ALERT

The ***patient ONLY*** should use the hand piece for a **PCA**

The ***nurse ONLY*** should use the hand piece for a **NCA** (this may be modified in the palliative care setting)

5.2 CHANGING A SYRINGE IN AN ALARIS® IVAC® PCAM® INFUSION SYSTEM

SAFETY ALERT
Two clinicians (Dr/RN) must independently check any opioid infusion parameters when the infusion is commenced, reloaded, reprogrammed or ceased

- ***Press*** the orange **"stop"** button located toward the left face of the pump

- ***Clamp*** the PCA administration set with slide clamp
- Obtain Alaris® IVAC® PCAM® key and open the pump cover, remove the old syringe and insert new syringe as per Section 5.1 and follow the prompts accordingly
- ***Close*** the cover
- ***Reconfirm*** protocols with 2 clinicians (Dr/RN) as per PCA/NCA prescription (if changes are required return to Section 5.1 re "MODIFY PROTOCOL")
- ***Press*** the green "start" button
- ***Remove*** the Alaris PCAM key directly from the left side of the pump

SAFETY ALERT
With the second clinician (Dr/RN), empty appropriately, discard the used syringe and sign the prescription

5.3 PROGRAMMING A CADD® SOLIS AMBULATORY INFUSION SYSTEM

- Begin <u>without</u> the cassette attached to the pump
- All pumps will be in a locked box, the same key opens both the pump and the locked box. You only need to open the box when changing the bag and fluids
- For all troubleshooting go to the intranet and to MyLink
  - After Logging into MyLink
  - Click on Collaborative Spaces/Portals under the Announcements heading
  - Click Networks and Streams
  - Click Anaesthesia and Pain ACS
  - Scroll down to Education and Training and click pain education
  - Click on CADD Solis Pump – Infusion System
  - Watch an informative 5 minute presentation and you'll be an expert in no time! If you have any queries or questions please contact your Educators or Pain Service on #2044
- Connect the pump to power (will also run on battery) and press the power switch on the side to turn the pump on-> pump will conduct a self-test
- Screen displays **"DO YOU WANT TO START A NEW PATIENT?"**
  - ►"**YES"** to reset the patient history to zero for a new patient
  - ►**"NO"** will retain all previous patient history

- **"SELECT THERAPY"** menu is displayed
  - ►Scroll ↑ or ↓ to highlight the prescribed therapy and press select

- **"QUALIFIER"** screen appears and the options available will depend on the therapy chosen
  - ►Scroll ↑ or ↓ to highlight the prescribed qualifier and press select

- **"DRUG & DOSE"** screen appears
  - ►Scroll ↑ or ↓ to highlight the prescribed drug and concentration (or unit) and press select

CADD® Solis Ambulatory Infusion System default pump protocols are:

PROTOCOLS	Dilution	Continuous Infusion	Clinician Bolus
FENTANYL	20 micrograms/kg	0-5 mL	0-4 mL
MORPHINE	1 mg/kg	0-5 mL	0-4 mL

SAFETY ALERT
Two clinicians (Dr/RN) must independently check the drug protocol selected to avoid confirmation bias

- To unlock the keypad use the security code (accessible on the intranet- search CADD Solis)
- **"ARE THESE CORRECT?"** screen then appears
  - Confirm that you have selected the correct therapy, qualifier, drug and concentration
  - Press yes if correct
- **"REVIEW PUMP SETTINGS"** screen appears
  - Select review; To edit for a patient specific parameter according to the prescription press select
  - Scroll ↑ or ↓ to the new value then press save

Note: If the desired value is outside the soft limit (related to protocol), press confirm. As a safety feature, the bar to the right will move from green to yellow. Verify the soft limit override by pressing yes.

- Continue until all patient specific parameters have been reviewed and/or edited Press 'accept value' or each setting. A tick needs to appear next to each patient parameter you have accepted before you can move on to the next one
- To change a patient specific parameter after you have accepted it, repeat the previous step

SAFETY ALERT
'Guardrails' are used on equipment to ensure unusual doses are not accidentally ordered or dialed up. If the order asks you to exceed the soft limit, you should check with the prescriber and with senior staff

"CASSETTE NOT ATTACHED. ATTACH CASSETTE BEFORE STARTING PUMP." is displayed

- The giving set is one piece including the cassette
- Don't prime the line
- Unlock the clear box and then unlock the pump using the key and swing arm down
- The cassette will only fit one way, first fit the end with 2 hooks into the base, then fit the other end with a latch until it clicks
- Close the arm and lock
- Reverse the procedure to remove the cassette

"PRIME TUBING?" displays

- Select yes if priming is needed
  - you don't need to hold down to prime the line
  - the line requires 2.5 mLs to prime
- Press stop when line primed otherwise the machine will continue to prime until it reaches 10mLs

"START PUMP?" displays

- Press yes when you are ready
  - home screen will show amount remaining, current status and power source on the top of the screen, middle section is the protocol selected and the lower section is the individual program set
- Changing a current program can be done with either the pump running or stopped
- Press stop/start if you wish to change with the pump stopped otherwise start with the step below
- scroll ↑ or ↓ to the parameter requiring changing
  - unlock the keypad using the security code or key
  - adjust the parameter as above, ensure the change is verified by a second nurse
  - ensure the keypad is locked by the key or by pressing the right soft key twice
  - ensure the pump is recommenced before locking the pump

5.4 CHANGING THE BAG/SYRINGE IN A CADD® SOLIS AMBULATORY INFUSION SYSTEM

- If changing the whole set start at the beginning of the programming
- If changing the bag or syringe without changing the tubing start by:
  - Press Stop/Start
- "**STOP PUMP?"** displays
  - Press Yes
  - Aseptically remove the empty IV bag or syringe from the tubing and attach the new IV bag or syringe
  - scroll ↑ or ↓ until Reservoir volume is highlighted
  - press select
- **"RESERVOIR VOLUME REMAINING: XXML RESET?"**
  - Press Yes
- Unlock the keypad using the security code or the pump key
- The screen displays the current reservoir volume and a scroll range
  - Press select to reset the reservoir volume or scroll ↑ or ↓ to adjust the value
  - Press save
- When programming is complete
  - Press Stop/Start
- **"REVIEW PUMP SETTINGS"** displays
  - Press Review
  - Choose 'Accept Value' to confirm the value is correct for the highlighted patient specific parameter or press elect to edit the highlighted parameter
- Continue until all patient specific parameters have been reviewed, accepted and display checkmarks
- Press Next
- **START PUMP?"** displays
  - Press Yes

If a security code was used to unlock the keypad, the pump will automatically relock when the pump is started. If a key was used to unlock the cassette/keypad, use the key to relock it.

5.5 CLINICIAN BOLUS USING A CADD® SOLIS AMBULATORY INFUSION SYSTEM

- Pump must be running
- From the home screen press Tasks
- **"GIVE CLINICIAN BOLUS"** displays
  - Press Select
- Enter the clinician security code
- The screen displays the clinician bolus scroll range available
  - Scroll ↑ or ↓ until the desired value appears
  - Press Deliver.

NOTE: If the desired value is outside the soft limit, press Confirm

Verify the soft limit override by pressing Yes

- Choose Stop Bolus anytime during delivery to cancel the bolus
- You must press Deliver to deliver the programmed value or Cancel to leave the screen.

SAFETY ALERT
Never leave the pump unattended while on the Clinician Bolus Edit screen

6. PATIENT MANAGEMENT AND MONITORING

- ***Prior*** to the patient being transferred from the Recovery Unit or Emergency department on a **PCA** the patient should demonstrate competence using the PCA device
- The accepting ward need to be ***notified*** if the patient being transferred is on a **NCA**

SAFETY ALERT

The clinician (Dr/RN) assuming a patient's care at any clinical handover point must check the syringe and pump settings against the prescription (i.e. on transfer or start of shift)

- ***Hourly*** patient observations are required on commencement of an opioid infusion for the first ***six hours***, followed by second hourly observations providing the patient remains stable. In the palliative care setting the frequency of observations may be reduced as ordered by the prescriber
- Patient monitoring and documentation ***includes:***
  - Rate of infusion and progressive total
  - Number of attempts and successful boluses when in PCA/NCA mode
  - Sedation Score
  - Pain score (use age-appropriate scale and record the scale used in the first column of the observation section so that all nursing staff will use the same scale for that child) **– *this score needs to be attended prior to any NCA boluses and reviewed 15 minutes post any NCA bolus***
  - Pulse and Respiratory rate
  - Oxygen saturations
  - Temperature 4/24
  - BP 4/24

SAFETY ALERT

ALL Clinical observations are to be documented on the relevant SPOC/PEDOC chart ONLY

- Patients are to receive ***ongoing education*** during the period of usage
- Cannula sites and central lines should be cared for according to current policy
- Blood/ Blood products can be infused via a three-way tap positioned at the end of the extension set and prior to the opioid infusion to enable pain management to continue
- Opioid infusions ***must not be*** disconnected to facilitate showering or mobilization
- A nursing or medical escort is required if the patient with an opioid infusion leaves the ward area.

6.1 SEDATION AND RESPIRATORY DEPRESSION

Closely monitor sedation scores and respiratory rates as an increase in sedation and/or a decrease in respiratory rate may indicate impending overdose

If ***sedation*** score **≥** 2

and/or

If ***respiratory*** rate is **≤** that specified in the YELLOW section of the SPOC/PEDOC chart

Actions:

1. STOP the opioid infusion (including remove the PCA button)
2. Increase frequency of vital signs and continually monitor oxygen saturations
3. Give oxygen at 12 L/min via face mask, assist ventilation if indicated
4. Instigate a Clinical Review or Rapid Response according to CERS
5. Prepare to administer naloxone as per established protocols after medical assessment (note naloxone has a short half-life and symptoms can reoccur)

SAFETY ALERT

Naloxone should be available on all wards caring for patients with an opioid infusion

6.2 NAUSEA & VOMITING

This is a ***common*** side effect of opioids and is made worse when the patient is moving

Actions:

1. Assess pain, as unrelieved pain may cause nausea and vomiting
2. Monitor patient's BP, as hypotension may cause nausea and vomiting
3. Administer anti-emetics as prescribed
4. Contact Admitting Medical Officer (AMO)/Acute pain Service if anti-emetics are ineffective

6.3 INSUFFICIENT ANALGESIA

Insufficient analgesia can be the result of insufficient drug received or increasing pain

Actions:

1. Assess IV access for patency
2. Check IV and administration sets and anti-reflux valve
3. Check syringe and pump for amount of drug infused over the previous hour
4. Review patient education and encourage PCA use as per prescription/ review NCA use as per prescription/ increase background as prescribed
5. If no improvement after 15 minutes instigate a Clinical Review as per CERS

6.4 PRURITUS

May be a direct opioid effect or may be ***secondary*** to histamine release associated with opioid administrations. Pruritus may not result in redness or a rash.

Actions:

1. Administer antipruritic if charted
2. Contact AMO or Acute Pain Service for medication or if unrelieved
3. Consider either low-dose naloxone or opioid rotation

6.5 URINARY RETENTION

Opioids can increase sphincter tone leading to urinary retention. This is ***unusual*** in children.

Actions:

1. Assess patient; consider bladder scan to ascertain volume or dehydration as cause of anuria
2. Instigate a Clinical Review according to CERS

6.6 HYPOTENSION

Opioids may induce histamine release and cause peripheral arterial and venous dilation. Orthostatic hypotension may occur and manifest as nausea and dizziness. If the Blood Pressure falls into the YELLOW zone of the SPOC/PEDOC chart:

Actions:

1. Instigate a Clinical Review and increase frequency of observations
2. If hypotension is severe (shock) STOP the infusion and instigate life support measures and Rapid Response according to CERS

6.7 MYOCLONIC JERKS

Most often, the pharmacological mechanisms responsible for this adverse effect are not clear but usually resolve after withdrawal of the offending drug

Actions:

1. Contact AMO or Acute Pain Service
2. Consider opioid rotation

7. STOPPING THE OPIOID INFUSION AND PLANNING "STEP-DOWN" ANALGESIA

- The treating team or Acute Pain Service can cease PCA/NCA/COI regimens
- The MO ceasing the infusion must prescribe replacement oral pain relief to be ***commenced*** before the infusion is ceased
- For guidance in making clinical decisions about analgesic drugs and modalities, refer to:
  - John Hunter Children's Hospital Guideline for Managing Acute Pain in Children (http://www.kaleidoscope.org.au/site/content.cfm?page_id=356550&current_category_code=8337&leca=930)
    Or
  - contact the Acute Pain Service
- The PCA/NCA/COI order needs to be clearly cancelled and signed
- ***On cessation*** of an opioid infusion:
  - Ensure oral pain relief is ***commenced*** before cessation, if clinically needed
  - Two clinicians (Dr/RN) ***must*** witness disposal of the remaining opioid in the syringe and record the discarded amount and sign the prescription infusion chart (any discrepancy requires reporting).
  - The pump needs to be cleaned and returned to Recovery Ward
  - Pain assessment needs to be ongoing and documented on the SPOC/PEDOC chart using the age appropriate scale
  - If pain score >5 and not resolved by replacement analgesia contact the AMO or Acute Pain Service.

8. REFERENCES

1. The Sydney Children's Hospital Practice Guideline (2013) Patient Controlled Analgesia (PCA) p1-15

2. Jimenez-Jimenez, F.J., Puertas, I., & de Toledo-Heras, M (2004). Drug-induced myoclonus: frequency, mechanisms and management. *CNS Drugs, 18*(2), 93-104. Retrieved 5/12/06 **http://gateway.ut.ovid.com/gw1/ovidweb.cgi**

3. Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine. (2010). Acute Pain Management: Scientific Evidence. *Australian Government: National Health and Medical Research Council* Retrieved **www.anzca.edu.au**

4. Stone, J.B., Cozine, K. A., & Wald, A. (1999). Nocturnal oxygenation during patient-controlled analgesia. *Anesthesia & Analgesia, 89*(1), 104-110.

5. Hagle, .E., Lehr, V.T., Brubakken, K., & Shippee, A. (2004). Respiratory depression in adult patients with intravenous patient-controlled analgesia. *Orthopaedic Nursing, 23*(1), 18-27.

6. Royal Children's Hospital, Melbourne. (2012). Patient controlled analgesia (PCA) guideline. www.rch.org.au/anaes/pain/index.cfm

7. Monitto, C.L.et al (2000). The safety and efficacy of parent-/Nurse- controlled analgesia in patients less than six years of age. *The International Anesthesia Research Society,91,* 573-9.

8. Anghelescu, D.L., Burgoyne, L.L., Oakes, L.L., & Wallace, D.a. (2005). The safety of patient-controlled analgesia by proxy in pediatric oncology patients. *The International Anesthesia Research Society,101,* 1623-7.,

9. Lehr, V.T. & BeVier, P. (2003). Patient-controlled analgesia for the pediatric patient. *Orthopaedic Nursing, 22*(4), 298-304.

10. Clinical Excellence Commission (CEC) Patient Safety Team. (2013). Clinical Focus Report: Patient Controlled Analgesia. Clinical Excellence Commission.

11. Plate, J. & Goldstein, L. B. (2011). Post-operative patient-controlled analgesia in pediatric patients. Practical Pain Management. (http://practicalpainmanagement.com)

12. Kaleidoscope Parent Fact Sheet Patient or Nurse Controlled Analgesia

13. Australian Medicines Handbook. (2013) AMH Children's Dosing Companion. https://childrens.amh.net.au.acs.hcn.com.au/index.html

9. CONSULTATION

Elizabeth Kepreotes CNC Children's Complex Pain Service JHCH

Mark Lee Medical Director Emergency JHH

Nicole Lacey A CNC Emergency JHH

Carly Crispin CNE JHCH

Margaret Allwood CNE JHCH

Kerri Sullivan CNC Paediatric Surgery JHCH

Bede Lamb CNE Anaesthetic & PARU JHH

Richard Burstal Anaesthetic Staff Specialist JHH

Caroline Phelan CNC Acute Pain Service JHH

Melissa Harvey Policy & Procedures JHH

JHCH QUM Committee

10. SIGNOFF

JHCH CPGAG – July 2014

JHCH QUM – December 2014

JHCH Quality Committee – December 2014

Melissa Harvey JHH

RATIFIED: JHCH Quality Committee December 2014

FEEDBACK

Any feedback on this document should be sent to the Contact Officer listed on the front page.

Appendix One

Clinical Audit Tool

(**National Standard 1:** 1.7.2 The use of agreed clinical guidelines by the clinical workforce is monitored)

Criterion no.	Criterion	Exceptions	Definition of terms and/or general guidance	Data source	Frequency	Position Responsible
1	Nursing staff are adequately prepared to provide safe and effective management of pain with the use of Patient-Controlled Analgesia (PCA) or Nurse-Controlled Analgesia (NCA) or Continuous Opioid Infusion (COI)	None	The aim is that all nursing staff who care for children receiving these opioid modalities will successfully complete 'Management of pain using opioids in JHCH' Self-directed learning package (SDLP) with competency or an equivalent program	Pathlore (HETI Online)	12 monthly	Paediatric Nurse Educator
2	To minimize the risk of clinical deterioration of the patient	None	The aim is to monitor and respond to any identified trends of errors associated with these opioid modalities	IIMS data Observation audits if required	6 monthly	JHCH QUM committee

Reference: *Electronic audit tool - National Institute for Health and Clinical Excellence (NICE): www.nice.org.uk/nicemedia/live/10996/56372/56372.xls*