OPIOID MANAGEMENT - SCH

PRACTICE GUIDELINE ©

DOCUMENT SUMMARY/KEY POINTS

This document should be read in conjunction with the following:

Medication: Administration & Handling (Non-Cytotoxic) – SCH:
http://webapps.schn.health.nsw.gov.au/epolicy/policy/3587

Safe Prescribing:

http://webapps.schn.health.nsw.gov.au/epolicy/policy/4169

Medication Handling in NSW Public Health Facilities:
http://webapps.schn.health.nsw.gov.au/epolicy/policy/3263

- Nurses may look after patients requiring opioid infusions/PCA/NCA only after instruction and having completed the HETI Fundamentals of Paediatric Medication Safety Module, Intravenous Drug Administration & Care of Paediatric Patient Receiving Opioids
- ENs must follow Enrolled Nurse (EN): Scope of Practice
  http://webapps.schn.health.nsw.gov.au/epolicy/policy/3672
- The key to the BBraun PCA machine is to be stored with the Schedule 8 drug key.
- Opioid infusions/PCA/NCA are to be prescribed by Acute Pain Service or anaesthetic department (APS)
  - APS in this document can be taken to mean acute pain service members and the paediatric anaesthetic department
- Oncology Fellows/Registrars may also prescribe opioid infusions/PCA/NCA for their own patients in consultation with the AMO
- When APS is unavailable paediatric junior medical officers may opioid infusions/PCA/NCA following consultation with Pain/Anaesthesia Depts.
- Programs on PCA machine can only be altered by accredited RN's or APS
- In Paediatric Recovery initial PCA doses may be activated by nursing/anaesthetic staff.
- Patients in the Children's Intensive Care Unit (CICU) often require much higher doses of opioids for sedation and pain management and are not specifically addressed in the

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1st August 2018	**Review Period**: 3 years
Team Leader:	CNC Pain Management	**Area/Dept**: Pain & Palliative Care

main body of this guideline this guideline – See 9.7 **Continuous Opioid Infusions in Children's Intensive Unit**

- CICU medical staff can prescribe opioid infusions/PCA/NCA for their own patients, and will refer to APS when ready for discharge to ward areas
- Immediate management of acute and or procedural pain in the Emergency Department is not covered in this guideline
  - Opioid infusions/PCA/NCA can be prescribed by ED medical officers
  - Patients commenced on opioid infusions/PCA/NCA according to this guideline in the ED will have on going management by the APS once transferred to the ward areas
  - Morphine infusions prescribed according to the Paediatric Emergency Drug Calculator cannot be administered with a BBraun PCA pump.

CHANGE SUMMARY

- New SCH document
  - Replaces Guideline: 1/C/12:7011-01:01 **Opioid Intravenous Infusions – SCH**
  - Replaces Guideline: 0/C/13:7032-01:01 **Intravenous Statim Opioid Administration – SCH**
  - Replaces Guideline: 0/C/13:7003-01:00 **Patient Controlled Analgesia (PCA) - SCH**
- Changes made:
  - Introduction of new pump for opioid infusions/Nurse controlled analgesia and PCAs referred to as BBraun PCA pump throughout the document as this is how the front of the pump is labelled –see below
  - See Appendix 10.2 for key features of BBraun PCA pump

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

- Introduction of Nurse Controlled Analgesia (NCA) –replacing continuous opioid infusions for the majority of patients
- BBraun PCA pump programming
- Use of Standard Opioid Concentrations
- Additional information on Non-Parenteral Opioids and routes of administration
- Inclusion of Palliative Care Mixed Syringe Subcutaneous Infusions
- Weaning / Withdrawal and Opioid Conversion information added
- Introduction of two new forms:
  - SCN 130200 Paediatric Parenteral Analgesia Prescription
  - SCN130325 SCHN Multi-modal Analgesia Infusion Record: http://intranet.schn.health.nsw.gov.au/files/attachments/2183/scn130325.pdf

READ ACKNOWLEDGEMENT

- SCH Medical officers who are required to prescribe opioid medications at SCH should read and understand this document.
- **Read Acknowledge**. All SCH clinical nurses and nursing managers, SCH clinical Pharmacists
- **Training/Assessment Required** –
  - Only **Registered Nurses/EN's** who have been assessed as competent in Drug Calculation, Intravenous Drug Administration & Care of Paediatric Patient Receiving Opioids may care for patients receiving opioid infusions/PCA/NCA.
  - The use of the BBraun PCA pump

  Note: EN's may be second checker but may not administer Opioids including NCA boluses

TABLE OF CONTENTS

STANDARD

- Applicable to all clinical areas of SCH
    - CICU Opioid infusions sit outside of the main body of this guideline
- All intravenous opioid infusions, PCA's and NCA's must be prescribed by a Medical Officer on the Paediatric Parenteral Analgesia Prescription form
- Only RN's & EN's who have been assessed as competent in Drug Calculation, Intravenous Drug Administration & Care of Paediatric Patient Receiving Opioids may care for patients receiving opioid infusions/PCA/NCA.
- ONLY two RNs or a RN & EN can prepare an opioid infusion, the loading of the syringe must be done by a RN and EN's can only be second checkers during this process
- ENs must follow Enrolled Nurse (EN): Scope of Practice
- Registered Nurses assessed as competent in care of paediatric patient receiving opioids may administer NCA & bolus doses and intravenous naloxone as per prescribed criteria
- Naloxone must be prescribed and available on the ward whenever a opioid infusions/PCA/NCA infusion is in progress
- Opioids, opioid-sparing agents and anti-emetics have specific side effects and drug interactions. Drug interactions, co-morbidities and cumulative risk of adverse effects must be considered prior to prescribing

Outcome:

- Opioid infusions/PCA/NCA and oral opioids will be administered in a safe, appropriate and effective manner to optimise analgesia whilst aiming to minimise incidences of adverse effects and reduce opioid withdrawal

Patient Outcome:

- Patient achieves an optimal level of analgesia in a safe manner to ensure there are minimal adverse events

1 Patient Controlled Analgesia (PCA)

Background:

- Intravenous Patient Controlled Analgesia is a drug delivery system. It functions on demand, by infusion, or a combination of the two. It contains a reservoir of opioid, which is usually delivered by a sideline into the I.V line of the patient. When the patient feels discomfort, pushing the hand held demand button causes a set bolus dose to be administered. Following major surgery, a low level background infusion can be set to reduce the number of button pushes the patient must make and to maintain analgesia while the patient sleeps.

- PCA systems have been successfully used for the treatment of 'acute' pain in both surgical and medical conditions. The advantages include improved analgesia for patients, compared to the conventional intravenous or intramuscular techniques, by maintaining the analgesic blood level within the effective range for that particular patient. This reduces the total drug dosage, and reduces swings in blood levels that may contribute to side effects e.g. nausea and sedation. PCA also removes observer interpretation of how much analgesia each patient requires.
- Children > 5-6 years have successfully used PCA; this is dependent on their cognitive ability and at the discretion of the prescriber
- Morphine is the drug of first choice for PCA unless the patient has a history of renal failure or excessive morphine side effects.
- If the patient has a history of renal failure or suffers side effects from morphine (e.g. severe pruritus, prolonged nausea), fentanyl is the alternative choice.
- The use of HYDROmorphone should only be considered after consultation with the APS
- **HYDROmorphone is 5 to 7 times stronger than morphine and has specific prescription, supply and administration requirements**

1.1 General Information on PCA

- All PCAs must be delivered using the BBraun PCA pump
- The decision that the patient is a suitable candidate for PCA should be made preoperatively in consultation with medical, nursing staff, the patient and parents/carers
- Criteria for the selection of patients in Paediatrics include:
  - Age > 5-6 years
  - No significant developmental delay - Ability of the child to understand the concept of PCA
  - No physical handicap or limitations which would interfere with the patient's ability to push the PCA demand button
  - Severity of the illness, operation or procedure
- The patient and parents/carer should receive preoperative and ongoing education on:
  - Rationale for using PCA
  - Use of PCA machine
  - Safety features of machine
  - An estimate of how long PCA will be required
  - An explanation of the rationale for frequent nursing observations
- A parent information sheet is available at:

  http://www.schn.health.nsw.gov.au/parents-and-carers/fact-sheets/analgesia-patient-or-nurse-controlled

- Standard orders for PCA's:
    - No one is permitted to push the button except the patient. (Special care must be taken to ensure parents are educated appropriately.)
    - No other opioids are to be administered while on PCA to prevent cumulative dosing. (Unless ordered by the APS/Senior Oncologist/CICU)
    - *When converting to oral Opioids the* APS *may start a long acting oral opioid in place of background infusion prior to ceasing PCA*
    - All prescriptions must be on the Paediatric Parenteral Analgesia Prescription form
- Observations
    - All Vital Signs and Pain/Sedation observations must be documented in line with BTF guidelines
    - Opioid administration observations must be made on the Multi-modal Analgesia Infusion Record
- Blood/ Blood products must not be infused through the PCA side line
- Minimum of 5 - 10 mL/hr 0.9 %sodium chloride must be running through the PCA side line at all times
    - Babies and fluid restricted patients can run 2 mL/hr via a syringe driver
- The PCA should only be ceased following review by a medical team and the decision should be documented in patient's eMR
    - APS review is not required prior to stopping PCA
    - Appropriate oral analgesia must be charted prior to ceasing PCA

1.2 Prescribing a PCA

- Place patient identification(ID) on the Paediatric Parenteral Analgesia Prescription form and sign across the label, if an ID label is unavailable written patient details must be completed
- Select appropriate PCA protocol according to opioid and patient weight, complete the pump programming prescription as per the standard table on the Paediatric Parenteral Analgesia Prescription form –see below or front page of prescription form

NOTE- Commencing PCA's with a background rate is not recommended in the majority of cases, but may be required depending on the surgery performed and any pre-existing analgesia requirements

- Sign and date prescription
- Prescribe emergency naloxone dose on Paediatric Parenteral Analgesia Prescription form
    - **Prescription is not valid and PCA must not be commenced without this step being completed**

- Prescribe anti-emetics on the paediatric National Inpatient Medication Chart (pNIMC)
- See Appendix 10.1 for step by step prescribing guide

1.3 Standard Prescription Table

All PCA's are made up to 50 mL with 0.9% sodium chloride unless otherwise specified.					
Drug Profile	**Standard Concentration**	**Recommended Bolus** (program default)	**Lockout**	**Dose** (background infusion rate) ***NB Program Default is Nil***	**Maximum Dose** (background infusion rate)
Morphine 10-50kg	50 mg/50 mL	20 microg/kg	5 min	10 microg/kg/hr	40 microg/kg/hr
Morphine >50kg	50 mg/50 mL	1 mg	5 min	500 microg/hr	2 mg/hr
Fentanyl 10-50kg	1,000 microg/50 mL	0.4 microg/kg	5 min	0.4 microg/kg/hr	1 microg/kg/hr
Fentanyl >50kg	1,000 microg/50 mL	20 microg	5 min	20 microg/hr	50 microg/hr
HYDROmorphone 10-50kg	10 mg/50 mL	4 microg/kg	5 min	2 microg/kg/hr	8 microg/kg/hr
HYDROmorphone >50kg	10 mg/50 mL	200 microg	5 min	100 microg/hr	400 microg/hr
Non Standard Dosing must be approved by a Senior Medical Officer from the APS, Palliative Care or *Oncology and *must* be documented in the patients eMR **Discussion with APS is recommended prior to charting.* **Non-Standard Dosing Tables in Appendix 10.12**					

1.4 Preparing and Programing a PCA

- A 50mL luer-lock syringe must be loaded and checked by two RN's or RN & EN accredited for "Care of Paediatric Patient Receiving Opioids" following prescription on the Paediatric Parenteral Analgesia Prescription form and recorded in Schedule 8 Drug Register. The RN must load the syringe and commence the infusion.
- The PCA administration set with anti-reflux and anti-siphon valve is primed and line clamp then closed.
- Lines and syringes must be labelled as per National Standard for User Applied Labelling of Injectable Medicines, Fluids and Lines
- Obtain BBraun lock box key and open lock box
- Load the syringe with primed PCA administration set attached, into the BBraun PCA pump and close lock box
- Select protocol as per prescription
- Enter patient weight
- PCA pump program must then be checked by two RN's or one RN & one EN prior to attaching giving set to patient
- Prescription is rechecked by two RN's or one RN & one EN against patient ID band and PCA set is then attached to IV access
- Release all line clamps and press start to commence PCA
- Document new syringe in "Record of Opioid PCA/NCA/Infusion syringe administration and drug discarded" area of the Paediatric Parenteral Analgesia Prescription form

- See Appendix 10.2 for key features of BBraun PCA pump
- See Appendix 10.3 for step by step programming guide
- See Appendix 10.4 for step by step guide to altering a program

1.5 Monitoring

- Continuous Pulse Oximetry is required for all patients receiving parenteral opioids
- All Vital Signs and Pain & Sedation observations must be documented as per SCHN policy in eMR BTF sections
- Opioid administration observations must be made on the Multi-modal Analgesia Infusion Record
- Patient monitoring and documentation as follows:
  - Respiratory rate
  - Oxygen Saturations
  - Heart rate
  - Pain score (appropriate for age/cognition)
  - Sedation Score
  - Rate of Infusion/Progressive total/Demands

  (Every Hour for the duration of the PCA)
  - Temperature and Blood Pressure every 4 hours

***Note**: Palliative care patients may require only 2-4 hourly documentation of observations or as appropriate to circumstances- Clinical variations should be documented in Patients eMR as per BTF guideline*

1.6 Syringe change procedure

- The syringe should be changed when the "Low syringe" alarm sounds and before the “Empty syringe" alarm occurs or every 24 hours
- Press mute button and explain alarm status to patient
- Prepare new syringe
- Prescription ID to be checked against ID bands
- Prescription is rechecked by two RN’s or one RN & one EN and an additive label completed and attached to IV PCA line
- Check IV cannula site for leakage/ inflammation
- Obtain BBraun Lock Box key and open cover
- Close slide clamp on PCA IV line
- Remove syringe from pump
- Connect new syringe to IV line
- Load new syringe into pump
- Close cover - remove key and place with Schedule 8 drug keys

- The prescription is checked by the same two RN's or one RN & one EN a third time and checked against additive label
- Unclamp line to patient
- Press start to recommence infusion
- Document new syringe and discard volume of old syringe in "Record of Opioid PCA/NCA/Infusion syringe administration and drug discarded" area of the Paediatric Parenteral Analgesia Prescription form
- See Appendix 10.4 for step by step programming guide
- See Appendix 10.5 for guide to ending a program and shutting down the pump

2 Nurse Controlled Analgesia (NCA)

Background:

In adults, adolescents, and children more than six years of age, IV patient-controlled analgesia (PCA) has become commonplace in the management of moderate-to-severe pain.

Extending the use of PCA's to children less than five to six years of age, and to children who are physically and/or cognitively impaired, is limited by their developmental and physical inability to use the pump.

When children who are unable to appropriately use PCA experience postoperative pain or painful medical conditions, continuous IV opioid infusions.

Continuous opioid infusions provide better pain relief than PRN dosing of opioids in the initial stage of injury or recovery, but do not address the problem of variability in pain intensity over time. Increasing infusion rates to manage pain exacerbations may result in overmedication.

Modifying this paradigm we will use a standard PCA pump and demand technology to treat pain in young and developmentally delayed patients.

By using lower-dose continuous opioid infusions, supplemented by bolus doses of opioid, which can be administered by a single nurse to treat acute exacerbations of pain, patients will receive appropriate and timely analgesia, whilst reducing the risk of overmedication.

2.1 General Information on NCA

- All NCAs are delivered using the BBraun PCA pump
- The decision that the patient is a suitable candidate for NCA should be made preoperatively in consultation with medical, nursing staff, the patient and parents/carers
- Criteria for the selection of patients for NCA include:
  - Age < 5-6 years
  - History of significant developmental delay – inability of the child to understand the concept of PCA

  - A physical handicap or limitations which would interfere with the patient's ability to push the PCA demand button
  - Severity of the illness, operation or procedure
- The patient and parents should receive preoperative and ongoing education on:
  - Rationale for using NCA
  - Use of the machine for NCA's
  - Safety features of machine
  - An estimate of how long the NCA will be required
  - An explanation of the rationale for frequent nursing observations
- A parent information sheet is available at:

    http://www.schn.health.nsw.gov.au/parents-and-carers/fact-sheets/analgesia-patient-or-nurse-controlled
- **One** RN may initiate a bolus (press the button) after assessing the patient for pain
  - **ONLY RN's MAY PRESS THE BUTTON**
  - **EN's may care for the patient but MUST NOT press the button**
  - **Special care must be taken to ensure parents are educated appropriately to ensure they are not pressing the button**
  - **Nurses transitioning to paediatrics will need second checker for a minimum of 6 months, must complete all required competencies and will require final approval by the CNE on the ward**
- The nurse should document each NCA dose administered on the Multi-modal Analgesia Infusion Record
  - If more than one bolus is given in an hour then subsequent doses should be noted in the comments area of the form
- No other opioids are to be administered while on NCA to prevent cumulative dosing. (Unless ordered by the APS /Senior Oncologist)
- When converting to oral Opioids the APS may start a long acting oral opioid in place of background infusion prior to ceasing NCA
- All NCA prescriptions must be made using the Paediatric Parenteral Analgesia Prescription form
- Observations
  - All Vital Signs and Pain/Sedation observations must be documented in line with BTF guideline
  - Opioid administration observations must be made on the Multi-modal Analgesia Infusion Record
- Blood/ Blood products must not be infused through the NCA side line

- Minimum of 5-10 mL/hr 0.9% sodium chloride must be running through the NCA side line at all times
    - Babies and fluid restricted patients can run 2 mL/hr via a syringe driver
- The NCA should only be ceased following review by a medical team and must be documented in patient's eMR
    - APS review is not required prior to stopping NCA
    - Appropriate oral analgesia must be charted prior to ceasing NCA

- Note: When commencing NCA's in Recovery, due to the minimum lock out anaesthetic staff will need to prescribe the standard recovery pain protocol when prescribing NCA's

2.2 Prescribing an NCA

- Place patient identification (ID) on the Paediatric Parenteral Analgesia Prescription form and sign across the label, if an ID label is unavailable written patient details must be completed
- Select appropriate NCA protocol according to opioid and patient weight, complete the pump programming prescription as per the standard table on the Paediatric Parenteral Analgesia Prescription form –see below or front page of prescription form
- Sign and date prescription
- Prescribe emergency naloxone dose on Paediatric Parenteral Analgesia Prescription form
    - **Prescription is not valid and NCA must not be commenced without this step being completed**
- Prescribe anti-emetics on the paediatric National Inpatient Medication Chart (pNIMC)
- See Appendix 10.1 for step by step prescribing guide
- Prescribe Recovery Pain Protocol on the paediatric National Inpatient Medication Chart (pNIMC)
- Step by Step guides 10.1 -10.5 cover all aspects of programming and prescribing

2.3 Standard Prescription Table

All NCA's are made up to 50 mL with 0.9% sodium chloride unless otherwise specified.

Drug Profile	Standard Concentration	Recommended Bolus (program default)	Lockout	Dose (background infusion rate)	Maximum Dose (background infusion rate)
Morphine 0-10 kg	10 mg/50 mL	10 microg/kg	15 min	10 microg/kg/hr	20 microg/kg/hr
Morphine 10-50 kg	50 mg/50 mL	20 microg/kg	15 min	20 microg/kg/hr	40 microg/kg/hr
Morphine >50 kg	50 mg/50 mL	1 mg	15 min	1 mg/hr	2 mg/hr
Fentanyl 0-10 kg	200 microg/50 mL	0.2microg/kg	15 min	0.4 microg/kg/hr	1 microg/kg/hr
Fentanyl 10-50 kg	1000 microg/50 mL	0.4 microg/kg	15 min	0.4 microg/kg/hr	1.5 microg/kg/hr
Fentanyl >50 kg	1000 microg/50 mL	20 microg	15 min	20 microg/hr	75 microg/hr
HYDROmorphone 0-10 kg	2 mg/50 mL	2 microg/kg	15 min	2 microg/kg/hr	4 microg/kg/hr
HYDROmorphone 10-50 kg	10 mg/50 mL	4 microg/kg	15 min	2 microg/kg/hr	8 microg/kg/hr
HYDROmorphone >50 kg	10 mg/50 mL	200 microg	15 min	100 microg/hr	400 microg/hr

Non Standard Dosing must be approved by a Senior Medical Officer from the APS, Palliative Care or *Oncology and ***must* be documented in the patients eMR ****Discussion with APS is recommended prior to charting.***
Non-Standard Dosing Tables in Appendix 10.12

2.4 NCA set up information

- All NCA set up information is as per PCA section 1.4 above

2.5 Monitoring

- Continuous Pulse Oximetry is required for all patients receiving parenteral opioids
- All Vital Signs and Pain & Sedation observations must be documented as per SCHN policy in eMR BTF sections
- Opioid administration observations must be made on the Multi-modal Analgesia Infusion Record
- Patient monitoring and documentation as follows:
  - Respiratory rate
  - Oxygen Saturations
  - Heart rate
  - Pain score (appropriate for age/cognition)
  - Sedation Score
  - Rate of Infusion/Progressive total/NCA boluses

  Every Hour for the duration of the NCA
  - Temperature and Blood Pressure every 4 hours

***Note**: Palliative care patients may require only 2-4 hourly documentation of observations or as appropriate to circumstances- Clinical variations should be documented in Patients eMR as per BTF guideline*

2.6 Escalation plan for increasing analgesia requirements

- If the patient requires 2 bolus doses in an hour without resolution of pain call for a clinical review as may need increase in background rate or bolus dose
- If the patient requires ≥ 2 boluses an hour for ≥ 2 consecutive hours call for a clinical review as may need increase in background rate or bolus dose
- In hours contact APS for clinical review
- Out of hours call the admitting team for review – team can then liaise with anaesthetic department as required
- Suggested increases for Dose (background infusion rates):
  - Morphine increase in 10 microg/kg/hr or 500 microg/hr increments
  - Fentanyl increase in 0.2 microg/kg/hr or 10 microg/hr increments
  - HYDROmorphone increase in 2 microg/kg/hr or 100 microg/hr increments
  - NCA Bolus amounts may be increased by a maximum of 50% of the recommended starting dose (see standard dosing table) at any time

Note: When commencing NCA's in Recovery, due to the minimum lock out Anaesthetic Staff will need to prescribe the standard recovery pain protocol

3 Continuous Opioid Infusions

Introduction

- A continuous intravenous opioid infusion (opioid infusion) provides a steady level of analgesia where the rate of infusion may be altered within a prescribed range according to the patient's requirements.

Note: It is anticipated that post-operative infants and young children will receive NCA for their pain management, however some babies under 10 kg may be better managed on a continuous infusion. It is the choice of the individual anaesthetist when to use a continuous opioid infusion

OPIOID INFUSIONS can only to be prescribed for Patients UNDER 10 kg

3.1 General Information on Continuous Opioid Infusions

- All continuous opioid infusions in ward areas must be delivered via the BBraun PCA pump
- Neonates and small infants require lower dosages due to potentially higher susceptibility to opioids
- Intravenous opioid infusions may be used in patients who are nil by mouth or for those whose pain management may not be optimised with oral preparations

- Some patients in special situations may require doses in excess of those normally required e.g. oncology or palliative care patients
- Intravenous opioid infusions are administered as a sideline infusion via a syringe pump
- Syringes must be changed every 24 hours
- Do not commence an intravenous opioid infusion if the child has any signs of respiratory depression or is heavily sedated
- The syringe MUST be clearly labelled with a completed hospital approved additive label
- A "PCA" administration set with anti-reflux and anti-siphon valve must be used for all opioid infusions and must be clearly labelled with an Opioid Infusion Label.
- Additional bolus doses of the opioid infusion may be prescribed on the Paediatric Parenteral Analgesia Prescription form
    - The usual interval between bolus doses is 30 minutes for infants less than 3 months old, and 20 minutes for all others, however, in recovery boluses may need to be given at 5 minute intervals to ensure adequate levels are achieved at commencement of the infusion

Note: Recovery Nurses may choose to use the recovery pain protocol rather than bolus dosing from a continuous opioid infusion to achieve this

- ONLY two RNs or one RN & one EN can administer a bolus from a continuous opioid infusion, the RN must load the syringe and commence the infusion
- See appendix 10.7 for step-by-step bolus guide
- The bolus should be signed for on the Multi-modal Analgesia Infusion Record form
- If the patient requires an increase in the infusion rate a bolus dose should be administered at the same time to achieve adequate analgesia
- No other parenteral or oral opioids are to be administered whilst receiving an OPIOID INFUSION, without consulting a medical officer
- Step by Step guides 10.1 -10.5 cover all aspects of programming and prescribing

3.2 Prescribing Continuous Opioid Infusions

- Place patient identification (ID) on the Paediatric Parenteral Analgesia Prescription form and sign across the label, if an ID label is unavailable written patient details must be completed
- Select appropriate opioid infusion protocol according to opioid (only for patients 0 – 10 kg), complete the pump programming prescription as per the standard table on the Paediatric Parenteral Analgesia Prescription form –see below or front page of prescription form
- Sign and date prescription
- Prescribe emergency naloxone dose on Paediatric Parenteral Analgesia Prescription form

- **Prescription is not valid and the opioid infusion must not be commenced without this step being completed**

- Prescribe anti-emetics on the paediatric National Inpatient Medication Chart (pNIMC)
- See Appendix 10.1 for step by step prescribing guide
- Prescribe Recovery Pain Protocol on the paediatric National Inpatient Medication Chart (pNIMC)
- Step by Step guides 10.1 -10.5 cover all aspects of programming and prescribing

3.3 Standard Prescription Table

All Opioid Infusions are made up with 0.9% sodium chloride unless otherwise specified					
Drug Profile	**Standard Concentration**	**Recommended Bolus** (program default)	**Lockout**	**Default Dose** (infusion rate)	**Maximum Dose** (infusion rate)
Morphine 0-10kg	10 mg/50 mL	10 microg/kg	30 min	10 microg/kg/hr	20 microg/kg/hr
Fentanyl 0-10kg	200 microg/50 mL	0.2 microg/kg	30 min	0.4 microg/kg/hr	1 microg/kg/hr
HYDROMORPHONE 0-10kg	2 mg/50 mL	2 microg/kg	30 min	2 microg/kg/hr	4 microg/kg/hr

3.4 Opioid Infusion set up information

- All opioid infusions set up information is as per PCA section 1.4 above
- Step by Step guides 10.1 -10.5 cover all aspects of programming and prescribing

3.5 Monitoring

- Continuous Pulse Oximetry is required for all patients receiving parenteral opioids
- All Vital Signs and Pain & Sedation observations must be documented as per SCHN policy in eMR BTF sections
- Opioid administration observations must be made on the Multi-modal Analgesia Infusion Record
- Patient monitoring and documentation as follows:
  - Respiratory rate
  - Oxygen Saturations
  - Heart rate
  - Pain score (appropriate for age/cognition)
  - Sedation Score
  - Rate of Infusion/Progressive total/infusions boluses

  Every Hour for the duration of the Infusion

  - Temperature and Blood Pressure every 4 hours

***Note**: Palliative care patients may require only 2-4 hourly documentation of observations or as appropriate to circumstances- Clinical variations should be documented in Patients eMR as per BTF guideline*

4 Complications and Side Effects of Opioids

- The escalation criteria as laid out on BTF guidelines has priority in all situations
- The following information is in addition to and compliments BTF criteria with specific reference to patients on PCA's, NCA's and continuous opioid infusions

4.1 Over Sedation

- Increasing loss of consciousness develops gradually with opioid overdose and may provide earlier warning of impending overdose than the respiratory rate.
- SEDATION SCORE should aim for score to be equal to or less than 1 on the University of Michigan Sedation Scale (UMSS) as per BTF observations
- If sedation score is in the BLUE zone (BTF) – continue to monitor patient regularly
- For sedation scores in YELLOW *or* RED zones (BTF) follow local procedures as per BTF eMR and local policy
- **AND**:
  - Remove Button and / or STOP any continuous infusion (background)
  - Utilise basic airway management and support techniques
  - Consider naloxone for over sedation when respiratory compromise is present

REMEMBER – Over Sedation may lead to Respiratory Depression and Apnoea

4.2 Respiratory Depression

A fall in respiratory rate is a late sign of respiratory depression. Strict hourly monitoring of patients on PCA's, NCA's and continuous opioid infusions essential to detect this sign of respiratory depression.

Management: determined by respiratory rate.

- If respiratory rate is in YELLOW zone on BTF
- Action:
  - Remove Button and /or Stop any background infusion
  - Activate response as per local policy
- If respiratory rate is in RED zone on BTF
- Action:
  - Remove Button and /or STOP any background infusion
  - Give oxygen by mask and supported ventilation if required

- Activate Rapid Response as per local policy
- Consider IV naloxone 5 micrograms/kg/dose to a maximum of 4 doses *(as charted in the Emergency Naloxone section of the Paediatric Parenteral Analgesia Prescription form)*

4.3 Inadequate Pain Control

If Pain score is in YELLOW zone on BTF

- Check patency of cannula. Check IV giving set and anti-reflux valve.
- Check syringe and pump for amount drug infused over previous hour.
- Action:
  - PCA- Encourage patient to press Handset Button as appropriate, it may take a few presses to achieve adequate pain relief
  - NCA- See NCA section 2.6
  - Continuous Opioid Infusion – give bolus and reassess
- In hours escalation contact APS
- Out of Hours call for clinical review from admitting team
  - Admitting team may need to liaise with Anaesthetic Department

4.4 Pruritus and Itch

- This is a common side effect of parenteral opioids and is due to Histamine release and is NOT an allergy,
- Consider non-sedating anti-histamine e.g. loratadine
- Avoid sedating agents such as promethazine / trimeprazine (alimeprazine)
- Add low dose naloxone to the syringe
  - prescribed on the Paediatric Parenteral Analgesia Prescription form:
  - protocols for children weighing 0-10 kg add 100 microg to syringe
  - protocols for children weighing 10-50 kg or >50 kg add 400 microg to syringe
- Opioid rotation can be considered if pruritus persists, discuss with APS

4.5 Nausea and Vomiting

Nausea and or vomiting can be a side effect of opioids; this is an opioid sensitivity and is NOT an allergy.

- Administer anti-emetics as prescribed on the pNIMC
- If symptoms persist in hours contact APS
- Out of hours call for a clinical review
  - Consider opioid rotation (admitting team to discuss with Anaesthetic Registrar)
  - Add low dose naloxone to the syringe,

    - Prescribe on Paediatric Parenteral Analgesia Prescription form:
    - Protocols for children weighing 0-10 kg add 100 microg to syringe
    - Protocols for children weighing 10-50 kg or >50 kg add 400 microg to syringe
- Consider adding droperidol to the syringe after discussion with APS and careful review of drug interactions, including risk of QT prolongation.
    - Prescribe on Paediatric Parenteral Analgesia Prescription form
    - Not for use in children < 10 kg or ≤ 2 years of age
    - Limited studies in children; however, addition of 2.5mg droperidol to syringe has been used safely by the APS at SCH

4.6 Urinary Retention

- Urinary retention is uncommon with PCAs, however, this may occur with higher doses
    - Opioid infusions are more likely to cause urinary retention so consider insertion of urinary catheter at time of commencement
- In the event of urinary retention call for a clinical review

4.7 Hypotension

- High doses of opioids may cause hypotension
- Should blood pressure fall into YELLOW or RED zones on BTF follow criteria for escalation according to BTF guidelines
- Remove button and/or STOP infusion (background)

4.8 Myoclonic Jerks

- Thought to be caused by toxic metabolites of opioids
- Low dose of diazepam can be used to manage this condition
    - oral 0.1–0.3 mg/kg daily in 2-3 doses usual maximum 5 mg dose or 15 mg daily
    - Commence as a PRN order, may need to be charted regularly
    - Note: Benzodiazepines used in combination with opioids increase the risk of CNS/respiratory depression.
- Opioid rotation or switching to oral analgesia can help, discuss with APS

4.9 Tolerance, Dependence & Withdrawal

- Exposure to parenteral opioids for more than a week can lead to issues with tolerance and dependence
    - Tolerance- greater dose of the same drug are required to achieve the same effect
    - Dependence- the body becomes used to the constant exposure to the drug and abrupt or rapid reductions/cessation of the drug can lead to withdrawal

- With opioids the shorter the half-life of the opioid the faster tolerance and dependence may occur
- Morphine and HYDROmorphone protocols that have a background or continuous infusion for 7-10 days will increase risk of withdrawal and may need a slower wean
- Fentanyl protocols that have a background or continuous infusion for 5-7 days will increase risk of withdrawal and may need a slower wean

- Withdrawal- a physical and emotional response to the rapid reduction of an opioid or similar drug of dependence

- Prolonged exposure to opioids (greater than 10-14 days depending on drug and doses) may require a formal weaning regime using an oral or transdermal preparation
- Contact APS for weaning help
  - see Section 8 Weaning Opioids after Prolonged Duration for further information

5 Oral Opioids

5.1 Immediate Release Opioids (usual duration 3-4 hours)

5.1.1 Oxycodone (endone, oxynorm)

Pharmacokinetics:

- Absorption. Compared with morphine, which has an absolute bioavailability of approximately 30%, oxycodone undergoes relatively low first-pass metabolism and has a high absolute bioavailability of up to 87% following oral administration
- Peak plasma concentrations of oxycodone are reached approximately one hour after administration

Dosage and Prescribing:

- As a short acting opioid oxycodone is ideal as a PRN analgesic
- The usual starting dose range is 0.05-0.1 mg/kg/dose (capped at 5mg in opioid naive patients) every 3 - 4 hours as needed
- **Should the patient require higher levels of analgesia the dose can be increased up to 0.2mg/kg/dose (up to a maximum of 10 mg per dose) –this should be done in consultation with APS**
- Doses must be charted on in the PRN section on the back of the pNIMC
- *Oxycodone(short acting dosage form) is not usually prescribed as a Regular medication*
- Formulations available: Endone® 5mg Tablets, oxyNORM® Oral Liquid 1 mg/mL

5.1.2 Morphine

Pharmacokinetics:

- Absorption- Morphine is readily absorbed from the gastrointestinal tract. Significant first pass metabolism occurs in the liver following oral administration; hence, the bioavailability of oral morphine is low and variable.
- With repeated regular dosing, oral morphine is about 1/3 as potent as when given by intramuscular injection

Dosage and Prescribing

- 0.1 - 0.3 mg/kg/dose up to 10 mg every 4 hours as needed when used as a PRN medication in opioid naïve patients
- Doses must be charted on the PRN section on the back of the pNIMC
- Morphine is more commonly used for weaning when a patient has required long periods of high dose opioid infusions in this case it is prescribed as a regular medication (see: Section 7 for conversion tables and Section 8 for weaning guide)
- Formulations available: Morphine Oral Liquid

5.1.3 HYDROmorphone

HYDROmorphone is a potent opioid analgesic that is 5 to 7 times more potent than morphine.

Due to its high potency, errors with this medicine may result in serious adverse patient outcomes. NSW Health has released a series of Safety Alerts in relation to HYDROmorphone, as serious incidents (including death) continue to occur in NSW hospitals with the use of this medicine (alerts SN011/10, SA004/011, SA 001/17).

Errors can arise from:

- confusion between HYDROmorphone and morphine
- selecting the *wrong strength or dosage form*
- dose *calculation* errors
- incorrect placing of the decimal place for a fractional dose

  e.g., 2.5 mg prescribed or administered instead of 0.25 mg
- confusion between mg and mL

  e.g. 0.5 mL(equivalent to 5 mg dose) administered instead of prescribed 0.5 mg
- administering via the wrong route e.g. subcutaneously instead of orally

Pharmacokinetics:

- HYDROmorphone is rapidly absorbed after oral administration and the plasma half-life ranges from 2.3 to 2.6 hours.
- HYDROmorphone undergoes extensive first-pass metabolism resulting in oral bioavailability of about 25%.

Dosage and Prescribing:

- Always use Tall Man Lettering to prescribe HYDROmorphone.
- HYDROmorphone is not considered as a first choice analgesic option at SCH.
- HYDROmorphone can only be prescribed by APS and is used for conversion from high dose parenteral HYDROmorphone.
- Prescribe as Generic and BRAND name to differentiate between short and long acting dosage forms, i.e., "HYDROmorphone (Dilaudid)".
- Formulations available Dilaudid Tablets, 2 mg, 4 mg & 8 mg and Dilaudid Oral Liquid 1mg/mL.

5.1.4 Codeine Phosphate and Codeine containing products

Codeine Phosphate and other Codeine containing products are now contraindicated in patients less than 12 years of age.

Codeine containing products are not on the formulary at SCH and are not available for use.

5.2 Sustained or Controlled Release Opioid Dosage Forms

Dosing for sustained or controlled release opioids need to be calculated according to current opioid requirements.

See Section 7 conversion information

Note: it may take between 1 & 3 days to transition from parenteral opioids to a stable dose of oral opioid.

5.2.1 oxyCONTIN® (sustained release oxycodone)

- oxyCONTIN is usually prescribed every 12hours to achieve 24hour coverage
- Always use Tall Man Lettering to prescribe oxyCONTIN.
- Dosing needs to be calculated according to current opioid requirements.
- Commencing opioid naïve patients on oxyCONTIN should be done with caution and should be discussed with APS.
- oxyCONTIN tablets must be swallowed whole, and *CAN NOT* be crushed/chewed/dispersed.

Note: it may take between 1 & 3 days to transition from parenteral opioids to a stable dose of oral opioid.

5.2.2 Targin® (sustained release oxycodone/naloxone formulation)

- Targin® is a long acting oxycodone that is bound to naloxone in a 2:1 ratio
  - Enteral naloxone has very little systemic effect due to first pass metabolism in the liver
  - Enteral naloxone binds to opioid receptors in the bowel to help reduce the effects of opioid induced constipation

- Patients with limited or poor mobility following surgery should be managed on Targin® rather than other long acting opioids.
- Commencing Opioid naïve patients on Targin® should be done with caution and should be discussed with APS.
- Tablets must be swallowed whole, and CAN NOT be crushed/chewed/dispersed
- Targin® tablets have a plastic shell that contains the medication and is passed in the patients stools
    - Patients should be warned this is a normal occurrence and ***does not*** mean they did not get the correct dose,
- The use of Targin® in patients with known bowel strictures or "blind loops" of bowel should be undertake with caution as obstruction may occur due to the plastic shell

Dosage and Prescribing:

- Dosing needs to be calculated according to current opioid requirements.
- Targin® is usually prescribed every 12 hours to achieve 24 hour coverage.
- Targin® can in certain circumstances be prescribed 8 hourly by the APS.
    - Targin® must be prescribed as "Targin (oxycodone/naloxone)"
    - The dose must include both the oxycodone and naloxone i.e. 5 mg/2.5 mg

Note: it may take between 1 & 3 days to transition from parenteral opioids to a stable dose of oral opioid.

5.2.3 MS Contin® (modified release morphine)

- MS Contin® is usually prescribed every 12 hours to achieve 24 hour coverage.
- MS Contin is available as tablets and modified release suspension
- Modified release suspension
    - The sachets contain various sized granules that dissolve at different rates to provide the sustained release over the 12 hours
    - The contents of each sachet must be reconstituted with water according to the volume specified in product information, mixed well and given immediately—with food where possible
    - Doses lower than 20 mg can be given but it is recommended that the lowest dose is 5 mg (25%) of the suspension volume when a 20 mg sachet is used
        - This ensures that there is a reasonable mix of the various sized granules to achieve a proper sustained release
    - Any unused suspension must be discarded and NOT used for further doses as the suspension will breakdown to become immediate release morphine over time
    - This is the only long acting opioid formulation that can be given via NG tubes or PEG tubes
        - Note: the suspension thickens over time and may block fine bore tubes, give immediately after preparation and flush well.
    - Some children unable to take tablets may be able to swallow the suspension

- Commencing opioid naïve patients on MS Contin® should be done with caution and should be discussed with APS

Note: it may take between 1 & 3 days to transition from parenteral opioids to a stable dose of oral opioid.

5.2.4 HYDROmorphone Jurnista® (modified release HYDROmorphone)

- HYDROmorphone is a potent opioid analgesic that is 5 to 7 times more potent than morphine.
- Due to its high potency, errors with this medicine may result in serious adverse patient outcomes. NSW Health has released a series of Safety Alerts in relation to HYDROmorphone, as serious incidents (including death) continue to occur in NSW hospitals with the use of this medicine (alerts SN011/10, SA004/011, SA 001/17).
- Errors can arise from:
  - confusion between HYDROmorphone and morphine
  - selecting the wrong strength or dosage form
  - dose calculation errors
  - confusion between mg and mL
  - administering via the wrong route e.g. subcutaneously instead of orally
- Jurnista® modified release tablets are usually prescribed once daily only
  - When weaning from high dose HYDROmorphone infusions the daily dose may be divided into twice daily dosing in discussion with APS if single oral dose is too high and causing over sedation
- Tablets must be swallowed whole, and CAN NOT be crushed/chewed/dispersed
- When converting from other opioid dosage forms the Jurnista dose must be rounded down
- Commencing opioid naïve patients on Jurnista should be done with caution and should be discussed with APS
- Prescribe as Generic and BRAND name i.e., “HYDROmorphone (Jurnista)”
- Jurnista® tablets have a plastic shell that contains the medication and is passed in the patients stools
- Patients should be warned this is a normal occurrence and ***does not*** mean they did not get the correct dose
- The use of Jurnista® in patients with known bowel strictures or “blind loops” of bowel should be undertake with caution as obstruction may occur due to the plastic shell.

Note: it may take between 1 & 3 days to transition from parenteral opioids to a stable dose of oral opioid.

5.3 Discharging Patients on Sustained or Controlled Release Opioids

- All patients that are discharged on sustained or controlled release (long acting) opioids must have a weaning plan in place.
- Patients must have a contact person in case of complications.
- The APS will usually create the weaning plan and provide contact details for parents.
- The APS CNCs will usually make at least one phone call in the first week following discharge.

6 Trans-Dermal Opioid Preparations (continuous release patches)

6.1 Fentanyl Patches

- Fentanyl patches have the active ingredient bound in a matrix with the adhesive,
- The dose of fentanyl received is governed by the surface area of the patch in contact with the skin
  - However, the dose of fentanyl is increased when exposed to external heat; heat packs and thermal blankets should not be used
- Patches are changed every 72 hours
  - Non-administration days should be crossed out on the pNIMC
  - Both the application and removal of the patch should be documented
- After initial patch application, serum fentanyl concentrations increase gradually
- The accumulation of fentanyl within skin tissue results in a significant delay before maximum serum concentrations are reached
- Peak serum concentrations of fentanyl generally occur between 24 and 72 hours after the first application
- Titration of dosing should therefore only happen every 72 hours
  - Transition from parenteral opioids to transdermal fentanyl refer to opioid conversion tables in Section 7
- Commencing a fentanyl patch should only happen in consultation with the APS
- After the patch is removed, serum fentanyl concentrations decline gradually, falling about 50% in about 17 (range 13-22) hours following a 24 hour application
- Following a 72 hour application, the mean half-life ranges from 20-27 hours
- In the event of an adverse reaction or over dose the patient must be monitored for at least 24 hours after the patch is removed

6.2 Buprenorphine Patch (Norspan®)

- Buprenorphine is a partial opioid agonist, acting at mu-opioid receptors. The opioid agonist activities are dose related. Buprenorphine also has antagonistic activity at the kappa-opioid receptor.
- Like other opioid agonists, buprenorphine produces dose related analgesia; however a ceiling effect to analgesia is well documented. Buprenorphine binds to and dissociates from the mu-receptor slowly, which may account for the prolonged duration of analgesia and, in part, for the limited physical dependence potential observed with the drug
- Buprenorphine produces similar effects to other opioids on the central nervous, cardiovascular, respiratory and gastrointestinal systems, although the intensity and duration of the effects may vary when compared with other opioids
- Norspan patches have the active ingredient in the center of the patch with an adhesive non active boarder
    - Non-administration days should be crossed out on the pNIMC
    - Both the application *and removal* of the patch should be documented
- The Norspan patches provides a steady delivery of buprenorphine for up to seven days
- Steady state is achieved by day three following the first application
    - Transition from parenteral to transdermal should occur slowly with the infusion being slowly weaned over at least 48 hours once the patch has been applied
- Commencing a Norspan patch should only happen in consultation with the APS
- After removal of a Norspan patch, buprenorphine concentrations decline, decreasing approximately 50% in 12 hours (range 10 to 24 hours)
- In the event of an adverse reaction or over dose the patient must be monitored for at least 24 hours after the patch is removed

7 Opioid Conversion

Opioid conversion information: Taken from - Eastern Metropolitan Region Palliative Care Consortium (Victoria) Opioid Conversion Ratios - Guide to Practice Palliative Care 2016 www.emrpcc.org.au

- **When rotating opioids aim to reduce by 30-40% as there is incomplete cross tolerance between opioids**
- **NOTE: Conversion tables may not include a dose reduction**
- **Discuss with APS if you think you need to rotate patients who have been on opioids for greater than 1 week**
- **These tables are for reference only and all complex patients should be discussed with the APS**

7.1 Parenteral Morphine to Other Parenteral Opioids

Parenteral	Parenteral	Conversion Ratio	Calculation
Morphine	Fentanyl	100:1	Morphine 10,000micrograms (10mg) = Fentanyl 100 micrograms
Morphine	HYDROmorphone	5:1	Morphine 10mg = HYDROmorphone 2mg
Morphine	Tramadol	1:10	Morphine 10mg = Tramadol 100mg
Morphine	Oxycodone	1:1	Morphine 10mg = Oxycodone 10mg

7.2 Oral Opioids to Parenteral Opioids– same drug to same drug

Oral	Parenteral	Conversion Ratio	Calculation	Comments
Morphine	Morphine	2 to 3:1	Oral Morphine 30mg = Parenteral Morphine 10 to 15mg	
Oxycodone	Oxycodone	2:1	Oral Oxycodone 10 mg = Parenteral Oxycodone 5 mg	Parenteral Oxycodone is not routinely used at SCH (non-Formulary)
HYDROmorphone	HYDROmorphone	3:1	Oral HYDROmorphone 15 mg = Parenteral HYDROmorphone 5 mg	
Methadone	***Methadone***	***2:1***	***Oral Methadone 20 mg = Parenteral Methadone10 mg***	*Consult palliative care or pain service*
Tramadol	Tramadol	1.2:1	Oral Tramadol 120 mg = Parenteral Tramadol 100 mg	Limited role in managing moderate to severe pain

7.3 Oral Morphine to other Oral Opioids

Oral to Oral	Conversion Ratio	Comments
Morphine to Oxycodone	1.5:1	Oral Morphine 15 mg = Oral Oxycodone 10 mg The oxycodone component of Targin® should be used for conversion calculations
Morphine to HYDROmorphone	5:1	Oral Morphine 5 mg = Oral HYDROmorphone 1 mg
Morphine to Tramadol	1:10	Oral Morphine 10mg = Oral Tramadol 100mg Tramadol has a limited role in managing moderate-severe pain
Morphine to Tapentadol	1:5 to 1:10	Oral Morphine 100 mg = Oral Tapentadol 300 mg
Morphine to Methadone		***CONSULTATION WITH APS or PALLIATIVE CARE SPECIALIST REQUIRED.***

7.4 Transdermal Fentanyl to Morphine

Fentanyl Patch Strength	Fentanyl Dose in 24 hours	Oral Morphine equivalent (mg/24	Parenteral Morphine equivalent (mg/24 hours)
Fentanyl Patch 12 microg/hour	300 microg/24 hours	30 mg	10 to 15 mg
Fentanyl Patch 25 microg/hour	600 microg/24 hours	60 mg	20 to 30 mg
Fentanyl Patch 50 microg/hour	1200 microg/24 hours	120 mg	40 to 60 mg
Fentanyl Patch 75 microg/hour	1800 microg/24 hours	150 mg	60 to 90 mg
Fentanyl Patch 100 microg/hour	2400 microg/24 hours	240 mg	80 to 120 mg
CONVERSION CALCULATION – TRANSDERMAL FENTANYL TO ORAL MORPHINE 25 micrograms/hour fentanyl patch 25 microg/hour x 24 = 600 microg/24 hours 600 microg x 100 (conversion) = 60,000 microg morphine = 60 mg oral morphine in 24 hours			

7.5 Parenteral Fentanyl to Transdermal Fentanyl

From	*To*	*Conversion Ratio*	*Comments*
Parenteral Fentanyl	Transdermal Fentanyl	1:1	Fentanyl 600 micrograms / 24 hours = Fentanyl patch 25 micrograms/hour

7.6 Converting to Transdermal Fentanyl

From	*To Transdermal Fentanyl*
4 hour immediate release oral opioid	*Give regular doses immediate release oral opioid for the first 12 hours after applying patch*
12 hour controlled/modified release (long acting) oral opioid	*Apply the patch at the same time as administering the final 12 hour controlled/modified dose*
24 hour controlled/modified release (long acting)oral opioid	*Apply the patch twelve hours after administering the final 24 hour controlled/modified dose*
Morphine continuous subcutaneous infusion (syringe driver)	*Continue the syringe driver unchanged for 8 to 12 hours after applying the patch, then cease the infusion*
Fentanyl continuous subcutaneous infusion (syringe driver)	*Continue the syringe driver at the same rate for 3 hours after applying the patch, then decrease the dose in the syringe driver by 50% for 3 hours, then cease the infusion*

7.7 Transdermal Buprenorphine to Oral Morphine

TRANSDERMAL BUPRENORPHINE TO ORAL MORPHINE				
Patch Strength	**Delivery Rate**	**Conversion Ratio**	**Calculation**	**Comments**
Buprenorphine **5 mg/7 days** (120microg /24 hours)	5 microg / hour	Conversion Partial = 1: 75 Total = 1:100	5 mg patch = 5 microg buprenorphine per hour 5 microg x 24 = 120 microg over 24 hours 120 microg buprenorphine x 75 = 9,000 microg (9 mg) or x 100 = 12,000 microg (12 mg) of oral morphine	Oral Morphine dose 9 to 12 mg/24 hours
Buprenorphine **10 mg/7 days** (240microg /24 hours)	10 microg / hour	Conversion Partial = 1: 75 Total = 1:100	10 mg patch = 10 microg buprenorphine per hour 10 microg x 24 = 240 microg over 24 hours 240 microg buprenorphine x 75 = 18,000 microg (18mg) or x 100 = 24,000microg (24 mg) of oral morphine	Oral Morphine dose 18 to 24 mg/24 hours
Buprenorphine **20 mg/7 days** (480microg/24 hours)	20 microg / hour	Conversion Partial = 1: 75 Total = 1:100	20mg patch = 20microgr buprenorphine per hour 20microg x 24 = 480 micrograms over 24 hours 480 microg buprenorphine x 75 = 36,000microg (36mg) or x 100 = 48,000microg (48mg) of oral morphine	Oral Morphine dose 36 to 48 mg/24 hours. Maximum transdermal dose recommended is 40 microg/hour (2 x 20 mg/7 day patches)

8 Weaning Opioids after Prolonged Duration

8.1 Weaning using parenteral infusion

- Patients with secure IV access can be weaned from long term opioids using an infusion
  - On Day 1 reduce by 10%- the amount the infusion is reduced by then becomes the set weaning dose
  - i.e. a patient receiving 40 microg/kg/hr would be weaned by 4 microg/kg/hr to 36 microg/kg/hr
- On Day 2 the infusion would be reduced by the set weaning dose,
  - i.e. this patient who is now receiving 36 microg/kg/hr would be weaned by 4 microg/kg/hr to 32 microg/kg/hr
- Weaning then continues on a daily basis

Note: some patients may tolerate weaning every 12 hours.

- A bolus or rescue dose must always be prescribed when weaning opioids in case of withdrawal

8.2 Weaning using oral morphine

- Convert current parenteral opioid dose to daily IV morphine equivalent dose; then convert to oral morphine total daily dose using Section 7 Conversion tables

- Consult APS for advice

- Divide total daily dose into a 4 hourly or 6 hourly regime and give for 48 hours
  - Do not wean for first 48 hours to ensure adequate conversion
- At 48 hours reduce the dose by 10% without changing the frequency
  - i.e. patient receiving 1mg morphine 4 hourly would wean by 100 microg to 900 microg 4 hourly
- After 24-28 hours, reduce again by the same dose–do not change the frequency
  - i.e. the patient now on 900 microg 4 hourly would wean to 800 microg 4 hourly.
- Continue to reduce by the same dose until each dose is ≤ 100 microg/kg
- Once hourly dose is ≤ 100microg/kg reduce the total number of doses per day
  - 4hourly -> 6hourly -> 8hourly -> 12hourly -> daily ->cease.
- For older patients requiring ≥ 20mg/day of oral morphine consider using MSContin
  - Discuss with APS
- A PRN rescue dose must always be prescribed when weaning opioids in case of withdrawal

8.3 Weaning from High Dose Fentanyl Infusions

- Patients who have been on high doses of fentanyl for greater than 3 weeks may be easier to wean using transdermal fentanyl patches
- The table below shows how to convert current Fentanyl dosing to a Fentanyl patch dose and to swap over
- Please discuss all patients with APS prior to commencing fentanyl patches due to complexities in weaning and an individualized plan will be drawn up
  - Section 8.5 has the fentanyl patch weaning process but not the weaning schedule

Parenteral Fentanyl to Transdermal Fentanyl	***1:1 conversion ratio*** Fentanyl total dose in micrograms in previous 24 hours ÷ 24 = Fentanyl patch requirements in micrograms/hour
Continue the syringe driver at the same rate for 3 hours after applying the patch *Then decrease the dose in the syringe driver by 50% for 3 hours, then cease*	

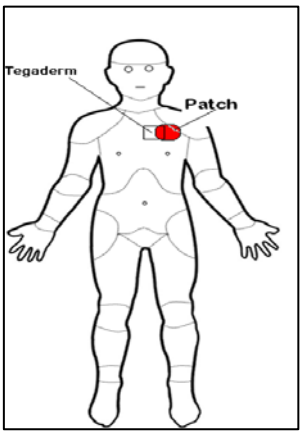
8.4 Weaning from high dose HYDROmorphone

- Due to the relative potency of HYDROmorphone vs. morphine converting to oral morphine may result in very high dosages.
- It is recommended that oral HYDROmorphone Dilaudid® (immediate release tablet or oral liquid) +/- Jurnista® (modified release tablet) is used to wean these patients.
- Weaning must be done in consultation with the APS.

8.5 Weaning using Transdermal Opioids

8.5.1 Fentanyl Patches

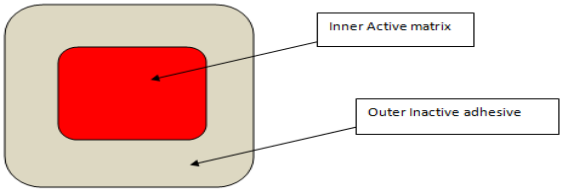
- Fentanyl patches are usually weaned every 72 hours.
- Reduce dose using different patch sizes when appropriate.
  - i.e. reducing from 50 microg/hr patch to 37 microg/hr can be achieved using a 25 microg/hr and 12 microg/hr patches.
- There may be times when weaning cannot be achieved by combining patches
- When needed weaning can be achieved using the overlap method as described below;
- Place either a whole or a half of a small Tegaderm® dressing on the patient's skin adjacent to where patch is to be placed
- Measure the length of the patch
  - For 25 microg patches 1/5th of length = 5 microg/hr
  - For 12 microg patches ¼ of length = 3 microg/hr
- Draw a line on the patch at the desired dose i.e. to wean from 25microg to 20microg draw a line 1/5th of length from the Left hand edge
- Peel off backing of the patch and place on the patient with the line on the patch on the edge of the Tegaderm®.



- When changing the patch (every 72hours) ensure that the site is changed.
- DO NOT PLACE A NEW PATCH ON THE PREVIOUS SITE
- See Appendix 10.6 for printable version

8.5.2 Weaning using Buprenorphine Patch

- Buprenorphine patches must only be used following discussion with the APS
- Graded crossover is required due to slower onset and time to steady state than when using fentanyl patches



- Unlike fentanyl patches buprenorphine patches have an inactive outer adhesive and an active inner area
- When weaning using the Overlap Method described above it is vital that only the dimensions of the inner patch are used to calculate dose
- E.g. 5mg patch has a 5mm border
- DO NOT PLACE A NEW PATCH ON THE PREVIOUS SITE

8.6 Weaning Opioids alongside benzodiazepines

- Patients who have been on both opioid and benzodiazepine infusions need special consideration when weaning both together
- Only wean 1 medication per day so alternate weaning days between opioids and benzodiazepines
- Oral midazolam or diazepam should be weaned using the same method as oral opioids (see: section 8.2 above and Flow Sheet in appendix 10.7)

8.7 Clonidine

- Clonidine can be useful when the weaning process is complicated or more than 1 drug is being weaned
- Starting dose is usually 1 microg/kg 6-8 hourly
    - Can be commenced as a PRN dose
    - Patients from CICU that have been on high doses of dexmedetomidine may be discharged on much higher doses
- Clonidine can be protective of withdrawal symptoms and decreases agitation often associated with weaning
- Clonidine is usually weaned off once other medications have been successfully ceased

8.8 Signs & Symptoms of Withdrawal

- Behavioral changes are often the primary manifestation of withdrawal and include;
    - Anxiety, agitation, insomnia, and tremors.

- In addition to behavioral symptoms, physiologic changes commonly seen in withdrawal include;
    - Increased muscle tone, nausea, vomiting, diarrhea, decreased appetite, tachypnea, tachycardia, fever, sweating, and hypertension.
- *Care must be taken to rule out other causes of these symptoms, such as infection and sepsis.*
- Patients display 1 or more of these signs or symptoms or in suspected cases of withdrawal should be assessed
- The SCHN Withdrawal Tool is to be used in these circumstances
    - Available from forms section of intranet

      http://intranet.schn.health.nsw.gov.au/files/scn110530_0.pdf

9 Special Circumstances

9.1 Intravenous Statim Opioids

- Definition: A 'Statim' opioid dose is administered via a burette and is only to be given for pain relief for patients that are not currently receiving an opioid infusion or PCA/NCA.

- Statim doses are not a suitable way to manage post-operative or ongoing pain.
- Recommended Doses for statim opioid administration:
  - Morphine: 50-100 microg/kg/dose (max dose 5mg),
  - Fentanyl: 0.5 -2 microg/kg/dose (max dose 100microg).

9.1.1 Procedure

- Intravenous statim opioid doses must be prescribed by a medical officer on the 'stat dose' section on the pNIMC and not as a PRN dose.
- Statim doses are to be used for inadequate analgesia may be administered in accordance with the following pain score criteria i.e.:
  - Pain score of 6 and above using an age/developmentally appropriate pain scale
  - A procedure on the ward that is likely to be painful during or after i.e. dressing changes
- Two RN's or RN & EN are required to administer all opioid statim doses in line with current hospital guidelines
- Statim opioids should be administered via a burette over a period of 5-10 minutes, IV fluids to minimum of KVO to be maintained for 1 -2 hours should any adverse reactions or side effects require IV management.
- Continuous pulse oximetry must be maintained for 2 hours post administration.
- After a patient receives a statim opioid dose, the nurse will need to assess efficacy of the dose and whether on-going pain management with opioids is required i.e. PCA/NCA.
  - Review 15 mins after dose has been administered
- If a second statim opioid dose is indicated
  - In hours contact APS
  - After hours management notify the admitting team who should discuss ongoing pain requirements with the on call anaesthetic registrar

9.2 Push Doses of Opioids

- There is no guideline for administering push doses of opioids in areas outside of ED, CICU and recovery
- Nurses must not administer any opioid push doses outside of these areas
- Medical officers from anaesthesia or CICU may administer push doses of opioids in emergency situations
- Any patient receiving a push opioid in a ward area must have continuous pulse oximetry and close observation for 2 hours post dose
  - Or until transferred to OT/CICU as needed

9.3 Recovery Pain Protocol

http://webapps.schn.health.nsw.gov.au/epolicy/policy/4033

9.4 Cocaine Mouth Wash for Mucositis

See: Pain Management in **Mucositis** - SCH

9.5 Palliative Care Patients Subcutaneous Infusions

- Palliative Care patients often have their pain management at home delivered via subcutaneous infusions
- On occasion these children may require admission to hospital and it is desirable to maintain their usual therapies where appropriate
- Infusions in this setting are delivered as a total daily dose rather than an hourly dose by weight
    - For a patient requiring 30 mg of morphine per day, 30 mg added to a syringe and made up to a total of 24 mL and delivered at 1 mL/hr.
- Palliative Care patients infusions can be opioid only or can be mixed infusions
    - i.e. morphine and midazolam may be added to the same syringe.
    - These infusions should be run via BBraun PCA pump using the Palliative Care Protocol
    - They may be prescribed as Sub Cutaneous or IV infusions
- The Palliative Care team should be contacted if there are any concerns or if pain appears to be poorly managed.
- Palliative Care breakthrough doses may be much higher than usual recommended doses as they are based on the portion of the total daily dose – i.e. 1/6th usually given as a separate sub-cut injection and are charted on the PRN section of the pNIMC
- In some circumstances a *Bolus Only* PCA/NCA may be prescribed for breakthrough along with the continuous infusion
- These higher doses are safe to use as these patients are opioid tolerant
    - See: **Palliative** Care For Inpatients

9.6 Methadone

- Methadone can be administered via Oral and Parenteral routes
- Conversion from other opioids to methadone is very complex and should only be done by a Palliative Care or Pain Specialist
- Methadone may also be prescribed alongside other opioids via various routes
- Methadone can only prescribed for palliative care patients by the palliative care team
- An Individual Patient Use application must be submitted for all other patients

9.7 Continuous Opioid Infusions in Children's Intensive Unit (CICU)

A continuous opioid infusion provides a steady level of analgesia and sedation in the CICU patient. Sedation in a CICU patient is necessary to assist with the tolerance of the discomfort associated with invasive therapies. The rate of the infusion may be altered within the prescribed range according to the patient's pain levels or required sedation level.

9.7.1 Standard CICU Prescription

For patients in CICU the continuous opioid infusion must be prescribed on the Paediatric Prescription for Continuous Opioid/Ketamine infusion chart (SEI130.320) by CICU medical staff, APS or Anaesthesia staff. Ensure that the following are completed for a valid prescription:

- Patient identification
- Weight
- Allergies
- Emergency Naloxone order on opioid infusion prescription chart

Drug	Dose in 50mL	Infusion Rate (dose/kg/hr)	Bolus Dose	Fluid
Morphine	1 mg/kg in 50 mL	Non-ventilated: 0 - 40 microg/kg/hr Ventilated: 0 - 80 microg/kg/hr	20 microg/kg	0.9% sodium chloride or 5% glucose
Fentanyl	50 microg/kg in 50 mL Max 2500 microg /50 mL	Non-ventilated: 0 - 2 microg/kg/hr Ventilated: 0 - 5 microg/kg/hr	Non-ventilated: 0.4 microg/kg Ventilated: up to 1 microg/kg	0.9% sodium chloride or 5% glucose
Ketamine	6 mg/kg in 50mL	0 - 10 microg/kg/min	Not recommended	0.9% sodium chloride

Note: HYDROmorphone when required will be administered via the BBraun PCA pump using either the Standard or Non-Standard NCA protocols, if more boluses are required more frequently than every 10 minutes CICU ventilated patients may need to utilise the PCA protocols.

9.7.2 Preparing and Programming

- Only Registered Nurses (RN) who have been assessed as competent in *Administration of Intravenous Medications and Fluids to Paediatric Patients* and *Care of Paediatric Patient Receiving Opioids*, and who have successfully completed the HETI Fundamentals of Paediatric Medication Safety Module, may prepare, check, and care for patients receiving Parenteral Opioids in CICU.
- The opioid infusion must be prepared by two RN's following a valid prescription. The prescribed dose must be checked prior to preparation.

- The syringe and lines are to be labelled as per the National Standard for User Applied Labelling of Injectable Medicines, Fluids and Lines.
- The prepared syringe is to be loaded into an Alaris ™ CC pump and programmed using Guardrails™ software.
- Prior to connection to the patient, the prescription, Guardrails™ program and patient ID are checked by two RN's. Special attention must be made to ensure the pump is programmed with the correct patient weight, dose and volume.
- The rate (in mL/hr) at which the infusion needs to run MUST also be calculated and checked against the programmed infusion.
- The infusion can then be connected and commenced.
- Opioid boluses may be administered when clinically indicated, with consideration for increasing the infusion if requiring more than 2 boluses in an hour.

9.7.3 Monitoring

- Observations must attended as per the *Observations in CICU - Minimum Standard – SCH Practice Guideline*
- Patients on opioid infusions >5 days will require a weaning regime. See Section 8 of the Opioid Management SCH-R Practice Guideline.

9.7.4 Prior to transfer to the Ward

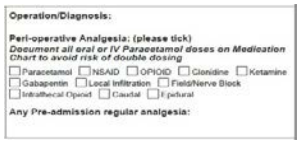
- Ensure aa APS referral is completed and they are notified of the discharge of a patient with an opioid infusion, PCA or NCA from CICU.
- PCA's must be prescribed, prepared and programmed as per section 1, NCA's as per section 2 and continuous opioid infusions as per section 3 of this Opioid Management SCH-R Practice Guideline, using the Paediatric Parenteral Analgesia Prescription form.
- A BBraun PCA pump must be used for continuous infusions as well as PCA and NCA infusions for any patient transferring to the ward
    - In hours obtain a BBraun PCA pump from Paediatric Recovery
    - Out of hours contact the after-hours supervisor for access to Recovery.
- Change infusion with two RN's ensuring that the syringe and lines are labelled as per the National Standard of User Applied Labelling of Injectable Medicines, Fluids and Lines.
- A "PCA" administration set with an anti-reflux and anti-siphon valve must be used.
- Two RN's must check the prescription, patient's ID and programming of the BBraun pump prior to commencing the infusion.
- Observe for complications following change to the BBraun PCA pump and protocol
    - See Section 4 of the Opioid Management SCH-R Practice Guideline
- Ensure sedation and pain score are charted with discharge observations on eMR Between the Flags chart.

10 Appendices

10.1 Prescribing Guide

Page 1 of 4

- Ensure Perioperative information is completed (where applicable)


Operation/Diagnosis:

Peri-operative Analgesia: (please tick)
Document all oral or IV Paracetamol doses on Medication Chart to avoid risk of double dosing

☐ Paracetamol ☐ NSAID ☐ OPIOID ☐ Clonidine ☐ Ketamine
☐ Gabapentin ☐ Local Infiltration ☐ Field/Nerve Block
☐ Intrathecal Opioid ☐ Caudal ☐ Epidural

Any Pre-admission regular analgesia:

- Patient ID label or complete information by hand
- Mark or highlight protocol being prescribed
    - Either put a cross next to the protocol or use highlighter pen

NCA Standard Prescription

Opioid/Weight	Protocol Name	Standard Concentration (amount in Syringe)	Recommended Bolus (program default)	Lockout	Default Dose (background infusion)	Maximum Dose (infusion rate)
Morphine 0-10kg	morphine-NCA_0-10kg	10mg/50 mL	10microg/kg	15min	10microg/kg/hr	20microg/kg/hr
Morphine 10-50kg	morphine-NCA_10-50kg	50mg/50mL	20microg/kg	15min	20microg/kg/hr	40microg/kg/hr
Morphine >50kg	morphine-NCA_>50kg	50mg/50mL	1mg	15min	1mg/hr	2mg/hr
Fentanyl 0-10kg	fentanyl-NCA_0-10kg	200microg/50mL	0.2microg/kg	15min	0.4microg/kg/hr	1microg/kg/hr
Fentanyl 10-50kg	fentanyl-NCA_10-50kg	1000microg/50mL	0.4microg/kg	15min	0.4microg/kg/hr	1.5microg/kg/hr
Fentanyl >50kg	fentanyl-NCA_>-50kg	1000microg/50mL	20microg	15min	20microg/hr	75microg/hr
HYDROmorphone 0-10kg	HYDROmorph-NCA_0-10kg	2mg/50mL	2microg/kg	15min	2microg/kg/hr	4microg/kg/hr
HYDROmorphone 10-50kg	HYDROmorph-NCA_10-50kg	10mg/50mL	4microg/kg	15min	2microg/kg/hr	8microg/kg/hr
HYDROmorphone >50kg	HYDROmorph-NCA_>50kg	10mg/50mL	200microg	15min	100microg/hr	400microg/hr

Page 2 of 4

- Complete and Sign ADR box
- Ensure weight is entered and dated
- Select Delivery Mode and Protocol
- Cross through Delivery Modes not being used
- Complete and sign Opioid Prescription line using dosing table (page 1)
- Naloxone or droperidol can be added to help manage side effects (discuss with APS)

As admixture to above Opioid Syringe for management of Pruritus/Nausea (Naloxone = 100microg to 0-10kg protocols, add 400microg to all other protocols): Droperidol as per guideline

NALOXONE / DROPERIDOL	Date	Time	Medication	Dose added to Syringe: mg/microg	Signature	Print Name
☑	31/5/18	1300	Naloxone	400 microg		JONES.

- Chart ketamine Infusion if one is required
    - Use same form for both opioid and ketamine prescriptions

KETAMINE INFUSIONS Standard Dosing and Prescription (Ketamine infusions at this concentration can be run via IV and Sub Cut routes-to be specified in prescription)

		Protocol Name	Amount/50mL	Concentration	Infusion Rates	Usual starting rate
KETAMINE INFUSION ☑	Ketamine 0-20kg	ketamine-INF_0-20kg	200mg/50mL	4mg/mL	0-200microg/kg/hr	50microg/kg/hr
	Ketamine 20-50kg	ketamine-INF_20-50kg	400mg /50mL	8mg/mL	0-400microg/kg/hr	100microg/kg/hr
	Ketamine >50kg	ketamine-INF_>50kg	600mg/50mL	12mg/mL	0-400microg/kg/hr	100 microg/kg/hr

Protocol: ☐ Ketamine 0-20kg ☒ Ketamine 20-50kg ☐ Ketamine >50kg — Starting Rate: microg/kg/hr

Date	Time	Route: IV SubCut	Medication	Amount in Syringe (/50mL)	Dose range microg/kg/hr	Signature	Print Name
31/5/18	1100	IV	Ketamine	400 mg/50mL	0-200 microg/kg/hr		JONES
				mg/50mL			

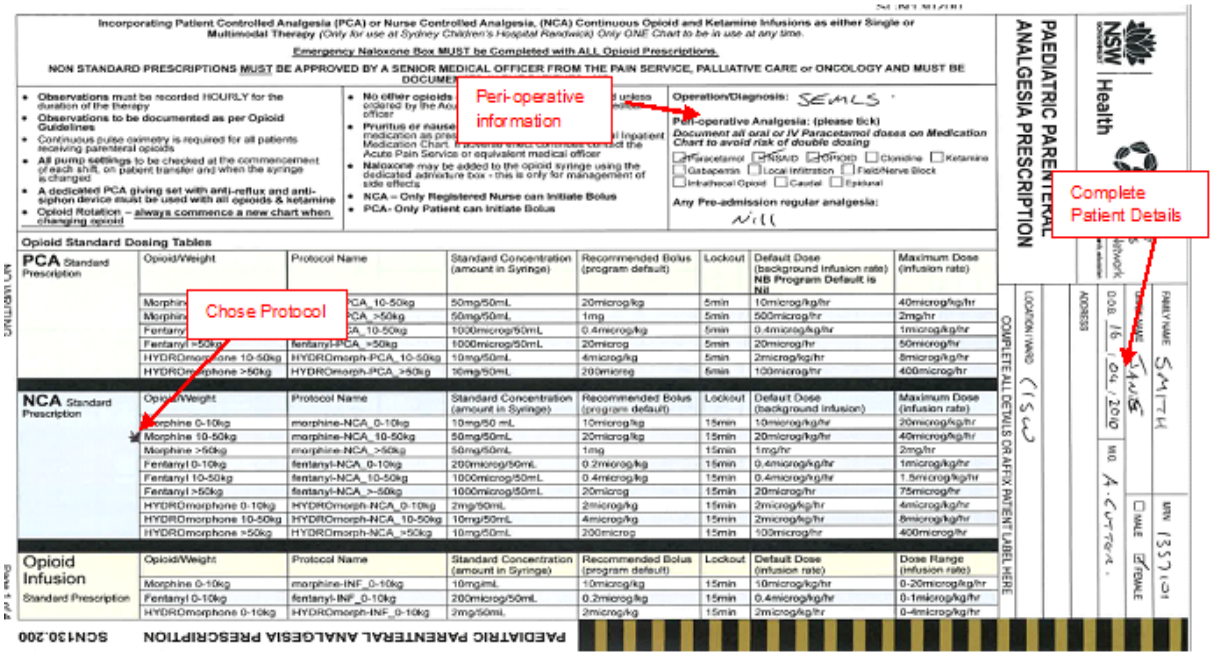
Page 3 of 4

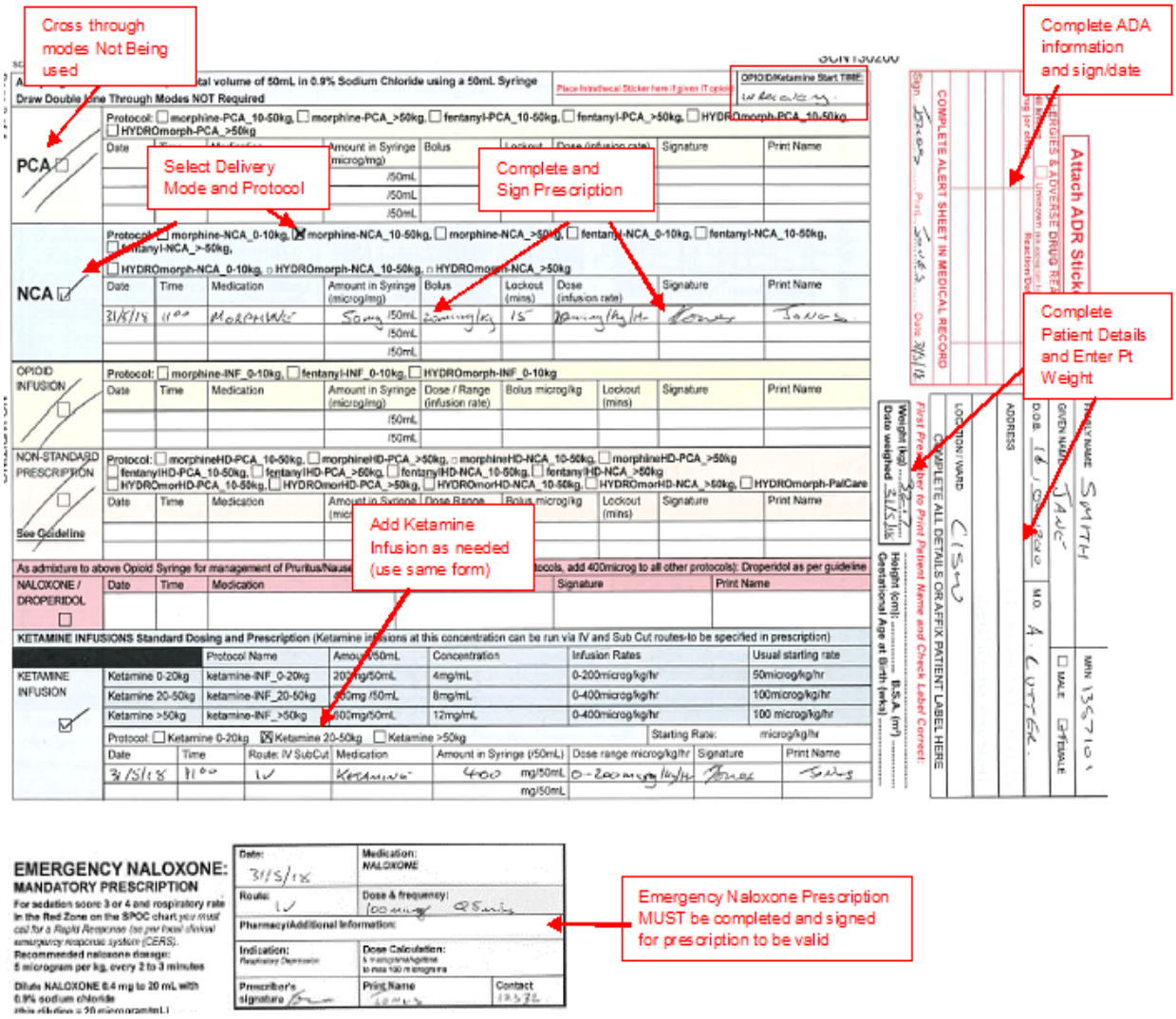
- Complete Emergency Naloxone prescription
    - Prescription is not valid without a naloxone order


EMERGENCY NALOXONE:
MANDATORY PRESCRIPTION
For sedation score 3 or 4 and respiratory rate in the Red Zone on the SPOC chart *you must call for a Rapid Response (as per local clinical emergency response system (CERS).*
Recommended naloxone dosage:
5 microgram per kg, every 2 to 3 minutes
Dilute NALOXONE 0.4 mg to 20 mL with 0.9% sodium chloride

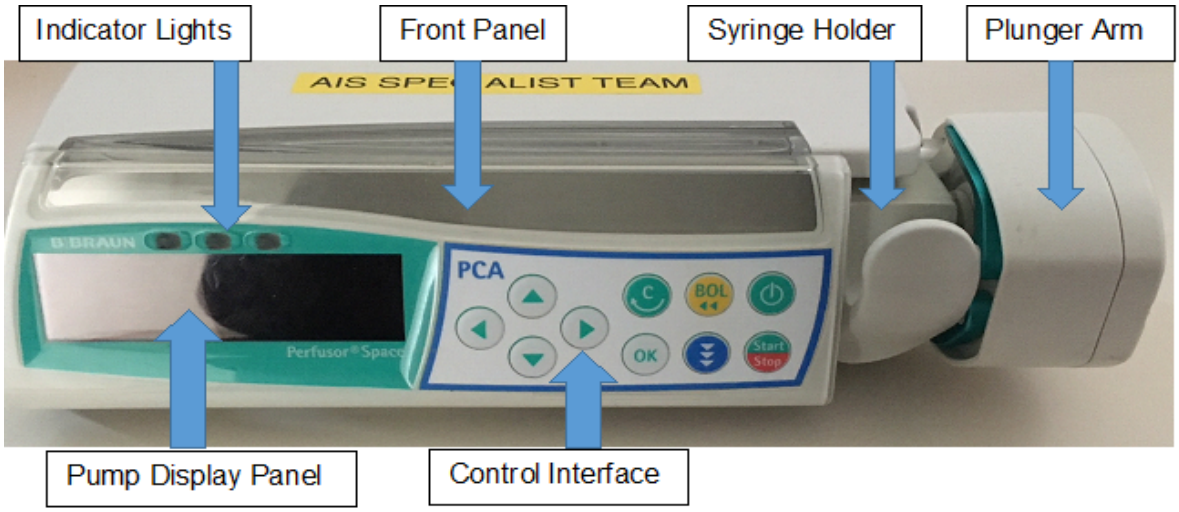
Date: 31/5/18
Medication: NALOXONE
Route: IV
Dose & frequency: 100 mcg Q5 mins
Pharmacy/Additional Information:
Indication: Respiratory Depression
Dose Calculation: 5 micrograms/kg dose to max 100 micrograms
Prescriber's signature
Print Name
Contact 12338

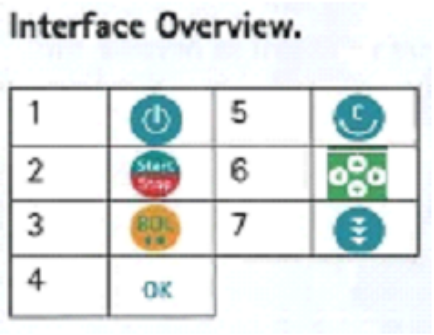
Essential Components to Completing Prescription



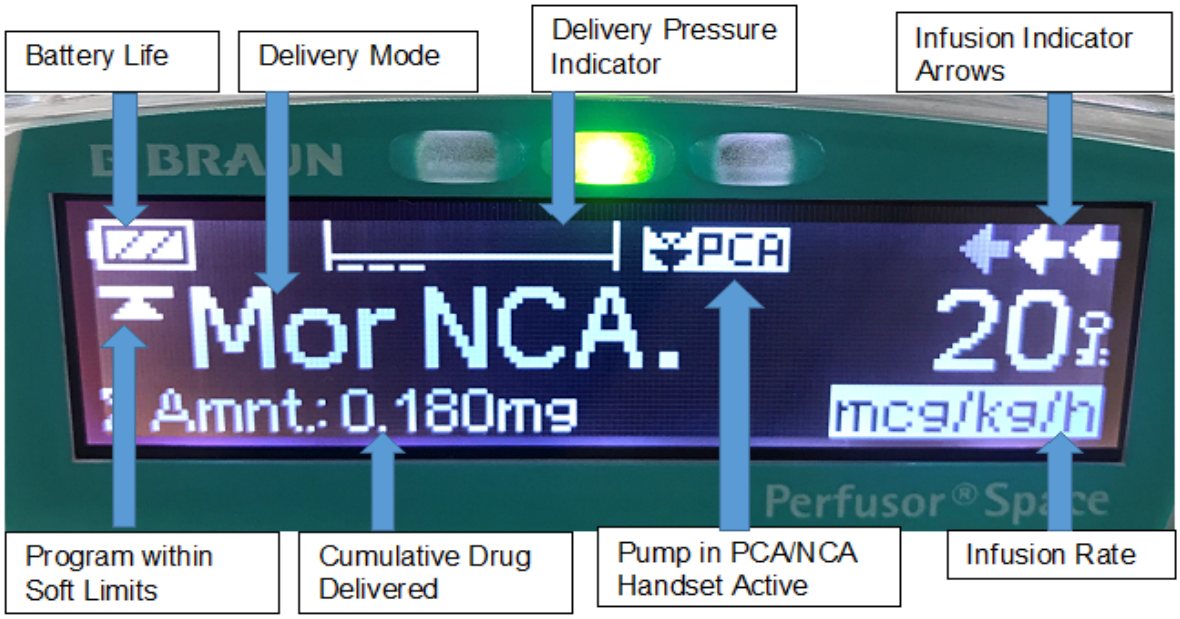


10.2 Key Features of BBraun PCA pump





1. Power On/Off Key
2. Start/Stop Key
3. Bolus Key (opioid infusion mode only)
4. OK Key and Alarm Silence Key
5. C-Clear/Cancel/Main Menu Key
6. Directional Arrow Keys
7. Not used (communicates with Wi-Fi when enabled)



10.3 Programming BBraun PCA pump

- Make up syringe as per the prescription and connect and prime the giving set
- Using Lock-Box key open the front of the lock box
- Press Green Power key
    - The pump will open plunger arm
- Pull down front cover
- Pull out Syringe holder fully and rotate 90° to the right
    - This will open the green syringe flange holder
- Slide syringe into pump with graduation markings on the bottom, then rotate so graduations are facing forward
    - Ensure syringes flange is located in green holder


- Holding syringe in place with left hand, pull back on syringe holder and rotate to the left and ease forward to locate syringe
    - Plunger will then be locked in place
- Close front cover and using navigation keys select syringe type
    - Press left arrow key to select
- Plunger arm will then locate the end of the syringe
- Close lock the Lock-Box
- Screen should say “New Therapy” and have the option to “Use drug library”
    - If this screen is not displayed the pump may not have been shut down correctly from previous patient
    - Press green C key and screen displays “Use last therapy?” use down arrow to select No
- Use up arrow to select Yes to use drug library
- Use down arrow until “Change care unit” is highlighted then press Left arrow to select
- Use up/down arrow keys to highlight “Standard” then Left arrow to select
- Use up/down arrow keys to highlight delivery mode as per prescription and press left arrow to select
- Use up/down arrow keys to highlight protocol and left arrow to select
- Enter patient weight using arrow keys then press OK to confirm
    - Weight option is not active for any protocols where the patient weight is > 50 kg
- Use up/down arrow keys to scroll through settings and check against prescription
    - This is a 2 nurse check
- Edit the program if required by using up/down arrow keys to highlight parameter then press left key
- Enter pass code using arrow keys and OK
- Use arrow keys to alter parameter then press OK
- Once happy program is correct, check prescription ID against patient ID band and connect giving set to patients IV access device
- If pump is set up in recovery, the pump can be put into standby mode pressing and holding green power key for 3 seconds
    - Cancel standby by pressing C key and entering pass code
- Release any clamps on the line
- Press start/stop key
- Enter pass code using arrow keys and OK
- Pump is now running

- If there is a background infusion the 4 arrows on the display will indicate the infusion is running
- For PCA/NCA protocols the access “hand Set” is now active

10.4 Altering a program on the BBraun PCA pump

- Press green C key
- Use up/down arrow keys to highlight parameter then press left key
- Enter pass code using arrow keys and OK
- Use arrow keys to alter parameter then press OK
- Pump remains running throughout this process
- Pump will lock screen after a few seconds
- Document Change on Multi Modal Analgesia Observation Form and in patient’s eMR

10.5 Syringing change procedure

- Prepare new Syringe as per Prescription
- Press start/stop key
- Enter pass code using arrow keys and OK
- Clamp all lines
- Unlock the “Lock-Box”
- Briefly pull back on Syringe Holder and release
- Screen will then display “Syringe change”
- Select Yes using up arrow
- Plunger arm will then open
- Pull down front panel
- Pull out Syringe holder fully and rotate 90° to the right
  - This will open the green syringe flange holder
- Remove old syringe from pump
  - Swap new syringe onto giving set
- Slide new syringe into pump with graduation markings on the bottom, then rotate so graduations are facing forward
  - Ensure syringes flange is located in green holder
- Close front cover and using navigation keys select syringe type
  - Press left arrow key to select
- Plunger arm will then locate the end of the syringe
- Close lock the Lock-Box
- Press start/stop key
- Enter pass code using arrow keys and OK
- Pump is now running
  - If there is a background infusion the 4 arrows on the display will indicate the infusion is running
  - PCA/NCA access button is now active

10.6 Changing Protocols on a Current Infusion

- Press start/stop key
- Enter pass code using arrow keys and OK
- Press green C key and screen displays “Use last therapy?” use down arrow to select No
- Use up arrow to select Yes to use drug library
- Use down arrow until “Change care unit” is highlighted then press Left arrow to select
- Use up/down arrow keys to highlight “Standard” then Left arrow to select
- Use up/down arrow keys to highlight delivery mode as per prescription and press left arrow to select
- Use up/down arrow keys to highlight protocol and left arrow to select
- Enter patient weight using arrow keys then press OK to confirm
    - Weight option is not active for any protocols where the patient weight is > 50 kg
- Use up/down arrow keys to scroll through settings and check against prescription
    - This is a 2 nurse check
- Edit the program if required by using up/down arrow keys to highlight parameter then press left key
- Enter pass code using arrow keys and OK
- Use arrow keys to alter parameter then press OK
- Once happy program is correct, check prescription ID against patient ID band and connect giving set to patients IV access device
- Release any clamps on the line
- Press start/stop key
- Enter pass code using arrow keys and OK
- Pump is now running
    - If there is a background infusion the 4 arrows on the display will indicate the infusion is running
    - For PCA/NCA protocols the access “hand Set” is now active

10.7 Bolus administration for continuous opioid infusions

- ONLY two RNs or a RN & EN can administer a bolus via a continuous opioid infusion
- Whilst the infusion is still running press the yellow BOL key
- Enter pass code using arrow keys and OK
- Press Left arrow key to access bolus amount and check default bolus against prescription
- When bolus amount is correctly displayed press the yellow BOL key again
- The bolus will now be delivered – this can be stopped by pressing the OK key
- Pump will return to normal running screen at end of bolus

10.8 Changing the Pressure Setting

If the pump is alarming due to being over set pressure when using small bore central or PICC lines then the delivery pressure limit may need to be altered

- If the infusion is running press green C key to return to the Main Menu. When the infusion is stopped it will automatically be on the Main Menu screen
- From the Main Menu use the arrow keys to scroll down to the Options Menu and access left arrow key
- Highlight the Pressure Setting using the arrow keys and access using the left arrow key
- Use the left or right arrow key to modify the Pressure Alarm Setting
    - Moving to a higher number will increase the pressure needed to trigger the alarm
    - Moving to a lower number will decrease the pressure needed to trigger the alarm
- Press Ok to confirm the new Pressure Alarm Setting

10.9 Shutting down BBraun at the end of use

- Press start/stop key
- Enter pass code using arrow keys and OK
- Clamp all lines
- Unlock the “Lock-Box”
- Briefly pull back on Syringe Holder and release
- Screen will then display “Syringe change”
- Select Yes using up arrow
- Plunger arm will then open
- Pull down front panel
- Pull out Syringe holder fully and rotate 90° to the right
    - This will open the green syringe flange holder
- Remove old syringe from pump
- Close syringe holder and front panel
- Press and hold green power key for 3 seconds and pump will close plunger arm and shut down

10.10 Alarms

Alarm	Is this a red or yellow alarm?	Action to be taken	Additional Information
Battery nearly empty	**Yellow**	Press OK to acknowledge the alarm. Plug into mains, or consider changing to another pump.	You will have 30 minutes until the battery is empty. Once connected to the mains the battery will proceed to charge.
Battery empty	**Red**	Press OK to acknowledge the alarm. Plug into mains immediately, or consider changing to another pump.	Please note the "Battery Cover Removed" alarm activates when the battery cover is not properly engaged on the battery compartment. When pushing on the battery cover listen for a "click".
Pressure high	**Red**	Press OK to acknowledge the alarm. An occlusion occurred in the system. The set pressure level was exceeded. Check if the tubing is kinked or damaged. Check patency of IV.	A bolus reduction is automatically initiated by the pump. Constant occlusion alarms can be reduced by increasing the occlusion pressure settings if necessary (according to local policy).
Standby time expired	**Red**	Press OK to acknowledge the alarm. Recommence therapy or input new standby time.	24 hours is the maximum standby time.
Syringe nearly empty	**Yellow**	Press OK to acknowledge the alarm. Prepare a new syringe if needed or prepare to discontinue therapy.	The time between a syringe nearly empty alarm and a syringe empty alarm is configurable.
Syringe empty	**Red**	Press OK to acknowledge the alarm. either perform syringe change and resume therapy , or discontinue therapy.	Due to varying Syringe tolerances a small amount of fluid may be left inside the syringe.
Syringe holder	**Red**	Press OK to acknowledge the alarm. The Syringe Holder was opened during a running infusion. Close the Syringe Holder.	

10.11 Overlap weaning method for fentanyl patches

Overlap weaning method for Fentanyl patches: Printable instructions

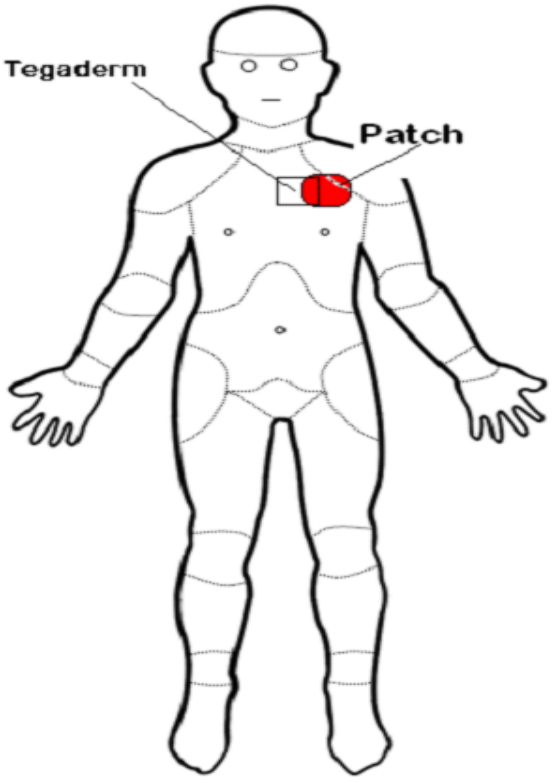
1. Place either a whole or a half of a small Tegaderm® dressing on the patient's skin adjacent to where patch is to be placed.

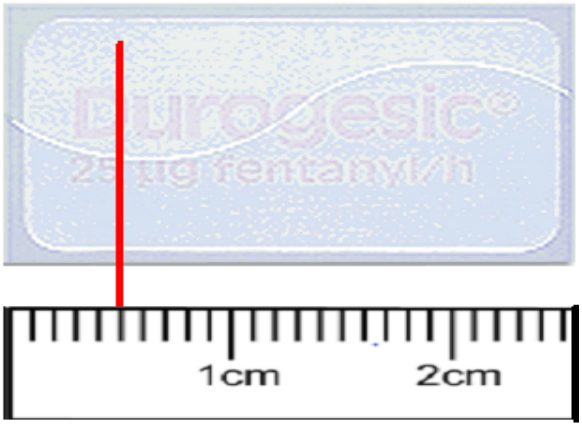
- Measure the length of the patch
  - For 25 microg patches 1/5th of length = 5 microg/hr
  - For 12 microg patches ¼ of length = 3 microg/hr
- Draw a line on the patch at the desired dose i.e. to wean from 25microg to 20microg draw a line 1/5th of length from the Left hand edge

2. Peel off backing of the patch and place on the patient with the line on the patch on the edge of the Tegaderm®

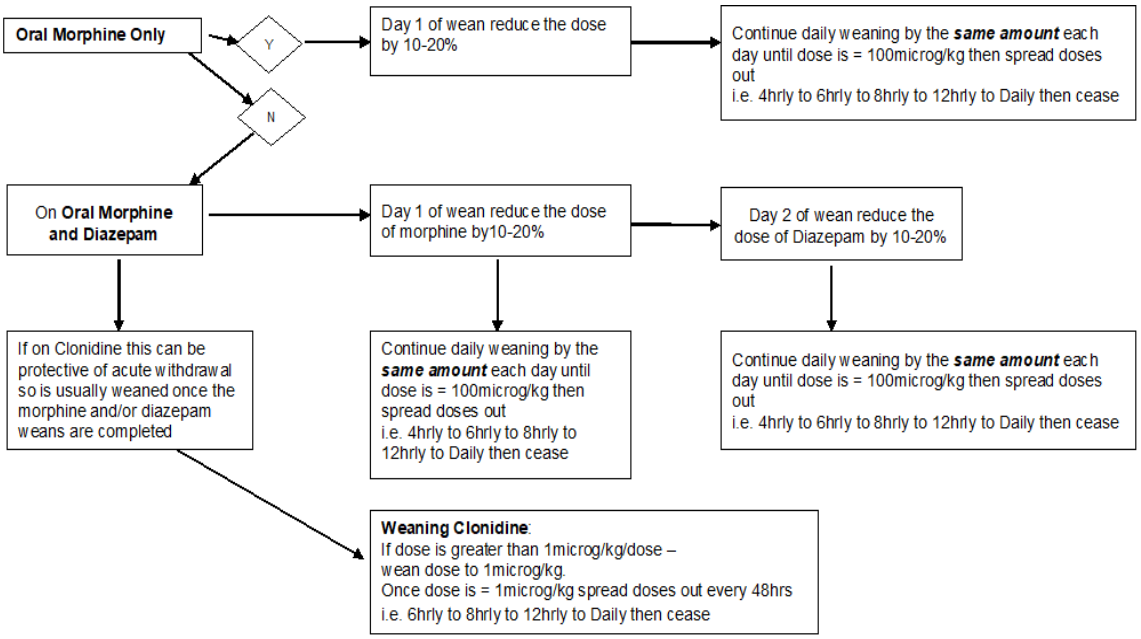
When changing the patch (every 72hours) ensure that the site is changed

DO NOT PLACE A NEW PATCH ON THE PREVIOUS SITE





10.12 Opioid and benzodiazepine weaning flow sheet



Always chart a rescue PRN Dose (of the medications that are being weaned) in case of withdrawal of 100microg/kg (max 1mg)
If following any change in dosage/frequency the patient appears to be withdrawing give rescue dose and return to the previous dosage/frequency and wait 48 hours before weaning again.

10.13 Non-Standard Dosing Tables

When prescribing any Non-Standard opioid protocol, the senior admitting consultant, APS consultant or CICU consultant must document approval of this in the patient's eMR, these protocols are only to be used if the patient cannot be managed within the Standard Protocols. Advice from the APS should be sought when using Non-Standard Protocols. Extra care should be used when completing the prescription to ensure there are no dosing errors due to the risks posed by the significantly higher dose limits!

Drug/Type	Wt.	Concentration	Lock out Default	Default bolus	Min Bolus	Max Bolus	Background Default	Background Max Rate (soft)	Background Max Rate (HARD)	Hourly Limit (Default)
Morphine X2 PCA	<50 kg	100 mg/50 mL *(2 mg/mL)*	5 min	20 microg/kg	10 microg/kg	60 microg/kg	Nil	40 microg/kg/hr	100 microg/kg/hr	580 microg/kg/hr
Morphine X2 PCA	>50 kg	100 mg/50 mL 2 mg/mL	5 min	1 mg	500 microg	3 mg	Nil	2 mg/hr	5 mg/hr	29 mg/hr
Morphine X2 NCA	<50 kg	100 mg/50 mL 2mg/mL	15 min	20 microg/kg	10 microg/kg	60 microg/kg	10 microg/kg/hr	40 microg/kg/hr	100 microg/kg/hr	340 microg/kg/hr
Morphine X2 NCA	>50 kg	100 mg/50 mL 2mg/mL	15 min	1 mg	500 microg	3 mg	500 microg	2 mg/hr	5 mg/hr	17 mg/hr
Fentanyl Neat PCA	<50 kg	2,500 microg/50 mL 50 microg/mL	5 min	0.4 microg/kg	0.2 microg/kg	1 microg/kg	Nil	1 microg/kg/hr	3 microg/kg/hr	11 microg/kg/hr
Fentanyl Neat PCA	>50 kg	2,500 microg/50 mL 50 microg/mL	5 min	20 microg	10 microg	50 microg	Nil	50 microg/hr	150 microg/hr	550 microg/hr
Fentanyl Neat NCA	<50 kg	2,500 microg/50 mL 50 microg/mL	15 min	0.4 microg/kg	0.2 microg/kg	1 microg/kg	0.4 microg/kg/hr	1 microg/kg/hr	3 microg/kg/hr	11 microg/kg/hr
Fentanyl Neat NCA	>50 kg	2,500 microg/ 50 mL 50 microg/mL	15 min	20 microg	10 microg	50 microg	20 microg/hr	50 microg/hr	150 microg/hr	550 microg/hr
HYDROmorphone HD PCA	<50 kg	20 mg/50mL 400 microg/mL	5 min	4 microg/kg	2 microg/kg	15 microg/kg	Nil	8 microg/kg/hr	40 microg/kg/hr	160 microg/kg/hr
HYDROmorphone HDPCA	>50 kg	50 mg/50 mL 1 mg/mL	5 min	200 microg	100 microg	1 mg	Nil	400 microg/hr	2 mg/hr	10,000 microg/hr
HYDROmorphone HD NCA	<50 kg	20 mg/50 mL 400 microg/mL	15 min	4 microg/kg	2 microg/kg	15 microg/kg	2 microg/kg/hr	8 microg/kg/hr	40 microg/kg/hr	160 microg/kg/hr
HYDROmorphone HD NCA	>50 kg	50 mg/50 mL 1 mg/mL	15 min	200 microg	100 microg	1 mg	2 microg/kg/hr	400 microg/hr	2 mg/hr	10,000 microg/hr
HYDROmorphone Palliative	*Max weight allowed* **50 kg**	50 mg/50 mL 1 mg/mL	5 min	4 microg/kg	2 microg/kg	30 microg/kg =1.5 mg	Nil	40 microg/kg/hr =2 mg/hr	100 microg/kg/hr =5 mg/hr	500 microg/kg/hr = 25 mg/hr

11 Reference and Bibliography List

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