Note:
This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

SA Health does not accept responsibility for the quality or accuracy of material on websites linked from this site and does not sponsor, approve or endorse materials on such links.

Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient’s medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Explanation of the aboriginal artwork:
The aboriginal artwork used symbolises the connection to country and the circle shape shows the strong relationships amongst families and the aboriginal culture.

The horse shoe shape design shown in front of the generic statement symbolises a woman and those enclosing a smaller horse shoe shape depicts a pregnant woman. The smaller horse shoe shape in this instance represents the unborn child. The artwork shown before the specific statements within the document symbolises a footprint and demonstrates the need to move forward together in unison.

The term ‘Aboriginal’ is used to refer to people who identify as Aboriginal, Torres Strait Islanders, or both Aboriginal and Torres Strait Islander. This is done because the people indigenous to South Australia are Aboriginal and we respect that many Aboriginal people prefer the term ‘Aboriginal’. We also acknowledge and respect that many Aboriginal South Australians prefer to be known by their specific language group(s).
Purpose and Scope of PCPG

In addition to information on analgesic options for children, this guideline delineates the responsibilities of medical nursing staff related to the section of appropriate medication, its administration and the monitoring of children receiving analgesia.

Doses and monitoring requirements in this guideline refer to analgesic doses. For procedural sedation refer to organisational guidelines.

Table of Contents

Purpose and Scope of PCPG ................................................................. 2
Abbreviations ..................................................................................... 3
Principles of Acute Pain Management .............................................. 4
Pain Assessment Tools ....................................................................... 5
Opioid Safety ....................................................................................... 7
Slow / Modified / Controlled Release Opioids .................................... 8
Opioid Tapering (weaning) ................................................................. 9
Discharge of Paediatric Patients on Opioid Analgesia ......................... 9
Patients Requiring Special Consideration and Closer Monitoring ...... 10
Monitoring and Observation ............................................................... 11
Minimum Observations Following Opioid Administration ................ 12
Management of Opioid Related Side Effects .................................... 13
Paracetamol ......................................................................................... 16
Non-steroidal Anti-inflammatory Drugs (NSAIDs) ......................... 17
Tramadol ............................................................................................ 19
Oral Opioid – Immediate Release .................................................... 21
Oral Opioid – Slow Release (SR) / Modified Release (MR) / Controlled Release (CR) and Long-Acting .................................................... 22
Intravenous Opioid – Bolus ............................................................... 23
Subcutaneous (SC) and Intramuscular (IM) Opioid – Intermittent ...... 24
Intranasal Fentanyl ............................................................................ 24
Transdermal Opioid .......................................................................... 25
Additional Adjuvant Medications ...................................................... 26
    Muscle Relaxant: Diazepam .......................................................... 26
    Clonidine ....................................................................................... 26
    Amitriptyline ................................................................................. 26
    Gabapentin ..................................................................................... 26
    Pregabalin ..................................................................................... 26
Intravenous Opioid / Analgesic Infusions / Nurse Controlled Analgesia (NCA) ................................................................. 27
Patient Controlled Analgesia (PCA) ............................................... 29
References ......................................................................................... 30
Acknowledgements .......................................................................... 30
Document Ownership & History ...................................................... 31
## Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED</td>
<td>Emergency Department</td>
</tr>
<tr>
<td>g</td>
<td>grams</td>
</tr>
<tr>
<td>ICU</td>
<td>Intensive Care Unit</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>Kg</td>
<td>Kilograms</td>
</tr>
<tr>
<td>MAD</td>
<td>Mucosal Atomiser Device®</td>
</tr>
<tr>
<td>Mg</td>
<td>Milligrams</td>
</tr>
<tr>
<td>mL</td>
<td>Milliliters</td>
</tr>
<tr>
<td>NCA</td>
<td>Nurse Controlled Analgesia</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>Non-steroidal anti-inflammatory drugs</td>
</tr>
<tr>
<td>PBS</td>
<td>Pharmaceuticals Benefit Scheme</td>
</tr>
<tr>
<td>PCA</td>
<td>Patient Controlled Analgesia</td>
</tr>
<tr>
<td>PO</td>
<td>Per oral</td>
</tr>
<tr>
<td>QID</td>
<td>Quarter in die (four times a day)</td>
</tr>
<tr>
<td>Sedation score 1</td>
<td>Awake, alert</td>
</tr>
<tr>
<td>Sedation score 2</td>
<td>Easy to rouse</td>
</tr>
<tr>
<td>Sedation score 3</td>
<td>Easy to rouse, difficulty staying awake</td>
</tr>
<tr>
<td>Sedation score 4</td>
<td>Difficult to rouse (severe respiratory depression)</td>
</tr>
<tr>
<td>SNRIs</td>
<td>Serotonin noradrenaline reuptake inhibitors</td>
</tr>
<tr>
<td>SpO₂</td>
<td>Oxygen saturation measure by pulse oximetry</td>
</tr>
<tr>
<td>SR</td>
<td>Slow release</td>
</tr>
<tr>
<td>SS</td>
<td>Sedation score</td>
</tr>
<tr>
<td>SSRIs</td>
<td>Selective serotonin reuptake inhibitors</td>
</tr>
<tr>
<td>TDS</td>
<td>Ter die sumendum (three times a day)</td>
</tr>
<tr>
<td>WCHN</td>
<td>Women’s and Children’s Health Network</td>
</tr>
</tbody>
</table>
Principles of Acute Pain Management

> The assessment and management of pain requires consideration of all of the biopsychosocial aspects of pain
> The goal of effective pain management is to keep the patient comfortable so that they can achieve their goals, e.g. deep breathing and coughing, mobilising, sleeping and playing
> Initiate appropriate non-pharmacological interventions to support patient comfort through distraction or play e.g. reading, movies, music, craft, relaxation techniques
> Analgesics should be given by the simplest method possible and at the lowest dose to achieve the desired analgesic effect
> Oral administration should be used as soon as the patient can tolerate oral intake
> Multimodal analgesia describes the concurrent use of different classes of analgesic medications in order to maximise analgesia and minimise side effects. If clinically appropriate, medications most commonly used as components of multimodal analgesia include paracetamol, non-steroidal anti-inflammatory drugs (NSAIDs), opioids, tramadol, clonidine and low dose ketamine infusion
> The optimal use of simple analgesics helps reduce opioid use so the risk of opioid related side effects is minimised
> Initial treatment of acute pain with oral opioids should use immediate-release opioids on a PRN basis
> Recommended doses provide a starting point but may require adjustment according to individual response. Balance analgesic effects with adverse effects, especially sedation
> For opioid naive individuals, the initial PRN dose of immediate release opioid should be weight-based. Clinicians should obtain expert advice or consult the literature when providing analgesia for obese children. Doses may need to be adjusted according to age, including gestational age for neonates, ideal body weight or co-existent liver or renal impairment. For patients transitioning from intravenous Patient Controlled Analgesia (PCA) or opioid infusion/Nurse Controlled Analgesia (NCA), PRN dose can be guided by their previous intravenous opioid requirements. Intermittent dosing permits treating acute pain in a targeted way, which is variable, changes with activity and improves with time as the patient recovers
> It is safer to administer a lower dose and titrate up to achieve the desired analgesic effect
> Assess the patient’s comfort and ensure their level of sedation is safe prior to administration of opioid medications. Refer to Pain Assessment Tools section to help recognise the patients level of comfort
> Pain should be assessed and documented every one to four hours when the patient is receiving interventions for pain and then as required. The patient should be reassessed at the time of peak effect of the drug related to route of administration
> Recognise that increasing discomfort to a level out of proportion to the trauma/surgery/illness may indicate a change in clinical condition that requires review by the treating team
> Even in an acute pain setting, psychological and social aspects need to be addressed concurrently with medical and pharmacological approaches such as analgesics. Pre-operative anxiety, catastrophising, depression or other mental health issues can amplify or confuse a patient’s expression of discomfort. Addressing these is important in treating acute pain adequately
> Engaging with consumers at all points of the medication management pathway, including at the point of prescribing, is essential. This includes discussing non-pharmacological and pharmacological options for managing acute pain. To ensure shared decision making and understanding of the management plan, actively involve the patient and their caregiver in the decision to use an analgesic and/or other pain management strategies.
Pain Assessment Tools

Faces Pain Scale - Revised
Suggested age group: 4 years and older.
Patients have an option of 6 faces to select across a pain scale 0-10.

Translation options available online: https://www.iasp-pain.org/resources/faces-pain-scale-revised/#download

Verbal Numerical Rating Scale
Suggested age group: adults and children 6 years and older.

Visual Analogue Scale
Suggested age group: 6 years and older
Patient marks their pain intensity along a 10cm line from ‘no pain’ to ‘worst pain’ which is then measured with a ruler.

FLACC Pain Scale (behavioural)
Suggested age group: term neonates – 7 years and for older children who are non-verbal

Instructions:
1. Rate patient in each of the five measurement categories
2. Add together – total score between 0 and 10
3. Document total pain score

<table>
<thead>
<tr>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Categories</td>
</tr>
<tr>
<td>Face</td>
</tr>
<tr>
<td>Legs</td>
</tr>
<tr>
<td>Activity</td>
</tr>
<tr>
<td>Cry</td>
</tr>
<tr>
<td>Consolability</td>
</tr>
</tbody>
</table>
r-FLACC (revised FLACC) Pain Scale (behavioural)

For children with developmental or intellectual impairment or disability

Instructions:
1. Rate patient in each of the five measurement categories
2. Add together – total score between 0 and 10
3. Document total pain score

The additional descriptors (in bold) are descriptors validated in children with developmental or intellectual impairment. The nurse can review with the caregiver the descriptors within each category. Ask the caregiver if there are additional behaviours that are better indicators of the child experiencing pain. Add these behaviours to the tool in the appropriate category, under ‘Individualised behaviour described by caregiver’

<table>
<thead>
<tr>
<th>Categories</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>No particular expression or smile</td>
<td>Occasional grimace or frown, withdrawn, disinterested; appears sad or worried</td>
<td>Frequent to constant frown, clenched jaw, quivering chin; distressed looking face, expression of fright or panic</td>
</tr>
<tr>
<td>Legs</td>
<td>Normal position or relaxed</td>
<td>Uneasy, restless, tense; occasional tremors</td>
<td>Kicking or legs drawn up; marked increase in spasticity, constant tremors or jerking</td>
</tr>
<tr>
<td>Activity</td>
<td>Lying quietly, normal position, moves easily</td>
<td>Squirming, shifting back and forth, tense; mildly agitated (head back and forth, aggression); shallow / splinting breaths, occasional sighs</td>
<td>Arched rigid or jerking; severe agitation, head banging, shivering (not rigors), breath holding, gasping, severe splinting</td>
</tr>
<tr>
<td>Cry</td>
<td>No cry (awake or asleep)</td>
<td>Moans or whimpers, occasional complaints; occasional verbal outburst or grunts</td>
<td>Crying steadily, screams or sobs, frequent complaints; repeated outbursts, constant grunting</td>
</tr>
<tr>
<td>Consolability</td>
<td>Content, relaxed</td>
<td>Reassured by occasional touching, hugging or talking, distractible</td>
<td>Difficult to console or comfort; pushing away caregiver, resisting care or comfort measures</td>
</tr>
</tbody>
</table>
Opioid Safety

> Opioid medications are the primary medications administered to patients with moderate to severe nociceptive pain.

> Safe use of opioid medications requires knowledge of:
  o high risk patients
  o opioids available
  o formulations available
  o routes of administration
  o safe dosing
  o management of potential medication side effects
  o specific patient observation and monitoring.

> Ensure that care is provided in an environment with pre-checked oxygen and suction.

> **Naloxone** should always be available in areas where opioid medications are administered.

> As a result of the individual variability of response following opioid administration, close observation is required for all patients over the period of peak concentration of the medication - this will depend on the specific medication used and the route of administration – refer to Minimum Observations following Opioid Administration section

> **Opioid analgesia should not be administered unless the patient has a sedation score less than 2** (is easy to rouse to voice or light touch and able to maintain eye opening and eye contact for >10 seconds).

> Document in ‘Pharmacy/Additional Information’ space on the National Standard Medication Chart only give if sedation score < 2 or only give if SS<2

> Prescriptions for immediate release oral opioids with a dose range allows the nurse to provide analgesia based on individual response to treatment.

> Prolonged use of opioids can result in tolerance, requiring greater doses if the cause of pain does not diminish over time. Opioid rotation should be considered with a reduction in the equianalgesic dose of the new medication.

> Opioid-induced hyperalgesia is where increasing doses of opioids paradoxically lead to increased pain sensitivity (hyperalgesia) rather than analgesia. Treatment options for suspected opioid-induced hyperalgesia include dose increase (to rule out tolerance), opioid dose decrease or cessation, changing to non-opioid analgesics or using multimodal analgesia for opioid-sparing.

> Recommended analgesic doses in this procedure are for opioid naive patients.

> Recommended doses are for routine analgesic use. Refer to organisational procedure for management of opioid medications used in conjunction with sedative medications for procedural pain relief.
Slow / Modified / Controlled Release Opioids

> Slow/modified/controlled release opioids are not recommended for use in acute pain management.

> After careful consideration and opportunity to assess the patients response to immediate release opioids, slow release opioids may be considered in a previously opioid-naïve patient on a temporary basis for post-operative or post-traumatic prolonged pain states.

> Always tick the SR (slow release) box on the National Standard Medication Chart when prescribing for inpatients.

> Document in ‘Pharmacy/Additional Information’ space on the National Standard Medication Chart only give if sedation score < 2 or only give if SS<2

> In acute pain, daily opioid requirements may vary considerably. The dose should be assessed frequently and adjusted appropriately.

> Not all pain is opioid responsive. If excessive sedation develops (a warning sign of impending respiratory depression) but pain is still present, non-opioid analgesics should be considered. Slow-release opioids in this scenario add further complexity and risk.

> The plan to wean and cease slow/modified/controlled release opioids is the responsibility of the person/medical team who initiated it. The need for discharge opioids should be assessed based on the inpatient use and anticipated ongoing requirements. Timely formal communication with other appropriate medical staff and/or the patient’s general practitioner about weaning and discontinuation should be completed. Appropriate instructions about opioid weaning should be given to the patient/carers by the treating team and pharmacy.

> Patients already taking opioids prior to admission are already tolerant and physically dependent on that opioid. After independent confirmation of the medication and dose, their slow-release opioid should be continued. The patient’s acute pain should be treated using multimodal analgesia including titration with PRN immediate release opioids. Their opioid requirements are likely to be greater than for those who are opioid naïve.

Prescribing slow/modified/controlled release opioids for acute pain management

Prescribing these medications may be restricted to certain prescriber groups. At WCHN these medications must only be prescribed by:

- Acute Pain Service (APS)
- Chronic Pain Service
- Palliative Care
- Other Consultant medical officer staff experienced in the prescribing of slow release opioids.
Opioid Tapering (weaning)

If patients have received regular or high doses of opioids for more than one week, weaning will be required before cessation to avoid opioid withdrawal.

- Infants of opioid dependent mothers who develop Neonatal Abstinence Syndrome – refer to High Risk Patients section
- Following prolonged opioid administration during intubation and ventilation
- Following prolonged opioid analgesia:
  - often occurs when the patient has ongoing analgesic need
  - the duration and dose of opioid treatment will influence the rate and frequency of weaning
  - if weaning is to continue at home, it is important that the patient/carers fully understands the process, including signs and symptoms of opioid withdrawal.
- When ready for discharge from hospital, the ward pharmacist can develop weaning instructions in a Medication Profile for the patient/carers.

Discharge of Paediatric Patients on Opioid Analgesia

- Prescription of opioid analgesia for patients discharged from hospital needs to be undertaken with caution due to the risk of abuse, misuse and diversion, adverse effects, interactions with other medication, impairment of driving and increased risk of falls
- If opioid analgesia is considered appropriate for discharge, limit the quantity supplied to the clinically appropriate amount
- Reinforce the education of the patient/family and provide written information
- Discuss safe storage of the medications at home to ensure they will be kept out of reach of children
- Advise patients/parents to return any unused opioid medication to their local pharmacy for safe disposal
Patients Requiring Special Consideration and Closer Monitoring

Some patients have a higher than usual risk of over sedation and respiratory depression. Safety can be improved through avoidance of concurrent sedatives or opioids by other routes, awareness of comorbidities posing extra risk and by careful dosing. These patients require special consideration when prescribing and administering opioids with vigilant monitoring before and after doses are given.

High Risk Patients

- Pre-existing respiratory co-morbidities, including:
  - ex-premature infants
  - airway obstruction, asthma, chronic respiratory conditions e.g. cystic fibrosis
  - sleep apnoea or increased potential for sleep apnoea e.g. cerebral palsy, craniofacial disorders, muscular dystrophy
  - limited neck mobility
  - obesity.

- Those receiving concurrent sedative medications, including benzodiazepines and sedating antihistamines e.g. promethazine.

- Pre-existing conditions e.g. liver or renal impairment or concurrent medications which reduce drug metabolism or excretion.

- Previous adverse reaction to opioid medications.

Infants

- Opioid medications have a prolonged half-life with increased risk of opioid accumulation in infants under 6 months of age and ex-premature infants up to 6 months corrected age.

- Infants less than 12 months require special consideration of monitoring and dosing if opioids are administered by any route – refer to Minimum Observations following Opioid Administration section.

- Discuss appropriate opioid doses with a consultant from Anaesthesia, Emergency Department, Intensive Care Unit or medical consultant if they are competent in appropriate assessment and dosing.

Pregnant women/newborn infants

- When opioids are administered to pregnant women, consideration must be given to the potential effect on the fetus.

- Naloxone is not routinely used in neonatal resuscitation although may be ordered by neonatal staff. In such instances, the newborn infant requires monitoring in the Special Care Baby Unit for 4-6 hours to monitor for recurrent respiratory depression. Medical review is required prior to leaving the unit.

Opioid tolerant mothers/infants

- It is harmful for the fetus if an opioid dependent mother ceases opioids abruptly during pregnancy. Newborn infants of opioid dependent mothers who develop Neonatal Abstinence Syndrome require monitoring, Neonatal Abstinence Syndrome scores and, if appropriate, an opioid weaning protocol. Refer to South Australian Perinatal Practice Guideline – Infants of Drug Dependent Women and South Australian Neonatal Medication Guideline - Morphine.

- Naloxone is contraindicated in newborn infants born to opioid dependent mothers. Acute opioid withdrawal can result in rapid onset of withdrawal symptoms including convulsions.

- For opioid-tolerant adult patients who are being treated by an outside agency for opioid dependence, refer to Medical Management of Patients at Risk of Opioid Withdrawal Clinical Guideline.
Monitoring and Observation

Opioid analgesia should not be administered unless the patient has a sedation score less than 2 - is easy to rouse to voice or light touch and able to maintain eye opening and eye contact for >10 seconds.

Monitoring is mandatory for all patients receiving opioid infusions, Nurse Controlled Analgesia, Patient Controlled Analgesia, sedative agents for procedural sedation, high dose oral opioids and standard dose oral opioids if the patient has any risk factors that increase sedation and respiratory depression.

More frequent observations may be required depending on clinical status, treating team orders and/or post-operative assessment.

Patients are at their most vulnerable when:

> The medication is at its peak concentration for the route of administration.
> They are taking concurrent sedating medications.
> The pain stimulus is removed e.g. wound dressing completed, hernia reduced, chest drain removed.

In certain circumstances there may be exceptions to monitoring of the patient and pump, such as palliative care. These decisions should be made in consultation with the treating team, palliative care and/or the Acute Pain Service and be documented in the Medical Record.

Minimum monitoring:

> Continuous cardio-respiratory monitoring for all:
  ○ ex-premature infants up to 6 months corrected age
  ○ full term infants up to 2 months of age.
> Continuous pulse oximetry for all:
  ○ high risk children – refer to High Risk Patients section
  ○ full terms infants 2 – 12 months of age.
Minimum Observations Following Opioid Administration

> This applies when given for routine analgesia. When given in higher doses and/or in conjunction with sedatives – refer to organisational procedure.
> Does not apply to opioid weaning programs such as Neonatal Abstinence Syndrome.

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>OBSERVATIONS</th>
</tr>
</thead>
</table>
| Oral opioids                               | Observe 1 hour post administration for analgesic effect and side effects. Record sedation score and pain score plus additional observations if any signs of respiratory compromise or over sedation.  
> Age < 12 months – see Infants alert below |
| Intramuscular / subcutaneous opioids       | **Subcutaneous Fentanyl:** Record pre and 15 minutes post each dose administration: respiratory rate, heart rate, SpO₂, sedation score and pain score.  
**Morphine:** Record pre and 30 minutes post each dose administration: respiratory rate, heart rate, SpO₂, sedation score and pain score. |
| Not recommended for general paediatric use |                                                                                                                                                                                                                                                                                                                                              |
| Intravenous bolus                          | Record pre and 5, 15 and 30 minutes post administration:  
  - respiratory rate, heart rate, SpO₂, sedation score and pain score.  
  Continuous oximetry recommended and mandatory for infants < 12 months. |
| Intranasal fentanyl                        | Record pre and 10 and 30 minutes post administration:  
  - respiratory rate, heart rate, SpO₂, sedation score and pain score.  
  Observe for 45 minutes from last dose. |
| Opioid infusions, Patient Controlled Analgesia | Observations as per organisational procedure.  
  Mandatory for all patients: continuous pulse oximetry – record respiratory rate, heart rate, SpO₂, sedation score and pain score hourly.  
> Age < 12 months – see Infants alert below |

**INFANTS**

**Require smaller doses + longer observation**

Discuss doses with Anaesthetic, Medical, ED, ICU or Neonatal Consultant for infants less than 12 months of age

**Opioids administered via any route require minimum cardio-respiratory monitoring as below**

Record respiratory rate, heart rate, SpO₂, sedation score and pain score at least hourly for duration of monitoring or more frequently depending on route as per above observations

<table>
<thead>
<tr>
<th>Age</th>
<th>Minimum duration of monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex-premature infant up to 6 months corrected age (older if persisting respiratory issues)</td>
<td>12 hours post opioid or last apnoea/brady</td>
</tr>
<tr>
<td>Full term infant: Birth - 2 months</td>
<td>8 hours</td>
</tr>
<tr>
<td>Full term infant: 2 - 6 months</td>
<td>4 hours</td>
</tr>
<tr>
<td>6 – 12 months (pulse oximetry monitoring may be sufficient)</td>
<td>2 hours</td>
</tr>
</tbody>
</table>
Management of Opioid Related Side Effects

Opioids have the potential to cause itch, startles, urinary retention, constipation, nausea and vomiting and opioid-induced ventilatory impairment including sedation and respiratory depression. Opioid-induced ventilatory impairment is a term encompassing opioid-induced central respiratory depression (decreased respiratory drive), decreased level of consciousness (sedation) and upper airway obstruction, all of which, alone or in combination may result in decreased alveolar ventilation and increased arterial carbon dioxide levels. These are side effects rather than allergic reactions and are usually dose related for each individual. Refer to Recognising and Responding to Clinical Deterioration clinical guideline when clinically appropriate.

Itch

Opioid-induced itch is primarily on the face and chest

> Maximise opioid sparing analgesia
> There is some evidence that a 5-HT₃ receptor antagonist, such as ondansetron, decreases the incidence and severity of opioid-induced itch
> If itch is distressing and/or impacting on sleep and recovery, consider change of opioid or change from intravenous to oral route if clinically appropriate
> Non-pharmacological measures e.g. cool face cloths
> Low dose naloxone may be titrated to effect to relieve opioid-induced itch following therapeutic doses without affecting analgesia
  ○ dosage: 1 microgram/kg/dose - repeat after 30 minutes if required

Startles

Occurs most often in infants and young children

> Maximise opioid sparing analgesia
> If startles are distressing and/or impacting on sleep and recovery, consider change of opioid or change from intravenous route to oral route if clinically appropriate

Urinary Retention

> Maximise opioid sparing analgesia
> Use appropriate strategies to encourage urination
> Consider other reasons for urinary retention/lack of urinary output
> Escalate to treating team as per clinical escalation guidelines

Constipation

> Monitor bowel function
> Consider regular stool softeners and stimulant laxatives for patients receiving regular opioids
> Avoid bulk-forming laxatives in opioid induced constipation.
Considerations when managing post-operative nausea and vomiting

- Limit/cease oral intake
- Hydrate patient (IV fluids)
- Minimise activity
- Encourage rest/sleep
- Reassure
- Manage discomfort
- Maximise opioid sparing analgesia
- If concern about opioid related nausea and vomiting, consider change of opioid or change from intravenous to oral route of administration if clinically appropriate
- Review to exclude other reasons for persistent nausea and vomiting
- Many patients receive antiemetics in theatre – check intra-operative anaesthetic chart
- Ondansetron can cause prolongation of the QT interval. Use with caution in patients who have pre-existing prolongation of the QT interval, are taking other medications which may increase the QT interval or have risk factors for a prolonged QT interval.
Sedation indicating Potential Opioid-Induced Ventilatory Impairment including Respiratory Depression

The best clinical indicator for potential opioid-induced ventilatory impairment is increasing sedation

1. Check respiratory rate, depth and SpO₂
2. Stimulate the patient
3. Administer oxygen and initiate other resuscitation measures as clinically appropriate
4. If patient is on a PCA or opioid infusion, put the pump on hold
5. Escalate to a medical officer or Medical Emergency Response as clinically indicated
6. If observations stable, including respiratory rate and SpO₂:
   - continue continuous oximetry until sedation resolves
   - restart PCA or opioid infusion at a lower rate once sedation score < 2 and pain score ≥ 3.

If patient using oral or IV bolus opioid administration, ask the treating team or the Acute Pain Service, if involved, for a review of the analgesia including dosage before the next dose is required.

Naloxone may be necessary following review by an anaesthetist or Medical Emergency Response team.

Naloxone for Reversal of Opioid Action – acute opioid overdose or sedation due to therapeutic use

> Naloxone may be necessary following review by an anaesthetic, ED or ICU specialist.
> Naloxone is short-acting (20-60 minutes) and therefore is shorter acting than most opioids.

Observe the patient closely for any recurrence of sedation following the last naloxone dose for a minimum of:

- 4 hours for short-acting opioid such as immediate release formulations
- 24 hours for long-acting opioid such as slow/controlled/modified release formulations or methadone.

Dosage:

> Paediatrics: refer to Australian Medicines Handbook – Children’s Dosing Companion

- Contraindicated in newborn infants born to opioid dependent mother: risk of rapid onset of withdrawal, including seizures (link to South Australian Perinatal Practice Guideline – Infants of Drug Dependent Women).
Paracetamol

<table>
<thead>
<tr>
<th>Age</th>
<th>Dose</th>
<th>Preparation</th>
<th>Indication and additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth (at term) – 1 month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(44 weeks post conceptual age)</td>
<td>Refer to South Australian Neonatal Medication Guideline - Paracetamol</td>
<td>Mild to moderate pain</td>
<td></td>
</tr>
<tr>
<td>&gt;1 month (44 weeks post conceptual age)</td>
<td>Refer to Australian Medicines Handbook – Children’s Dosing Companion</td>
<td>Oral (liquid): 250 mg/5mL check specific bottle</td>
<td>May be used as a component of multimodal analgesia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral (tablets): 500 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rectal (suppository):</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 mg*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>60 mg*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>125 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>250 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>500 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*WCHN manufactured product</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Injection: 1 g/100mL</td>
<td></td>
</tr>
</tbody>
</table>

**Relative contraindications/considerations when ordering paracetamol**

Refer to Australian Medicines Handbook – Children’s Dosing Companion

**Indications for intravenous use**

- Current SA Medicines Formulary restriction: when other forms of paracetamol are inappropriate – patients MUST be nil by mouth
- Not tolerating oral intake
- Rectal route not available e.g. rectal surgery, oncology
- Rectal route refused or inappropriate
- As soon as the oral or rectal routes are available, intravenous route should be changed
Non-steroidal Anti-inflammatory Drugs (NSAIDs)

<table>
<thead>
<tr>
<th>Dose</th>
<th>Preparation</th>
<th>Indication and additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ibuprofen</strong></td>
<td>Oral (liquid): 100 mg/5mL</td>
<td>Mild to moderate pain, especially in relation to an inflammatory process</td>
</tr>
<tr>
<td></td>
<td>Oral (tablets): 200 mg 400 mg</td>
<td>Administer oral preparations with food or milk</td>
</tr>
<tr>
<td></td>
<td><em>single dose may be given without food/milk although this may cause mild stomach irritation</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>May be used as a component of multimodal analgesia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>May be given with paracetamol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See below for relative contraindications/considerations</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Do not give to infants &lt; 3 months of age</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Diclofenac</strong></td>
<td>Suppositories: 12.5 mg 25 mg 50 mg 100 mg</td>
<td>May be used as a component of multimodal analgesia</td>
</tr>
<tr>
<td></td>
<td>Oral (tablets): 25 mg 50 mg</td>
<td>May be given with paracetamol</td>
</tr>
<tr>
<td></td>
<td><strong>Give rectal only with parental consent</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oral (capsules):</td>
<td>See below for relative contraindications/considerations</td>
</tr>
<tr>
<td></td>
<td>100 mg 200 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>No liquid preparation available</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Do not give to infants &lt; 6 months of age</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Celecoxib</strong></td>
<td>Selective COX-2 Inhibitor</td>
<td>May be given without regard for timing of meals</td>
</tr>
<tr>
<td></td>
<td>100 – 200 mg oral twice daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multiple doses (up to 14 days) for patients &gt; 12 years of age and &gt; 40kg AND who can take oral medicines but are not tolerating food (alternative to parecoxib)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oral (capsules): 100 mg 200 mg</td>
<td></td>
</tr>
</tbody>
</table>
Parecoxib
Selective COX-2 Inhibitor

<table>
<thead>
<tr>
<th>1 mg/kg</th>
<th>Injection: 40 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV once daily</td>
<td></td>
</tr>
</tbody>
</table>

Maximum dose: 40 mg/dose

paediatric surgical patients
≥ 2 years of age

Multiple doses (up to 3 further doses in the post-operative setting) for children ≥ 2 years of age on recommendation of the WCH Acute Pain Service only

No further NSAID for at least 12 hours

Relative contraindications/considerations when ordering NSAIDs

> Hypovolaemia, dehydration, prolonged lack of oral intake – NSAIDs may reduce renal function and cause acute renal impairment (prostaglandins are important in maintaining renal blood flow when circulating blood volume is decreased)
> Pre-eclampsia
> Pregnancy
> Renal disease
> Severe hepatic impairment
> Avoid if receiving other nephrotoxic antimicrobials i.e. vancomycin, gentamicin and tobramycin
> NSAID/Aspirin induced Asthma – NSAIDs may increase risk of bronchospasm. If trialled previous NSAID with no issues – may be used. If not previous trial of NSAID – suggest use.
> Bleeding/clotting disorder – non-selective NSAIDs may increase risk of bleeding (anti-platelet effect)
> Likelihood of surgical intervention within 48 hours – particularly if there is a significant risk of post-operative bleeding and in people requiring critical haemostasis
> History of gastrointestinal bleeding, ulceration or inflammatory bowel disease
> Recent neurosurgical/transcranial procedure
> Ear, Nose & Throat surgery (consult with surgeon)
> Cardiovascular disease or increased cardiovascular risk is present
> Known hypersensitivity reaction
> Rectal administration contraindicated in: inflammatory bowel disease, surgery or inflammatory conditions of the rectum, anus or sigmoid colon and most oncology patients
Tramadol

Dose reduction required for renal or severe hepatic impairment.

*It is not recommended to prescribe Tramadol to outpatients – seek expert advice.*

<table>
<thead>
<tr>
<th>Dose</th>
<th>Preparation</th>
<th>Indication and additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tramadol – Immediate Release</strong></td>
<td>Oral (capsules): 50 mg</td>
<td>Moderate pain</td>
</tr>
<tr>
<td>Refer to <a href="#">Australian Medicines Handbook – Children’s Dosing Companion</a></td>
<td>For doses other than 50 mg or 100 mg orally, disperse contents of capsule: 50 mg made up to 10mL in water = 5 mg/mL</td>
<td>May be used as an analgesic in its own right or as an opioid sparing agent</td>
</tr>
<tr>
<td></td>
<td>Injection: 100 mg/2mL</td>
<td>Reputation for nausea but well tolerated by many, especially children</td>
</tr>
<tr>
<td></td>
<td>Tramadol drops not recommended for children</td>
<td>Report tachycardia, tremor, sedation or agitation to treating team</td>
</tr>
</tbody>
</table>

**Do not give to infants < 12 months of age**

| **Tramadol – Slow Release** | Oral (tablets): 50 mg | Time to peak concentration: 10-12 hours after 1st dose |
| Minimum patient weight: 25kg | 100 mg | Duration of effect: 12 hours |
| Refer to [Australian Medicines Handbook](#) | Tablets must not be crushed, cut or chewed | |
| Always tick the SR box on the National Standard Medication Chart when prescribing for inpatients |  | When ordering for discharge: |
| If prescribing SR + immediate release tramadol for breakthrough, do not exceed maximum recommended daily dose |  | • Patient must have tolerated a dose during current admission |

When ordering for discharge:
- Patient must have tolerated a dose during current admission
- Order a clinically appropriate quantity
- Dispersing of capsules requires specific caregiver education from a pharmacist

See below for relative contraindications/considerations

Tramadol drops not recommended for children
Relative contraindications/considerations when ordering tramadol

Do not use for the following patients:
- **History of seizures or a recognised risk for seizures as it may lower seizure threshold**
- Concurrently taking selective serotonin reuptake inhibitors (citalopram, dapoxetine, escitalopram, fluoxetine, fluvoxamine, paroxetine, sertraline) and serotonin and noradrenaline reuptake inhibitors (desvenlafaxine, duloxetine, venlafaxine) – risk of serotonin toxicity
- Received pethidine in the last two days
- Received moclobemide in the last two days
- Received monoamine oxidase inhibitors (phenelzine, transylcypromine) in the last 14 days.

Use with caution:
- Tramadol is metabolised to an active metabolite by CYP2D6; variable metabolism may result in toxicity or reduced effect
- In patients who are taking warfarin - may increase anticoagulant effects
- In patients who are taking tricyclic antidepressants (amitriptyline, clomipramine, dosulepin (dothiepin), doxepin, imipramine, nortriptyline) especially at higher doses
- Carbamazepine - may reduce tramadol's activity
### Oral Opioid – Immediate Release

**Dose reduction required for renal or severe hepatic impairment**

<table>
<thead>
<tr>
<th>Dose</th>
<th>Preparation</th>
<th>Routine observations</th>
<th>Indication and additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oxycodone – Oral</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refer to <a href="#">Australian Medicines Handbook – Children’s Dosing Companion*</a></td>
<td>Oral (liquid): 1 mg/mL</td>
<td>Observe at 1 hour for analgesic effect and side effects</td>
<td>Moderate – severe pain if oral route available</td>
</tr>
<tr>
<td></td>
<td>Oral (tablets): 5 mg</td>
<td></td>
<td>Oral opioid of choice for children</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Special monitoring precautions for infants &amp; neonates</em></td>
<td>Document on medication chart: only give if sedation score &lt; 2 (only give if SS&lt;2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Consider minimising supply quantity on discharge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Immediate release opioids may occasionally be used at regular (scheduled) intervals or shorter intervals than those stated above with Acute Pain Service advice</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Morphine – Oral</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refer to <a href="#">Australian Medicines Handbook – Children’s Dosing Companion*</a></td>
<td>Oral (liquid): 5 mg/mL</td>
<td>Observe at 1 hour for analgesic effect and side effects</td>
<td>Moderate – severe pain if oral route available</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Special monitoring precautions for infants &amp; neonates</em></td>
<td>Morphine liquid is less palatable than oxycodone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Document on medication chart: only give if sedation score &lt; 2 (only give if SS&lt;2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Larger doses may be ordered as a component of procedural analgesia – refer to organisational procedure for dosing &amp; monitoring</td>
</tr>
</tbody>
</table>

*For infants < 12 months of age or concerns re. respiratory depression – consult with Anaesthetic, Medical, ICU, ED or Neonatal Consultant*
Oral Opioid – Slow Release (SR) / Modified Release (MR) / Controlled Release (CR) and Long-Acting

⚠️ Slow release opioids are not recommended for acute pain management ⚠️
refer to Slow/Modified/Controlled Release Opioids section

**Oxycodone Slow Release**
(Oxycontin® SR)

Non-formulary – not stocked at the WCH*
*available on Statewide Formulary – at WCH can be prescribed for continuing therapy while inpatient on recommendation of WCH Pain Service

**Tramadol Slow Release**
Refer to Tramadol section

**Methadone**
Long-acting
⚠️ Specialised modality – seek expert advice ⚠️

<table>
<thead>
<tr>
<th>Dose</th>
<th>Preparation</th>
<th>Routine observations</th>
<th>Indication and additional information</th>
</tr>
</thead>
</table>
| **Morphine SR**
(MS Contin®)

⚠️ Specialised modality – seek expert advice ⚠️

Refer to Australian Medicines Handbook – Children’s Dosing Companion

*Time to peak concentration: 3-4 hours after 1st dose*

*Duration of effect: 12 hours*

- Oral (sachets): 20 mg made up to 10 mL water = 2 mg/mL
- Oral (tablets): 5 mg 10 mg 15 mg 30 mg 60 mg

Observe for and report excessive sedation, especially at commencement of therapy or with dose increase

Moderate – severe pain
At WCH, must only be prescribed by:
- Acute Pain Service (APS)
- Chronic Pain Service
- Palliative Care
- Other Consultant medical officer staff experienced in the prescribing of slow release opioids

Document on medications chart: only give if sedation score <2 (only give if SS<2)

Tablets must not be crushed, cut or chewed

**Practice Points when ordering Morphine SR (MS Contin®).**

- Consider dose reduction in renal or hepatic impairment.
- It takes 2-3 days to reach steady state following commencement.
- Breakthrough analgesia should be ordered PRN if used for analgesia.
- Can be used within an opioid weaning process, opioid tolerance or opioid rotation.
- In most instances, slow release or long-acting doses should be administered even when patients are fasting prior to a general anaesthetic.
- Tick the SR box on the medication chart when prescribing these medications.
Intravenous Opioid – Bolus

**Morphine:** consider dose reduction in renal or hepatic impairment

**Fentanyl:** consider dose reduction in renal impairment

- Single dose intravenous bolus opioids have a role in the management of short term moderate-severe pain or incident related pain
- If regular bolus doses are required, the use of PCA, NCA or opioid infusions should be considered if available in your organisation using organisational procedures

### Dose

<table>
<thead>
<tr>
<th>Drug</th>
<th>Preparation</th>
<th>Routine Observations</th>
<th>Indication and additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>Injection: 10 mg/mL</td>
<td>Record pre and 5 minutes, 15 minutes and 30 minutes post administration: respiratory rate, heart rate, SpO₂, sedation score and pain score</td>
<td>Single dose: moderate – severe pain or incident related pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous oximetry recommended for all and mandatory for infants &lt; 12 months of age</td>
<td>If regular bolus doses are required, the use of PCA or opioid infusion should be considered</td>
</tr>
<tr>
<td></td>
<td></td>
<td>'Pain Protocols’ for use ONLY in Emergency Department and Post Anaesthetic Care Unit by accredited staff following local organisational guidelines</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Larger IV doses may be ordered as a component of paediatric procedural analgesia refer to organisational procedure for dosing &amp; monitoring</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Document on medication chart: only give if sedation score &lt; 2 (only give if SS&lt;2)</td>
<td></td>
</tr>
</tbody>
</table>

**Fentanyl** – Intravenous

Refer to Australian Medicines Handbook – Children’s Dosing Companion

- Infants < 12 months of age: special dosing precautions - consult with Anaesthetic, Medical, ICU, ED or Neonatal Consultant
- Time to peak concentration: 3-5 minutes
- Duration of effect: 30-60 minutes

- If given in conjunction with sedative agents for procedural pain, refer to organisational procedure for personnel & monitoring

- Special monitoring precautions for infants <12 months of age - refer to Minimum Observations

- Document on medication chart: only give if sedation score < 2 (only give if SS<2)
Subcutaneous (SC) and Intramuscular (IM) Opioid – Intermittent

**Morphine – Subcutaneous / Intramuscular**

**Fentanyl – Subcutaneous**

⚠️ Not recommended for general paediatric use ⚠️

---

**Intranasal Fentanyl**

<table>
<thead>
<tr>
<th>Dose</th>
<th>Preparation</th>
<th>Routine Observations</th>
<th>Indication and additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fentanyl – Intranasal</td>
<td>Injection: 50 microgram/mL</td>
<td>Prior to administration and 10 minutes following each dose: heart rate, respiratory rate, SpO₂, pain score and sedation score</td>
<td>Severe pain</td>
</tr>
</tbody>
</table>

**Indication**

- May be used as initial analgesia or procedural pain management e.g. fractures requiring plaster application or wound exploration
- Do not use if the patient has an altered conscious state, head injury or if they have upper respiratory or nasal tract infection as absorption can be altered
- Document on medication chart: only give if sedation score < 2 (only give if SS<2)

**Administration**

Use a Mucosal Atomiser Device® (MAD) and a 3mL syringe

1. Draw up more than required dose
2. Attach MAD to the syringe
3. Prime syringe to correct dose - this eliminates dose errors from 0.09mL dead space in atomiser
4. Position the patient, if able, sitting up with head tilted back at a 45° angle
5. Deliver fentanyl into single nostril – the volume may be equally divided into both nostrils, especially if large volume

---

**Time to therapeutic level:** 10 minutes

**Duration of effect:** 30-60 minutes

**Infants < 12 months of age:** special dosing precautions - consult with Anaesthetic, Medical, ICU, ED or Neonatal Consultant

---

Refer to

Australian Medicines Handbook – Children’s Dosing Companion
### Transdermal Opioid

⚠️ **Not recommended for acute pain management** ⚠️

Refer to organisational procedures for management of patches

<table>
<thead>
<tr>
<th>Dose</th>
<th>Available sizes</th>
<th>Routine Observations</th>
<th>Indication and additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fentanyl – Transdermal</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

⚠️ **Specialised modality – seek expert advice** ⚠️

If converting from parenteral or oral opioid analgesic medication:
starting dose can be estimated using the total opioid requirement in the previous 24 hours using an equianalgesic table or Opioid Calculator available from ANZCA Faculty of Pain Medicine website or app store

It is preferable to choose a slightly lower dose and provide breakthrough analgesia when commencing therapy

Patch size may be titrated depending on breakthrough use

- Fentanyl: 12 microgram/hr
- 25 microgram/hr
- 50 microgram/hr
- 75 microgram/hr
- 100 microgram/hr

- Buprenorphine: 5 microgram/hr
- 10 microgram/hr

Observe for sedation during the first 24 hours of therapy or if the patch size is increased

Predominantly used in palliative care, oncology or for patients requiring a few days of background opioid who are non-compliant with oral medications and have no IV access

### Practice Points when ordering transdermal opioids

- Do not use for opioid naïve patients.
- The initial patch will take time to reach peak effect and breakthrough analgesia may be required during this period.
- Check with a pharmacist or prescriber that the patch is suitable for cutting.
- Patients require observation for over sedation during the first 24 hours of therapy or if the patch size is increased.
- Check patch 2-3 times daily and document to ensure patch remains in place.
- Remove the old patch prior to applying a new patch.
- Dispose of used patches as per organisational procedure - must be folded over and disposed of in a yellow sharps container.

### Time to peak effect of transdermal opioids:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Time to steady state after initial patch application or dose increase</th>
<th>Patch replacement</th>
<th>Length of effect following patch removal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fentanyl</td>
<td>12 – 24 hours (therapeutic at 6 hours)</td>
<td>Every 3 days</td>
<td>50% wears off over 17 hours</td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>Up to 3 days</td>
<td>Weekly</td>
<td>50% wears off over 12 hours</td>
</tr>
</tbody>
</table>
Additional Adjuvant Medications

**Muscle Relaxant: Diazepam**
- Muscle spasm may occur following some neurosurgery or orthopaedic surgery/trauma
- Oral diazepam is the medication of choice
- If patient is on concurrent opioids or sedating medications, monitor SpO2 following initial dose

**Dosage:** Diazepam
Refer to Australian Medicines Handbook – Children’s Dosing Companion

**Clonidine**
- $\alpha_2$ adrenergic agonist
- Has analgesic and sedative properties as well as a role in facilitating opioid weaning
- Anti-hypertensive – do not give if hypotensive
  - Monitor blood pressure with 1st dose and any subsequent dose increases:
    - IV: pre and 30 minutes post administration
    - Oral: pre and 1 hour post administration
- Reduce dose if sedation excessive
- Regular dosing can be stopped immediately if used for less than 2 weeks
- If used for more than 2 weeks, wean off regular dose – suggest daily over at least 5 days then stop

**Dosage:** consider dosage reduction in renal impairment
Oral / IV clonidine dose: 1-2 micrograms/kg/dose 8 hourly regularly or PRN

**Amitriptyline**
- Tricyclic antidepressant but can be used for the management of neuropathic pain in low doses
- No oral mixture available

**Dosage:** prescribed once per day 2 hours prior to bed time
Refer to Australian Medicines Handbook – Children’s Dosing Companion

**Gabapentin**
- Anticonvulsant medication but can be used in the management of neuropathic pain
- Used in post-operative and burn injury for neuropathic pain
- Not available on PBS for neuropathic pain so not first choice for outpatient care
- No oral mixture available but the contents of the capsules may be dispersed in 10mL of water before administration

**Dosage:** consider dosage reduction in renal impairment
Refer to Australian Medicines Handbook – Children’s Dosing Companion

**Pregabalin**
- Available on PBS for neuropathic pain
- No oral mixture available

**Dosage:**
No paediatric dosing guidelines available
Intravenous Opioid / Analgesic Infusions / Nurse Controlled Analgesia (NCA)

⚠️ Specialised modality – seek expert advice ⚠️

Opioid infusions and nurse controlled analgesia provide continuous and/or bolus doses of opioid/analgesic medication for the management of acute pain to infants, children and older patients who are unable to effectively manage patient controlled analgesia.

Refer to organisational procedure for indications, contraindications, management and specific patient monitoring requirements. The syringe pump should be lockable to prevent accidental or intentional tampering.

Patients receiving opioid infusions require close observations because of the risk of accumulation and adverse effects. Continuous pulse oximetry is mandatory for all patients and must continue for at least two hours following cessation of opioid infusion. As a minimum, document respiratory rate, heart rate, SpO₂, sedation score and pain score at least hourly.

Infants – additional monitoring

The physiological immaturity of infants increases their sensitivity to opioids. Particular attention and longer monitoring is required in infants receiving opioid infusion and following cessation of opioid infusion – refer to Minimum Observations Following Opioid Administration section

> Morphine - consider dose reduction in hepatic or renal impairment
> Fentanyl - consider dose reduction in renal impairment

Opioid / Analgesic Infusion standard dosing protocol:

<table>
<thead>
<tr>
<th>Infants LESS than 1 year</th>
<th>Morphine or Oxycodone</th>
<th>Fentanyl</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Add 0.5 mg/kg and dilute to a total volume of 50mL with sodium chloride 0.9% (10micrograms/kg/mL)</td>
<td>• Add 10 micrograms/kg and dilute to a total volume of 50mL with sodium chloride 0.9% (0.2micrograms/kg/mL)</td>
<td></td>
</tr>
<tr>
<td>• Rate: 0 – 2 mL/hr (0 – 20 micrograms/kg/hr)</td>
<td>• Rate: 0 – 2 mL/hour (0 – 0.4 micrograms/kg/hr)</td>
<td></td>
</tr>
<tr>
<td>• Bolus dose: 1 – 2mL (10 – 20 micrograms/kg) every 30 minutes PRN for breakthrough or intervention pain.</td>
<td>• Bolus dose: 1 – 2mL (0.2 – 0.4 micrograms/kg) every 15 minutes PRN for breakthrough or intervention pain</td>
<td></td>
</tr>
</tbody>
</table>
Children 1 year and OVER

<table>
<thead>
<tr>
<th>Morphine or Oxycodone</th>
<th>Fentanyl</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Add 0.5 mg/kg (maximum 50mg/50mL) and dilute to a total volume of 50mL with sodium chloride 0.9% (10 micrograms/kg/mL or less if &gt;50kg)</td>
<td>• Add 10 micrograms/kg (maximum 1000micrograms/50mL) and dilute to a total volume of 50mL with sodium chloride 0.9% (0.2 micrograms/kg/mL or less if &gt;50kg)</td>
</tr>
<tr>
<td>• Rate: 0 – 4 mL/hour (0 – 40 micrograms/kg/hr)</td>
<td>• Rate: 0 – 4 mL/hour (0-0.8 micrograms/kg/hr)</td>
</tr>
<tr>
<td>• Bolus dose: 1 – 3mL (10 – 30 micrograms/kg) every 30 minutes PRN for breakthrough or intervention pain.</td>
<td>• Bolus dose: 1 – 3mL (0.2 – 0.6 micrograms/kg) every 15 minutes PRN for breakthrough or intervention pain</td>
</tr>
</tbody>
</table>

Low dose ketamine infusions may be prescribed to provide adjuvant analgesia in order to enhance the analgesic effects of opioid medications while acting as an opioid sparing agent and in the prevention and treatment of neuropathic pain. Ketamine may be used prior to and after an amputation to try and prevent subsequent phantom pain. Ketamine may cause dysphoric reactions.

Ketamine – Low Dose Infusion

Low dose ketamine infusion may be prescribed to provide adjuvant analgesia in order to enhance the analgesic effect of opioid medications while acting as an opioid sparing agent and in the prevention and treatment of neuropathic pain.

• Add 5 mg/kg (maximum 200mg/50mL) and dilute to a total volume of 50mL with sodium chloride 0.9% (100 micrograms/kg/mL or less if >40kg)
• Rate: 0 – 2 mL/hour (0 – 200 micrograms/kg/hr)
• Bolus doses are not to be given outside of PICU
Patient Controlled Analgesia (PCA)

Specialised modality – seek expert advice

Patient controlled intravenous analgesia (PCA) is a method of pain control that allows patients to self-administration analgesia using a programmable device in response to pain or anticipated pain.

Refer to organisational procedure for indications, contraindications, management and specific patient monitoring requirements. The syringe pump should be lockable to prevent accidental or intentional tampering.

Patients receiving opioid infusions require close observations because of the risk of accumulation and adverse effects. Continuous pulse oximetry is mandatory for all patients and must continue for at least two hours following cessation of opioid infusion. As a minimum, document respiratory rate, heart rate, SpO₂, sedation score and pain score at least hourly.

PCA is usually programmed without a background infusion, particularly in opioid naïve patients. A background infusion increases the risk of sedation and respiratory depression.

Dilute to a total of 50mL with sodium chloride 0.9%

Dosing Protocol:

**Morphine or Oxycodone**

<table>
<thead>
<tr>
<th>Less than 50kg:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Add 1 mg/kg and dilute to a total volume of 50mL with sodium chloride 0.9% (20 micrograms/kg/mL)</td>
</tr>
<tr>
<td>• Bolus dose: 1mL = 20 micrograms/kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>50kg or greater:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Add 50 mg and dilute to a total volume of 50mL with sodium chloride 0.9% (1 mg/mL)</td>
</tr>
<tr>
<td>• Bolus dose: 1mL = 1 mg</td>
</tr>
</tbody>
</table>

**Fentanyl**

<table>
<thead>
<tr>
<th>Less than 50kg:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Add 20 micrograms/kg and dilute to a total volume of 50mL with sodium chloride 0.9% (0.4 micrograms/kg/mL)</td>
</tr>
<tr>
<td>• Bolus dose: 1mL = 0.4 micrograms/kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>50kg or greater:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Add 1000 micrograms and dilute to a total volume of 50mL with sodium chloride 0.9% (20 micrograms/mL)</td>
</tr>
<tr>
<td>• Bolus dose: 1mL = 20 micrograms</td>
</tr>
</tbody>
</table>

**Administration Order:**

- Lockout period: 5 minutes – may be adjusted by prescriber according to symptoms
- Continuous background infusion: rarely required
  - do not consider a background infusion unless sedation score ≤ 1 i.e. the patient is easy to rouse to voice or light touch and able to maintain eye opening and eye contact for >10 seconds
- PCA delivery: stat – may be adjusted by prescriber according to symptoms
Acute Pain Management and Opioid Safety in Children
South Australian Paediatric Clinical Practice Guidelines

References

Acknowledgements
The South Australian Child and Adolescent Health Community of Practice gratefully acknowledges the contribution of clinicians and other stakeholders who participated throughout this guidelines development process, particularly:

Write Group Lead
Dr Laura Burgoyne

Write Group Member
Rachel Dineen

South Australian Paediatric Clinical Practice Guideline Reference Group