South Australian Paediatric Clinical Practice Guidelines

Acute Pain Management and Opioid Safety in Children

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.

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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.

Cultural safety enhances clinical safety.

To secure the best health outcomes, clinicians must provide a culturally safe health care experience for Aboriginal children, young people and their families. Aboriginal children are born into strong kinship structures where roles and responsibilities are integral and woven into the social fabric of Aboriginal societies.

Australian Aboriginal culture is the oldest living culture in the world, yet Aboriginal people currently experience the poorest health outcomes when compared to non-Aboriginal Australians.

It remains a national disgrace that Australia has one of the highest youth suicide rates in the world. The over representation of Aboriginal children and young people in out of home care and juvenile detention and justice system is intolerable.

The cumulative effects of forced removal of Aboriginal children, poverty, exposure to violence, historical and transgenerational trauma, the ongoing effects of past and present systemic racism, culturally unsafe and discriminatory health services are all major contributors to the disparities in Aboriginal health outcomes.

Clinicians can secure positive long term health and wellbeing outcomes by making well informed clinical decisions based on cultural considerations.

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).

Government of South Australia
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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

Abbreviations

ED	Emergency Department
G	grams
ICU	Intensive Care Unit
IV	Intravenous
Kg	kilograms
MAD	Mucosal Atomiser Device®
Mg	Milligrams
mL	milliliters
NCA	Nurse Controlled Analgesia
NSAIDs	Non-steroidal anti-inflammatory drugs
PBS	Pharmaceuticals Benefit Scheme
PCA	Patient Controlled Analgesia
PO	Per oral
QID	*Quarter in die* (four times a day)
Sedation score 1	Awake, alert
Sedation score 2	Easy to rouse
Sedation score 3	Easy to rouse, difficulty staying awake
Sedation score 4	Difficult to rouse (severe respiratory depression)
SNRIs	Serotonin noradrenaline reuptake inhibitors
SpO_2	Oxygen saturation measure by pulse oximetry
SR	Slow release
SS	Sedation score
SSRIs	Selective serotonin reuptake inhibitors
TDS	*Ter die sumendum* (three times a day)
WCHN	Women's and Children's Health Network

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

Pain Assessment Tools

FLACC Pain Score (behavioural)

Suggested age group: term neonates – 7 years and for older children who are non-verbal

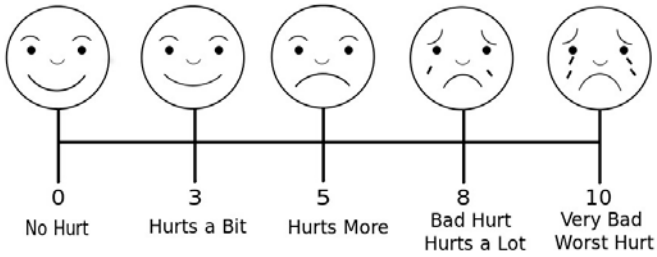
Instructions:

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

	Scoring		
Categories	**0**	**1**	**2**
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaints	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or talking, distractible	Difficult to console or comfort

Faces Scale

Suggested age group: 4 years and older.
Patients have an option of 5 faces to select across a pain scale 0-10.



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.

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:
  - opioids available
  - formulations available
  - routes of administration
  - management of potential side effects
  - 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-naive 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 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.

ROUTE	OBSERVATIONS
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 < 12months – **see Infants alert below**
Intramuscular / subcutaneous opioids **Not recommended for general paediatric use**	**Subcutaneous Fentanyl:** Record pre and 15 minutes post each dose administration: respiratory rate, heart rate, SpO_2, sedation score and pain score. **Morphine:** Record pre and 30 minutes post each dose administration: respiratory rate, heart rate, SpO_2, sedation score and pain score.
Intravenous bolus	Record pre and 5, 15 and 30 minutes post administration: • respiratory rate, heart rate, SpO_2, 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, SpO_2, 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, SpO_2, 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 <u>any route</u> require minimum cardio-respiratory monitoring as below

Age	Minimum duration of monitoring
Ex-premature infant up to 6 months corrected age (older if persisting respiratory issues)	12 hours post opioid or last apnoea/brady
Full term infant: Birth - 2 months	8 hours
Full term infant: 2 - 6 months (pulse oximetry monitoring may be sufficient)	4 hours
6 – 12 months (pulse oximetry monitoring may be sufficient)	2 hours

Management of Opioid Related Side Effects

Opioids have the potential to cause itch, startles, urinary retention, constipation, nausea and vomiting, sedation and respiratory depression. 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-HT_3 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

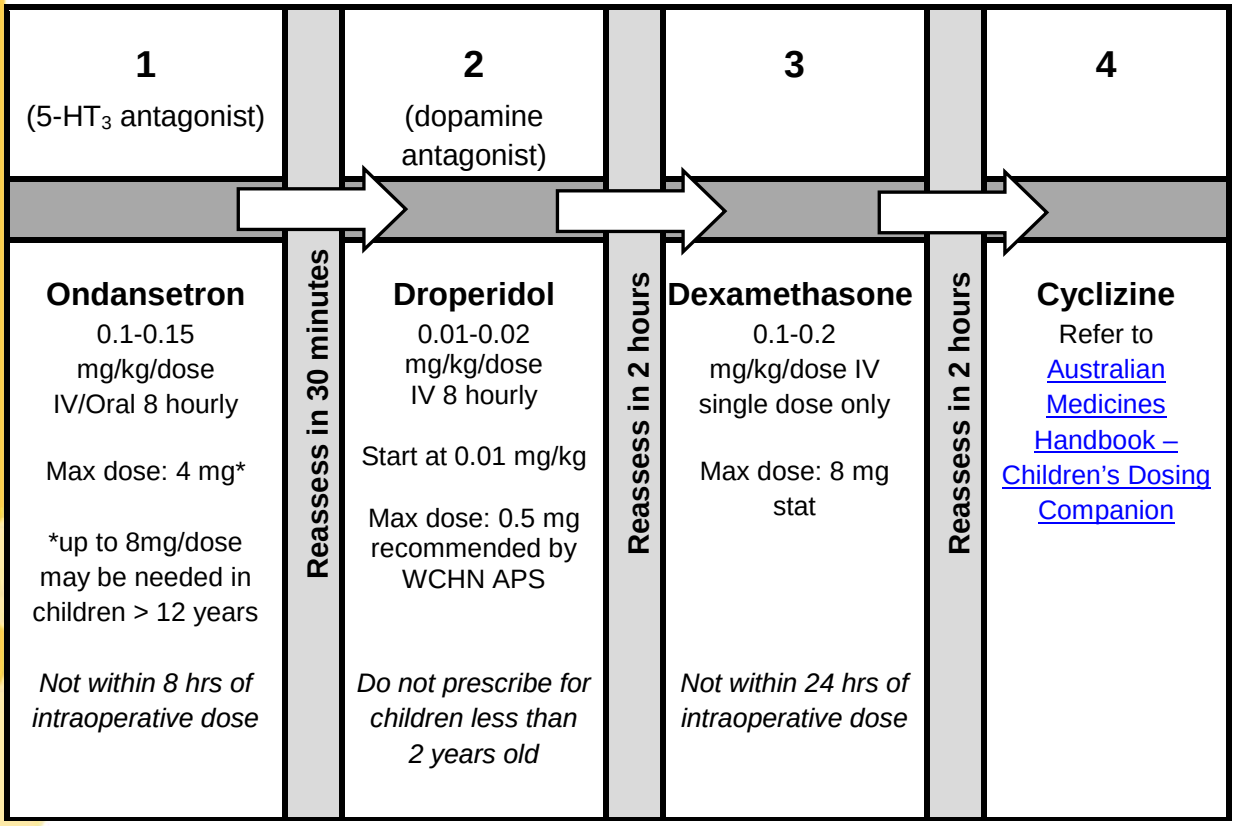
Urinary Retention

- 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.

Post-operative / Opioid Induced Nausea and Vomiting



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 Respiratory Depression

The best clinical indicator for potential respiratory depression is increasing sedation

1. Check respiratory rate, depth and SpO_2
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 SpO_2:
    - 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

Age	Dose	Preparation	Indication and additional information
Paracetamol			
Neonate	Refer to South Australian Neonatal Medication Guideline - Paracetamol		Mild to moderate pain May be used as a component of multimodal analgesia May be given in conjunction with ibuprofen if no contraindications for NSAID See below for relative contraindications/ considerations and indications for intravenous use
Birth (at term) – 1 month (44 weeks post conceptual age)			
>1 month (44 weeks post conceptual age)	Refer to Australian Medicines Handbook – Children's Dosing Companion **Give PR only with parental consent**	Oral (liquid): 250 mg/5mL *check specific bottle Oral (tablets): 500 mg Rectal (suppository): 30mg* 60mg* 125mg 250mg 500mg *WCHN manufactured product Injection: 1 g/100mL	

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)

Dose reduction required for renal or severe hepatic impairment

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

Parecoxib Selective COX-2 Inhibitor		
1 mg/kg IV once daily 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 WCHN Acute Pain Service only *No further NSAID for at least 12 hours*	Injection: 40 mg	

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
- 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

Dose	Preparation	Indication and additional information
Tramadol – Immediate Release		Moderate pain May be used as an analgesic in its own right or as an opioid sparing agent Reputation for nausea but well tolerated by many, especially children Report tachycardia, tremor, sedation or agitation to treating team
Refer to Australian Medicines Handbook – Children's Dosing Companion ⚠ *Do not give to infants < 12 months of age*	Oral (capsules): 50 mg 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 Injection: 100 mg/2mL Tramadol drops not recommended for children	
Tramadol – Slow Release		**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
Minimum patient weight: 50kg Refer to Australian Medicines Handbook Always tick the SR box on the National Standard Medication Chart when prescribing for inpatients If prescribing SR + immediate release tramadol for breakthrough, do not exceed maximum recommended daily dose *Time to peak concentration: 10-12 hours after 1st dose* *Duration of effect: 12 hours*	Oral (tablets): 100 mg Tablets must not be crushed, cut or chewed	

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
- Theoretically stimulants (both methylphenidate and dexamphetamine) may contribute to serotonin syndrome.

Oral Opioid – Immediate Release

Dose reduction required for renal or severe hepatic impairment

Dose	Preparation	Routine observations	Indication and additional information
Oxycodone – Oral			
Refer to Australian Medicines Handbook – Children's Dosing Companion* ⚠ *For infants < 12 months of age or concerns re. respiratory depression* – consult with Anaesthetic, Medical, ICU, ED or Neonatal Consultant	Oral (liquid): 1 mg/mL Oral (tablets): 5 mg	Observe at 1 hour for analgesic effect and side effects ⚠ Special monitoring precautions for infants < 12 months of age - refer to Minimum Observations	Moderate – severe pain if oral route available Oral opioid of choice for children Document on medication chart: only give if sedation score < 2 (only give if SS<2) Consider minimising supply quantity on discharge
Morphine – Oral			
Refer to Australian Medicines Handbook – Children's Dosing Companion* ⚠ **For infants < 12 months of age or concerns re. respiratory depression* – consult with Anaesthetic, Medical, ICU, ED or Neonatal Consultant	Oral (liquid): 5 mg/mL	Observe at 1 hour for analgesic effect and side effects ⚠ Special monitoring precautions for infants < 12 months of age - refer to Minimum Observations	Moderate – severe pain if oral route available Morphine liquid is less palatable than oxycodone Document on medication chart: only give if sedation score < 2 (only give if SS<2) **Larger doses may be ordered as a component of procedural analgesia** – refer to organisational procedure for dosing & monitoring
*Immediate release opioids may occasionally be used at regular (scheduled) intervals or shorter intervals than those stated above with Acute Pain Service advice			

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 WCHN can be prescribed for continuing therapy while inpatient on recommendation of WCHN Pain Service

Tramadol Slow Release

Refer to Tramadol section

Methadone Long-acting

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

Dose	Preparation	Routine observations	Indication and additional information

Morphine SR (MS Contin®)

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

Dose	Preparation	Routine observations	Indication and additional information
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 = 2mg/mL Oral (tablets): 5 mg 10 mg 15 mg 30 mg 60 mg Tablets must not be crushed, cut or chewed	Observe for and report excessive sedation, especially at commencement of therapy or with dose increase ⚠ refer to Minimum Observations	Moderate – severe pain **At WCHN, 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)

> 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	Preparation	Routine observations	Indication and additional information
Morphine – Intravenous		Record pre and 5 minutes, 15 minutes and 30 minutes post administration: respiratory rate, heart rate, SpO_2, sedation score and pain score Continuous oximetry recommended for all and mandatory for infants < 12 months of age ⚠ Special monitoring precautions for infants <12 months of age - refer to Minimum Observations	Single dose: moderate – severe pain or incident related pain If regular bolus doses are required, the use of PCA or opioid infusion should be considered **'Pain Protocols' for use ONLY** in Emergency Department and Post Anaesthetic Care Unit by accredited staff following local organisational guidelines **Larger IV doses may be ordered as a component of paediatric procedural analgesia** refer to organisational procedure for dosing & monitoring Document on medication chart: only give if sedation score < 2 (only give if SS<2)
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 Titrate dose according to response and sedation *Time to peak concentration: 20 minutes* *Duration of effect: 2-4 hours*	Injection: 10 mg/mL		
Fentanyl – Intravenous		If given in conjunction with sedative agents for procedural pain, refer to organisational procedure for personnel & monitoring	
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	Injection: 50 micrograms/mL		

Subcutaneous (SC) and Intramuscular (IM) Opioid – Intermittent

Morphine – Subcutaneous / Intramuscular
Fentanyl - Subcutaneous
⚠ **Not recommended for general paediatric use** ⚠

Intranasal Fentanyl

Dose	Preparation	Routine Observations	Indication and additional information
Fentanyl – Intranasal			
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 therapeutic level: 10 minutes* *Duration of effect: 30-60 minutes*	Injection: 50 micrograms/mL	Prior to administration and 10 minutes following each dose: heart rate, respiratory rate, SpO_2, pain score and sedation score Patient must be observed for 45 minutes following last dose and until they have returned to their pre-analgesic level of functioning **If used with a sedative agent as a component of paediatric procedural analgesia –** refer to organisational procedure for additional monitoring	Severe pain 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

Transdermal Opioid

⚠ Not recommended for acute pain management ⚠

Refer to organisational procedures for management of patches

Dose	Available sizes	Routine Observations	Indication and additional information
Fentanyl – Transdermal **Buprenorphine - Transdermal** **⚠ 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:

Drug	Time to steady state after initial patch application or dose increase	Patch replacement	Length of effect following patch removal
Fentanyl	12 – 24 hours (therapeutic at 6 hours)	Every 3 days	50% wears off over 17 hours
Buprenorphine	Up to 3 days	Weekly	50% wears off over 12 hours

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

> α_2 adrenoreceptor 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
> Wean off regular doses to avoid rebound hypertension

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, SpO_2, sedation score and pain score at least hourly.

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:

Infants LESS than 1 year	
Morphine	**Fentanyl**
• Add **0.5mg/kg** of morphine to the syringe • Dilute to a total volume of 50mL with sodium chloride 0.9% (10 micrograms/kg/mL) • **Infuse at 0 – 2 mL/hour** (0- 20 micrograms/kg/hr) • **Recommended bolus** for pain or painful procedures • 1-2 mL (10- 20 micrograms/kg) every 30 minutes PRN	• Add **10 micrograms/kg** of fentanyl to the syringe • Dilute to a total volume of 50mL with sodium chloride 0.9% (0.2 micrograms/kg/mL) • **Infuse at 0 – 2 mL/hour (**0-0.4 micrograms/kg/hr) • **Recommended bolus** for pain or painful procedures • 1-2 mL (0.2-0.4 micrograms/kg) every 30 minutes PRN

Children 1 year and OVER	
Morphine	**Fentanyl**
• Add **0.5mg/kg** of morphine to the syringe • Dilute to a total volume of 50mL with sodium chloride 0.9% (10 micrograms/kg/ml) • **Infuse at 0 – 4 mL/hour** (0-40 micrograms/kg/hr) • **Recommended bolus** for pain or painful procedures • 1-3 mL (10-30 micrograms/kg) every 30 minutes PRN	• Add **10 micrograms/kg** of fentanyl to the syringe • Dilute to a total volume of 50mL with sodium chloride 0.9% (0.2 micrograms/kg/ml) • **Infuse at 0 – 4 mL/hour** (0-0.8 micrograms/kg/hr) • **Recommended bolus** for pain or painful procedures • 1-3 mL (0.2-0.6 micrograms/kg) every 30 minutes PRN

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 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 **5mg/kg** of ketamine to the syringe **(maximum adult dose 200mg)** • Dilute to a total volume of 50mL with sodium chloride 0.9% (100 micrograms/kg/mL or less if > 50kg) • **Infuse at 0 – 2 mL/hour** (0 – 200 micrograms/kg/hr)

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, SpO_2, sedation score and pain score at least hourly.

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

> **Choose the appropriate weight range**
> **Dilute to a total of 60mL** with sodium chloride 0.9%

Morphine

consider dose reduction in hepatic or renal impairment

Weight	mg per 60mL	Concentration (micrograms/mL)	Bolus Dose (micrograms)	Lockout Interval	PCA Dose Rate	Background (if used)
15 – 20 kg	18	300	300	5 mins	stat	150 – 300 micrograms/hr
21 – 26 kg	24	400	400	5 mins	stat	200 – 400 micrograms/hr
27 – 32 kg	30	500	500	5 mins	stat	250 – 500 micrograms/hr
33 – 38 kg	36	600	600	5 mins	stat	300 – 600 micrograms/hr
39 – 44 kg	42	700	700	5 mins	stat	350 – 700 micrograms/hr
45 – 50 kg	48	800	800	5 mins	stat	400 – 800 micrograms/hr
51 – 56 kg	54	900	900	5 mins	stat	450 – 900 micrograms/hr
57 kg+	60	1 mg	1 mg	5 mins	stat	500 – 1000 micrograms/hr

Order all increments of less than 1 mg in micrograms

Fentanyl consider dose reduction in renal impairment						
Weight	**micrograms per 60mL**	**Concentration (micrograms/ mL)**	**Bolus Dose (micrograms)**	**Lockout Interval**	**PCA Dose Rate**	**Background (if used)**
15 – 20 kg	360	6	6	5 mins	stat	3 – 6 micrograms/hr
21 – 26 kg	480	8	8	5 mins	stat	4 – 8 micrograms/hr
27 – 32 kg	600	10	10	5 mins	stat	5 – 10 micrograms/hr
33 – 38 kg	720	12	12	5 mins	stat	6 – 12 micrograms/hr
39 – 44 kg	840	14	14	5 mins	stat	7 – 14 micrograms/hr
45 – 50 kg	960	16	16	5 mins	stat	8 – 16 micrograms/hr
51 – 56 kg	1080	18	18	5 mins	stat	9 – 18 micrograms/hr
57 kg+	1200	20	20	5 mins	stat	10 – 20 micrograms/hr

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