



| <b>CLINICAL GUIDELINE</b>  |                              |
|--|------------------------------|
| <b>Pain Assessment and Management</b>  |                              |
| <b>Scope (Staff):</b>  | Nursing and Medical Staff    |
| <b>Scope (Area):</b>   | NICU KEMH, NICU PCH, NETS WA |
| <b>Child Safe Organisation Statement of Commitment</b>   |                              |
| <p>The Child and Adolescent Health Service (CAHS) commits to being a child safe organisation by meeting the National Child Safe Principles and National Child Safe Standards. This is a commitment to a strong culture supported by robust policies and procedures to ensure the safety and wellbeing of children at CAHS.</p> |                              |

**This document should be read in conjunction with this [DISCLAIMER](#)**

**Contents**

Introduction .....2

Key Points.....2

Common Painful Procedures in the NICU.....3

Adverse effects of Pain .....3

Physiological, behavioural and hormonal responses of neonatal pain .....3

Pain Assessment .....4

Frequency of Pain Assessment.....4

Documentation.....5

Pain Management.....5

Principles of pain management in neonates .....5

Non-pharmacological (comfort measures) .....5

Pharmacological.....6

Post-Operative Analgesia .....8

Sucrose.....8

Key Points.....8

Exclusions for administering sucrose .....8

Sucrose dosage .....9

References .....9

Appendix 1 Pain Assessment Tool.....12

## Introduction

The neonate in the nursery is subjected to prolonged and repetitive exposure to painful stimuli. This can lead to long-term physiological, behavioural and hormonal complications. Continuous noxious stimuli results in the neonate entering a withdrawn state over time, to conserve energy. [5, 9, 11, 12, 23, 24]

The delayed, subdued or absent reactions to pain within the neonate can be barriers for healthcare workers effectively assessing pain. Accurate pain assessment with the use of pain assessment tools holds the key for optimal pain management. Pain assessment should be considered a 5<sup>th</sup> vital sign. [11, 16, 17, 20, 21, 22]

## Key Points

- Every neonate has the right to appropriate and safe pain assessment and management.
- Neonates are unable to verbalise their pain. It is the responsibility of the healthcare professionals and parents to advocate in their place.
- Neuroanatomical components and neuroendocrine systems have developed in the premature neonate to allow the transmission of painful stimuli.
- Unmyelinated sheaths surrounding the nerve cells cause the premature neonate to be hypersensitive to pain [2].
- Continuous noxious stimuli cause the neonate to enter into a 'withdrawn state', to conserve energy. The neonate can become floppy and unresponsive to painful procedures. Especially premature neonates. This withdrawn state is often mistaken for compliance of the neonate when really they are experiencing very high levels of pain. In this case, if possible, the procedure should be ceased and recommenced once the neonate has had a break.
- When administering pain relief of any kind, it is important to wait the appropriate time until the sucrose/analgesia has taken effect before undertaking the procedure.
- It is the responsibility of the healthcare professional to assess pain routinely, taking into account the family's perspective of their baby's pain.
- The prevention strategies, interventions, treatment plan and follow up assessment and care should be documented. [4]
- Pain management is a collaborative effort that includes all members of the healthcare team and family members

## Common Painful Procedures in the NICU

| Diagnostic                          | Therapeutic   | Surgical            |
|-------------------------------------|---|---------------------|
| Heel prick/capillary blood sampling | Endotracheal intubation, extubation and ventilation | Surgical Procedures |
| Venepuncture                        | Chest drain insertion/removal                       |                     |
| Lumbar puncture                     | Intravenous cannula insertion                       |                     |
| Umbilical lines                     | Central line insertion/removal                      |                     |
| Peripheral arterial lines           | Gastric tube insertion                              |                     |
| Intravenous cannula insertion       | Intramuscular injection                             |                     |
|                                     | Changing a dressing                                 |                     |
|                                     | Removal of adhesive tape                            |                     |
|                                     | Bladder catheterisation                             |                     |
|                                     | Cooling for HIE                                     |                     |
|                                     | Chest needling                                      |                     |

Adapted from; Anand 2001

## Adverse Effects of Pain

The long term effects of untreated pain are well documented in the literature [2, 6, 7, 11, 13, 19]. Unrelieved pain within the neonate can lead to immediate and long lasting negative behavioural, physiological and developmental effects. Poorly assessed and managed pain can have detrimental outcomes; leading to longer hospital stay, increased ventilation requirements and increased family distress.

## Physiological, behavioural and hormonal responses of neonatal pain

|                  | Physiological      | Behavioural                  | Hormonal             | Autonomic               |
|------------------|--------------------|------------------------------|----------------------|-------------------------|
| <b>Increased</b> | Heart rate         | Facial expression            | Cortisol             | Pallor                  |
|                  | Blood pressure     | Grimace                      | Glucagon             | Sweating (term infants) |
|                  | Respirations       | Brow furrowing               | Aldosterone          | Flushing                |
|                  | Muscle tone        | Nasolabial squeeze           | Antidiuretic hormone | Pupil dilation          |
|                  | Sensitivity        | Eye squeeze                  | Growth hormone       |                         |
|                  | Oxygen consumption | Quivering chin               |                      |                         |
|                  | Metabolism         |                              |                      |                         |
|                  |                    |                              | Vocal expression     |                         |
|                  |                    |                              | Attempted cry        |                         |
|                  |                    |                              | Grizzling            |                         |
|                  |                    | Grunting                     |                      |                         |
|                  |                    | Body movements               |                      |                         |
|                  |                    | Waving or extension of limbs |                      |                         |
|                  |                    | Clenching of hands           |                      |                         |
|                  |                    | Arching back                 |                      |                         |
| <b>Decreased</b> | Oxygen saturations | Body movements               | Insulin              |                         |
|                  | Vagal nerve tone   | Tone                         |                      |                         |

Adapted from; Byers and Thornley (2004); Evans (2001); Mitchell and Boss (2002); New South Wales Government (2004)

## Pain Assessment

As neonates are unable to verbalise their pain it is the neonatal nurse's role to advocate for the patient to provide comfort, quality and safety of care <sup>[4]</sup>. Accurate pain assessment using an appropriate assessment tool allows the nurse to respond with the appropriate pain management and comfort measures required <sup>[6]</sup>.

### Use of Pain Assessment Scoring Tool

For infants born <33 weeks gestation use the [Premature Infant Pain Profile \(PIPP\)](#)

Infants born >33 weeks gestation use the Pain Assessment Tool (PAT).

### Scoring Instructions

1. Observe infant for 15 seconds at rest and assess vital sign indicators (highest heart rate and lowest O<sub>2</sub> saturation) and behavioural state.
2. Observe infant for 30 seconds after procedure and assess change in vital sign indicators (highest heart rate, lowest O<sub>2</sub> saturation and duration of facial actions observed).

## Frequency of Pain Assessment

### Admission to Neonatal Intensive Care Unit

- Complete a baseline pain assessment on admission to the NICU
- Reassess pain score after each procedure
- Record what pain management strategy was provided if applicable

**Rational:** This will allow healthcare professionals to closely monitor the neonate's pain score throughout the many painful procedures that may occur on admission. It will allow healthcare professionals to react to increasing pain, provide appropriate treatment and be more aware of the neonate's acute pain state.

### Neonates on respiratory support

- Complete a baseline pain assessment at the commencement of each shift.
- Pain assessment to be completed every 6 hours for intubated and ventilated neonates. If neonate appears uncomfortable or agitated consider pain scoring hourly until the neonate settles or pain management strategies are attended.
- If the neonate is admitted intubated and ventilated complete a pain assessment on admission.

### Procedures

- Scoring should be completed prior to and following any procedure that the neonate undergoes.
- For procedures where analgesia is given, score 30 minutes post pain management to assess effectiveness.

### Continuous analgesia infusions

- On commencement of infusions, complete pain assessment hourly for the first 4 hours.
- Complete 4 hourly thereafter.
- On cessation of infusion continue to complete a pain assessment 4 hourly for 24 hours to ensure neonate is without pain post infusion.

### Other

- If the nurse perceives the neonate to be in pain commence a pain assessment chart. Alter Doctors to the pain score.
- Consider commencing a pain assessment chart for neonates that are admitted to the nursery after instrumental deliveries.

## Documentation

After completing pain score, the number should be documented on the MR489, what interventions were initiated and whether effective. A circle should be put around the baseline score on the MR489. If you complete a baseline score and a post procedure score in the same hour, place diagonal line through the pain score box on the MR489. Record the baseline pain score in the top box with a circle around the number and the post procedure scores recording under it.

## Pain Management

### Principles of pain management in neonates

Consider the following before undertaking any painful procedure:

|                            |  |
|----------------------------|--|
| <b>Prevention</b>          | <ol style="list-style-type: none"> <li>1. Is the test/intervention necessary or can it be minimised?</li> <li>2. Can a non-invasive technique be used such as using TCMs for monitoring Co<sub>2</sub> rather than a CBG/ABG?</li> <li>3. Can a central line be used rather than a peripheral?</li> </ol>  |
| <b>Environment</b>         | <p>Reduce noxious stimuli to minimise stress such as</p> <ul style="list-style-type: none"> <li>- Lighting</li> <li>- Tactile stimulation</li> <li>- Visual stimulation</li> <li>- Temperature – ensure baby’s temperature is normothermic</li> <li>- Acoustic sounds: be mindful of placing objects on top of incubator, talking to others over baby or whilst incubator doors are open. DO NOT open packets such as alcohol wipes in the incubator or near baby’s head.</li> </ul> |
| <b>Behavioural Methods</b> | For any procedure use comfort measures to relieve minor pain.  |
| <b>Pharmacological</b>     | Pharmacological pain relief is to be used for any procedure entering a body cavity.  |

### Non-pharmacological (Comfort measures)

Comfort measures are non-pharmacological interventions that can be used to better manage neonatal pain. These measures are encouraged to be used by both healthcare professionals and parents. When used in combination with pharmacological treatments there is a synergistic effect in that comfort measures can provide short term pain relief during which time the medication acts to alleviate procedural pain <sup>[8,20]</sup>.

- **Breastfeeding** - if baby is able.
- **Non-nutritive sucking** - Use of dummy, or clean gloved finger to suck on to make the baby feel secure.
- **Sucrose** – Before attending a procedure that may be painful to the neonate such as insertion of OGT, removal of tape, blood sampling. Give neonate appropriate amount and wait 2 minutes for sucrose to take effect before attending the procedure.
- **Kangaroo care** - (skin to skin cuddles) if baby is stable enough nursing the infant on a parents bare skin at a 40-60 degree angle with a blanket to cover is shown to reduce infants pain response. This is suitable for stable infants when receiving routine blood tests e.g. capillary gas etc.

- **Nesting** – using boundaries to mimic the womb-like environment and secure the infant.
- **Swaddling** – Even if the infant is not usually swaddled consider this technique for procedures such as IV insertions. The infant can be swaddled with the limb exposed that is needed to be cannulated. This allows the infant to feel secure when having to be on its back.
- **Containment holding** - Rather than stroking- the caregiver can use two hands to hold the infant and make them feel secure (i.e. one hand on the baby’s head and one on their feet).
- **Facilitated tucking** - By holding the infants limbs in close to its body with gentle pressure, whilst on its side in a flexed position the infant feels in a natural controlled position and feels secure.
- **Decreasing environmental stressors** - Reducing noise/light and stimulation can settle neonates. Use of ear muffs, incubator covers and dimming of lights. Quite talking in and around ward.
- **Tactile soothing** - Gentle touch from caregivers by placing their hands on the infants head and abdomen/back. Avoiding stroking, tapping, prodding or poking.
- **Cue based cares** - When the neonate wakes and displays signs of stress; attend cares and reposition.

**Other considerations**

- Ensure adequate ventilation prior to and during procedures. Neonates become agitated when ventilation is inadequate.
- Unless urgent, procedures should be performed around care times to encourage developmental care.

**Pharmacological**

Combined effects of pharmacological and non-pharmacological measures provide a synergistic effect. Sedatives do not provide pain relief but can enhance the effect of narcotics.

Treat anticipated procedural pain prophylactically.

Note: long term use of opioid use or narcotic infusions can lead to [acquired narcotic dependence](#). Care should be taken when weaning infusion for neonates have had long term narcotic treatment.

**Suggested management for common painful procedures**

1<sup>st</sup> Option: For procedures not entering a body cavity      Comfort Measures coupled with sucrose.  
**Note:** non-nutritive sucking and sucrose increases the analgesic effect.

2<sup>nd</sup> Option: For all procedures when a body cavity is being entered (e.g. chest drain, lumbar puncture)      Lignocaine  
 Consider opioid analgesia

| Procedure  | Suggested Pain Management  |
|--|--|
| Heel prick, Venepuncture, IV cannula, IM injection | <ol style="list-style-type: none"> <li>1. Administer Sucrose or minimum 0.2mls EBM (allow 2 minutes to work).</li> <li>2. Allow baby to non-nutritively suck on dummy or gloved finger (this enhances the analgesic effect).</li> <li>3. Whilst waiting 2 minutes for sucrose to take effect, use other comfort measures such as swaddling, lateral positioning, etc.</li> <li>4. Attend procedure.</li> </ol> <p>Alternatively:</p> <ol style="list-style-type: none"> <li>1. Put baby to the breast or allow parent to give baby a suck feed or cuddle (if cuddling with suck feed administer sucrose).</li> <li>2. Attend procedure.</li> </ol> |
| Gastric tube insertion                             | <ol style="list-style-type: none"> <li>1. Administer Sucrose or minimum 0.2mls EBM (allow 2 minutes to work).</li> <li>2. Allow baby to non-nutritively suck on dummy or gloved finger (this enhances the analgesic effect).</li> <li>3. Whilst waiting 2 minutes, use other comfort measures such as swaddling and containment.</li> </ol>  |
| Central line insertion, PAL                        | <ol style="list-style-type: none"> <li>1. Ensure the baby is warm.</li> <li>2. Attend pain score</li> <li>3. Provide comfort measure. In particular swaddle baby for procedure even if in incubator. Expose the limb required for the procedure.</li> <li>4. Administer Sucrose or minimum 0.2mls EBM (allow 2 minutes to work).</li> <li>5. Allow baby to non-nutritively suck on dummy or gloved finger (this enhances the analgesic effect).</li> <li>6. Attend procedure.</li> <li>7. Complete pain score</li> </ol>   |
| Lumbar puncture                                    | <ol style="list-style-type: none"> <li>1. Ensure the baby is warm and settled.</li> <li>2. Attend pain score.</li> <li>3. Administer Sucrose or minimum 0.2mls EBM (allow 2 minutes to work).</li> <li>4. Allow baby to non-nutritively suck on dummy or gloved finger (this enhances the analgesic effect).</li> <li>5. Lignocaine injection to numb area of procedure.</li> <li>6. Commence procedure.</li> <li>7. Complete pain score.</li> </ol>   |
| ETT intubation                                     | See <a href="#">Intubation</a>   |
| ETT suctioning                                     | <ol style="list-style-type: none"> <li>1. Make sure baby is in comfortable position in order to self soothe.</li> <li>2. Use swaddling or containment comfort measures.</li> </ol>   |
| Chest drain (ICC)                                  | <ol style="list-style-type: none"> <li>1. Ensure the baby is warm and settled.</li> <li>2. Attend pain score.</li> <li>3. Administer Sucrose or minimum 0.2mls EBM (allow 2 minutes to work).</li> </ol>   |

|  |   |
|--|---|
|  | <ol style="list-style-type: none"> <li>4. Lignocaine injection to numb area of procedure.</li> <li>5. Consider analgesia narcotic infusion such as <b>Morphine</b> or <b>Fentanyl</b> prior to and/or on completion of drain insertion.</li> <li>6. Commence procedure.</li> <li>7. Complete pain score.</li> </ol>   |
| Laser Therapy for ROP                    | <ol style="list-style-type: none"> <li>1. Reduce lighting - Place loose cover over baby's eyes such as a loose Biliband, incubator/cot cover.</li> <li>2. Consider Paracetamol if pain score increases.</li> </ol>  |
| Routines cares and Diagnostic procedures | <p>Things to consider:</p> <ul style="list-style-type: none"> <li>• Always be mindful of developmental care and not to stress the baby with continual handling.</li> <li>• If procedures are not urgent consider doing them around care times and discuss with diagnostic teams if the procedure can be done with cares.</li> <li>• If a procedure you are about to perform on a baby is known to be painful (in adults), then it is potentially even more painful to a baby. Use analgesia if the procedure is not an emergency. The baby will cope better and recover faster <sup>[2, 6, 7]</sup>.</li> <li>• Read baby's cues. If baby appears agitated and uncomfortable consider attending cares at the time to assist in settling the baby. Alternatively if baby appears comfortable and is asleep, consider stretching out care times.</li> </ul> |

Adapted from; New South Wales Government (2004).

## Post-Operative Analgesia

### Sucrose

The administration of sucrose to neonates produces analgesic effect administered to the anterior part of the tongue. The initially response of the neonates to sucrose is the sweet taste which offers a soothing effect. The secondary response results from the activation of the sweet taste receptors on the tongue. This leads to the activation of endogenous opioid pathways. Breastmilk has also been reported in the literature to provide a similar response <sup>[1, 18]</sup>.

### Key Points

- Sucrose is short acting and peaks after 2 minutes. After administering sucrose allow 2 minutes for sucrose to work before commencing the procedure.
- Sucrose last for 5-8 minutes.
- Sucrose should always be used in combination with other comfort measures.
- Sucrose is absorbed in the buccal membrane not the stomach. It does not affect blood sugar levels.

### Exclusion for Administering Sucrose

- Suspected or proven necrotising enterocolitis (these neonates should have narcotic analgesia infusions).
- Un-repaired tracheo-oesophageal fistula.
- Altered gag or swallow reflex (i.e. infants with HIE).
- Known fructose or sucrose intolerance.



- Critically ill neonates already receiving IV analgesia and/or sedation.

### Sucrose Dosage

The 24% sucrose solution in single use ampoules can be used multiple times throughout a procedure. However, the ampoule must be discarded after the procedure.

20 drops from the ampoule equates to 1 mL, therefore, 1 drop is equal to 0.05mL.

- Term: up to 0.5-1.0 mL (give in 5 drop aliquots)
- Preterm: 1500 grams and above 0.25 mL of 24% sucrose solution.
- Preterm: 1000-1500 grams 0.15 mL.
- 0.05 to 0.1 mL (1 to 2 drops) of 24% sucrose solution for VLBW if deemed appropriate.

**Total dose in 24 hours:**    **3 mL** if weight > 1500 grams  
   **2 mL** if weight < 1500 grams  
   **1 mL** if weight < 1000 grams

Evaluate and document the effectiveness of treatment in the comments section of the observation chart.

### Related CAHS internal policies, procedures and guidelines

Neonatology

- [Intubation](#)
- [Narcotic Dependence: Treatment of Iatrogenically Acquired Narcotic Dependence](#)
- [Post-Operative Analgesia](#)

Neonatology Medication Protocols

- [Morphine](#)
- [Fentanyl](#)

### References and related external legislation, policies, and guidelines (if required)



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### Useful resources

[Neonatal eHandbook \(VIC\)](#)

This document can be made available in alternative formats on request for a person with a disability.

|                       |   |                   |                             |
|-----------------------|---|-------------------|-----------------------------|
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**Healthy kids, healthy communities**

Compassion

Excellence

Collaboration

Accountability

Equity

Respect

Neonatology | Community Health | Mental Health | Perth Children's Hospital

## Appendix 1

### PIPP Assessment Tool

| Process   | Indicator                 | 0   | 1   | 2   | 3   | Total Score |
|---|---------------------------|---|---|---|---|-------------|
| Chart   | Gestational Age           | 36 weeks or more                          | 32-35 weeks, 6 days                         | 28-31 weeks, 6 days                         | Less than 28 weeks                            |             |
| Observe infant for 15 seconds                                   | Behavioural State         | Active, awake, eyes open, facial movement | Quiet awake, eyes open, no facial movements | Active sleep, eyes closed, facial movements | Quiet sleep, eyes closed, no facial movements |             |
| Observe baseline heart rate & oxygen saturations for 30 seconds | Heart Rate Maximum        | 0 - beats per minute increase             | 5 - 15 beats per minute increase            | 15 - 24 beats per minute increase           | 25 beats per minute increase                  |             |
|   | Oxygen saturation minimum | 92-100 %                                  | 89-91 %                                     | 88-85 %                                     | < 85 %  |             |
| Observe infant's facial actions for 30 seconds                  | Brow Bulge                | None                                      | Minimum                                     | Moderate                                    | Maximum                                       |             |
|   | Eye Squeeze               | None                                      | Minimum                                     | Moderate                                    | Maximum                                       |             |
|   | Naso-labial furrow        | None                                      | Minimum                                     | Moderate                                    | Maximum                                       |             |

### Using PIPP Scoring Tool

1. Familiarise yourself with each indicator and how it is to be scored, by looking at the PIPP.
2. Score gestational age before you begin the assessment (points are added to the premature infant's pain score based on gestational age to compensate for their limited ability to behaviourally and physiologically respond to pain).
3. Score behavioural state by observing the infant for 30 seconds.
4. Record baseline heart rate and oxygen saturation at the beginning of the shift.
5. Observe the infant for 30 seconds. You will need to look back and forth from the heart monitor to the baby's face. Score physiological and facial changes seen during that time and record immediately following the observation period. Calculate the total score.
6. Scores of 0-6 generally indicate the infant has minimal or no pain.
7. Scores of 7-12 generally indicate slight to moderate pain.
8. Scores > 12 may indicate severe pain.

### Pain Score Flow Chart

**Score 0-6** - No Action.

**Score 7-12** - Non Pharmacological Intervention e.g. Positioning, Containment, Swaddling, Non-nutritive sucking.

**Reassess in 30 Minutes** for effectiveness of intervention.

**Score > 12** - Pharmacological Intervention e.g. Narcotics.

**Reassess in 15-30 Minutes** for effectiveness of intervention.

