# Neonatal pain and sedation: Assessment and nursing management in Newborn Intensive Care Unit (NICU)

## Guideline Responsibilities and Authorisation

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| **Target Audience** | NICU Staff |
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## Guideline Review History

| Version | Updated by | Date Updated | Summary of Changes |
|---|---|---|---|
| 1 | Aira Javier | Oct 2015 | First version |
| 2 | Aira Javier | Sept 2018 | Modified NPASS and NICU Guideline for Management of Pain and Sedation Scores, frequency of monitoring pain and sedation scores, annually audits on Pain and Sedation Scoring |
| 3 | Aira Javier | December 2023 | Deleted Appendix B: Guideline for Medical Team: Management of Pain and Sedation Scores<br>Dextrose 40% changed to Sucrose 25% for analgesia |

# Neonatal pain and sedation: Assessment and nursing management in Newborn Intensive Care Unit (NICU)

## Contents

# Neonatal pain and sedation: Assessment and nursing management in Newborn Intensive Care Unit (NICU)

## 1 Overview

### 1.1 Purpose

To provide guidance for NICU medical and nursing staff on how to conduct pain and sedation assessment and implement pain management interventions for infants.

### 1.2 Staff group

Health New Zealand| Te Whatu Ora Waikato staff working in NICU.

### 1.3 Patient / client group

Neonates and infants in NICU

### 1.4 Definitions

| | |
|---|---|
| **CPAP** | Continuous positive airway pressure |
| **Modified Neonatal Pain Agitation and Sedation Scale (N-PASS)** | A tool used to assess pain and sedation in neonates. It has 5 assessment criteria: crying/irritability, behavior/state, facial expression, extremities/tone and vital signs. |
| **NICU Guideline for Management of Pain and Sedation Scores** | A guideline that includes well-defined strategies for both non-pharmacologic and pharmacologic interventions based on regular assessment of the N-PASS and titration of analgesic and sedative therapy according to aim scores. |
| **Pain** | An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. |
| **Sedation** | A state of calm or reduced nervous activity. |

## 2 Clinical Management

### 2.1 Competency required

- Registered nurse who has completed Level 2 orientation.
- Enrolled nurse who has completed Level 2 orientation and under the direction and delegation of a registered nurse.

### 2.2 Equipment

- Modified Neonatal Pain, Pain/Agitation and Sedation Scale (N-PASS) guideline and scoring criteria (see Appendix A)
- NICU Guideline for Management of Pain and Sedation Scores (Appendix B)

## 2.3 Procedure

### 2.3.1 Pain management

**1. Identify potential sources of pain**

Identify actual or potential sources of pain and agitation for the neonate:

- clinical procedures, including PICC insertion, lumbar puncture, eye exam
- invasive/indwelling tubes, including continuous positive airway pressure (CPAP)
- heel pricks and IV cannulation
- suctioning
- noxious stimuli, e.g. noise, light, touch
- neurological irritability
- other causes, e.g. peritonitis, fractures, renal stones

**2. Pain assessment tool**

- Use Modified N-PASS to assess pain (refer to Appendix A) to provide a standardised and measurable scale to direct interventions individualised to infant needs.
- Score and record pain and sedation separately.

**3. Frequency of assessment**

- Perform pain assessment at regular intervals on all NICU patients: 4hourly in Level 3 nurseries and 8 hourly in Level 1 & Level 2 nurseries.
- Indicate if pain scores were done at rest, or with handling. Do not disturb baby unnecessarily to obtain pain scores
- Assess pain more frequently in the following situations:
  - 2 hourly for infants with invasive tubes or lines, e.g. chest drain, other than intravenous (IV) or feeding tubes.
  - 2 hourly for infants receiving analgesics and/or sedatives.
  - 30-60mins after medication is given to assess response: this includes analgesics, sedatives and sucrose.
  - Post-operative pain assessments hourly for 4 hours until stable, then 2-4 hourly until 48 hours. After such period revert back to standard intervals.

**4. Pain management**

Calculate pain and sedation scores using the standardized scales (Appendix A) based on the sum of the scores

## 5. Manage mild pain (NPASS score +4 to +7),

- Implement comfort measures as a first line where appropriate because pharmacologic interventions often have side effects in neonates.
- Provide developmental supportive care
  - knees flexed, arms close to body, hands to mouth
  - swaddling
  - nesting
  - providing pacifier (after obtaining parental consent)
  - reducing environmental stressors such as light, noise and handling
- Older babies may respond to rocking and holding/cuddling
- Optimise respiratory support because babies become agitated when they are not being adequately ventilated:
  - suctioning only if required
  - adjusting ventilator/CPAP/nasal flow settings in consultation with the medical team

## 6. Manage moderate pain

If after performing 2 comfort measures and the pain score is still +4 to +7, discuss initiation or escalation of sedative and/or analgesic therapy with medical team. Prescribed PRN or bolus analgesics may be used.

## 7. Manage severe pain

- If the NPASS score is +8 to +10, prescribed PRN or bolus medications may be used. Discuss with medical team to initiate or escalate sedative and/or infusion analgesic therapy.
- Refer to Appendix B NICU Guideline for Management of Pain and Pain/Sedation Scores

## 8. Manage procedure-related pain

Treat anticipated procedure-related pain prophylactically:

- When appropriate one of the preferred pain management strategies, is to provide expressed breast milk, or breastfeeding when mother is present. . The sweet taste of breast milk has an analgesic effect and parental contact provides comfort.
- Use comfort measures for brief and less invasive procedures, e.g. CPAP cares.
- Swaddle or ask parents/other staff to help to hold baby in a flexed and contained position because this help all babies to have increased tolerance to procedures.

- Non-nutritive sucking dummy/pacifier may be used only when known to be a normal part of the infant's care and when the infant is able to suck.
- Calm the baby before and after the procedure.
- Administer analgesics, e.g. for invasive procedures such as insertion of chest tubes, abdominal drains, IV starts, heel sticks, etc.
- Consider offering Sucrose Oral Liquid for Analgesia in Neonates and Infants on anterior tongue as an adjunctive measure before and during any procedure as it attenuates the pain response. It is a legal requirement to document every administration of Sucrose 25% which also has maximum recommended dose in 24 hours.

## 9. Administer analgesics/sedatives

- Administer analgesics to provide relief of pain using the least painful route possible.
- Provide sedatives along with analgesics if needed to attain a restful state.
- Treat side effects of the medications.
- Evaluate effectiveness of analgesics/sedatives 30-60 minutes after administration.
- Special considerations:
  - Sedatives do not provide pain relief, but do enhance the effects of opioids. Therefore, sedatives should rarely be given alone since it is usually not possible to distinguish between pain and agitation in the neonate.
  - Sedatives are not recommended for routine use in preterm infants. Seizure-like myoclonic movements have been observed in preterm infants receiving sedatives. Adverse neurologic outcomes have been associated with sedative use in preterm infants.

## 10. Observations

- Monitor continuously cardiorespiratory status, pulse oximetry and blood pressure (BP) if arterial line is in-situ or 1-4 hourly BP as charted when using opioids or sedatives for pain relief or sedation.
- If pain score is not falling as expected, institute additional medications and comfort measures and re-evaluate for additional causes for pain and agitation.

## 11. Parent / Caregiver education

- Educate parents in infant pain behaviors and include them in the assessment and treatment of the infant's pain and sedation.

### 2.3.2 Sedation management

#### 1. Sedation assessment

- Perform assessment with handling and more frequently as needed e.g. on sedated or medically paralysed baby.
- Sedation assessment requires an assessment of response to stimuli; the baby should not be stimulated unnecessarily to accomplish this.
- Sedation does not need to be assessed with every pain score.

#### 2. Sedation management

- Use Modified N-PASS to assess level of sedation
- Document sedation as negative scores; desired levels of sedation vary according to the situation.
  - Deep sedation: goal is -10 to -7
  - Moderate sedation: goal is - 6 to -4
  - Light sedation: goal is - 3 to - 1

**Rationale:**
The Modified N-PASS is useful when sedation of the infant is the goal. It can also be used to assess infants for over-sedation related to sedative/opioid administration. A negative score without the administration of opioids/sedatives may indicate neurological depression, sepsis, or other pathology. A premature infant who has experienced prolonged untreated pain and/or stress may also appear sedated, as these infants have been observed to become lethargic and “shut down” in response to their unrelenting pain.

#### 3. Sedation management

Refer to NICU Guideline for Management of Pain and Sedation Scores for management of sedation (Appendix B).

##### Mild to moderate sedation

If the baby is on sedative/ analgesic therapy and the goal is weaning, consider reduction of the sedative/ analgesic if the sedation score is -2 to -5.

##### Deep sedation

- For sedation scores of -6 to -10, reduce sedative and/or analgesic.

#### 4. Documentation

- Document N-PASS pain and sedation scores in the observation sheet.
- Document analgesia given in the clinical notes and in the medication chart, including sucrose 25%.

- If management is changed in response to a score, i.e. pain medication, comfort measures, increase or decrease in medication, document response to this intervention 30-60 minutes after the intervention.
- Document on the Comments/Events/Procedure column of the observation sheet if an intervention was required, or if the scores remain high.

## 3 Audit

- Assessment and documentation of pain and sedation scores: audit annually.
- Target: compliance ≥90%

## 4 Evidence base

### 4.1 References


- Berger A., Czaba C., & Deindl P. (2013). Successful Implementation of a Neonatal Pain and Sedation Protocol at 2 NICUs. Pediatrics,132, e211-218.
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- The Royal Children's Hospital Melbourne. Sucrose (oral) for procedural pain management in infants. (2021). Retrieved from https://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/sucrose_oral_for_procedural_pain_management_in_infants/

### 4.2 Associated Health NZ Waikato Documents

- Care of Ventilated Infant (0432)
- Sucrose Oral Liquid for Analgesia in Neonates and Infants (2905)
- End of life care for neonate: care of baby having treatment withdrawn/dying baby (4948)
- Lippincott Procedure:
  - Developmental support care, neonatal

## Appendix A – Modified N-PASS

### A1 - Neonatal Pain and Pain/Agitation Assessment Scale


**Modified N-PASS: Neonatal Pain and Pain/Agitation Assessment Scale**

| Assessment Criteria | Pain | Pain/Agitation | |
|---|---|---|---|
| | 0 | 1 | 2 |
| **Crying/ Irritability** | No pain signs | Irritable or crying **at intervals**<br>**Consolable** | High-pitched or silent-<br>**continuous cry**<br>**Inconsolable** |
| **Behaviour State** | No pain signs | Restless, squirming<br>Awakens frequently | Arching, kicking<br>Constantly awake or<br>Arouses minimally/ no movement (not sedated) |
| **Facial Expression** | No pain signs | Any pain expression,<br>**intermittent** | Any pain expression<br>**continual** |
| **Extremities Tone** | No pain signs | **Intermittent** (<30 seconds duration) observation of clenched toes, fists or finger splay<br>**Body is not tense** | Continual, frequent (≥30 seconds duration) clenched toes, fists or finger splay<br>**Body is tense/stiff** |
| **Vital Signs**<br>**HR, RR, BP, SaO2** | No pain signs | ↑ 10-20% from baseline<br>$SaO_2$ 76-85% with stimulation, quick recovery<br>(within 2 minutes) | ↑≥20% from baseline<br>$SaO_2 \leq 75\%$ with stimulation- slow recovery<br>(> 2 minutes)<br>Out of sync/fighting vent |

**Based from P. Hummel's Neonatal Pain, Agitation and Sedation Scale (N-PASS)**

- Score each criteria from 0 to 2 for each physiological criteria, then sum to provide total score
- Add +1 to total score if baby is <30 weeks gestation/ corrected age to compensate for the limited ability to behaviourally communicate pain
- Frequency of pain scores:
  - Minimum 8 hourly in Level 2
  - Minimum 4 hourly for all babies in Level 3
  - Minimum 2 hourly for ventilated, babies on analgesia/sedatives
  - Hourly for 4 hours until stable, then 2-4 hourly until 48 hours. After such period revert back to standard intervals.
  - 30-60mins after an analgesic is given
- Indicate under "comments" section of NICU observation sheet if pain scores were done at rest, or with handling. Do not disturb baby unnecessarily to obtain pain scores.

## A2 - Modified N-PASS: Neonatal Sedation Assessment Scale

**Modified N-PASS: Neonatal Sedation Assessment Scale**

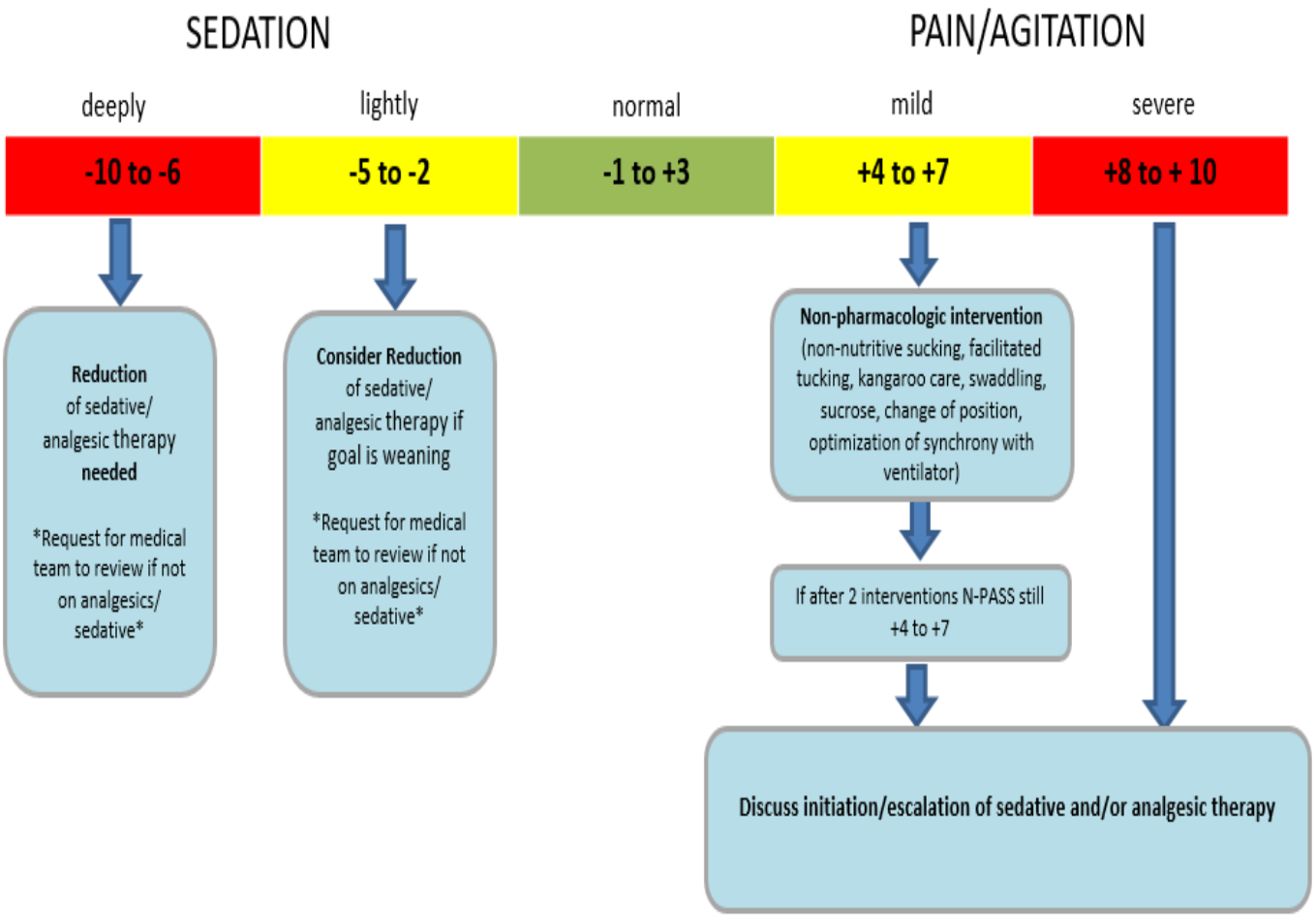
| Assessment Criteria | Sedation | | |
|---|---|---|---|
| | 0 | -1 | -2 |
| **Crying/ Irritability** | No sedation signs | Moans or cries minimally with painful stimuli (needle sticks, suctioning) | No cry with painful stimuli |
| **Behaviour State** | No sedation signs | Arouses minimally with stimuli<br><br>Little spontaneous movement | No arousal to any stimuli<br><br>No spontaneous movement |
| **Facial Expression** | No sedation signs | Minimal expression with stimuli | Mouth is lax<br><br>No expression |
| **Extremities Tone** | No sedation signs | Weak grasp reflex<br><br>↓muscle tone | No grasp reflex<br><br>Flaccid tone |
| **Vital Signs**<br><br>**HR, RR, BP, SaO2** | No sedation signs | <10% variability from baseline with stimuli | No variability with stimuli<br><br>Hypoventilation, or apnoea, no respiratory effort |

**Based from P. Hummel's Neonatal Pain, Agitation and Sedation Scale (N-PASS)**

- Score each criteria from 0 to -2 for each behavioural and physiological criteria, then sum to provide a total score and note as a negative score (0 to -10)
- Sedation scoring can only be done with handling, minimum 8 hourly
- Sedation does not need to be assessed/scored with every pain assessment/score

## Appendix B – Guideline for Management of Pain and Sedation Scores

# Guideline for Management of Pain and Sedation Scores




*Based from Vienna Protocol for Neonatal Pain & Sedation