



GUIDELINE

Developmental Care: Reducing Environmental Stimuli

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| Scope (Staff): | Nursing and Medical Staff |
| Scope (Area): | NICU KEMH, NICU PCH, NETS WA |

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

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

Aim

To provide an environment to support and facilitate neurodevelopment of premature and critically ill infants admitted to hospital.

Risk

Briefly describe what the risks are to clients/patients, staff, or the organisation if this policy is not adhered to.

Background

Understanding infants' behaviour could help to adjust cares or interventions and guide environment modification in order to reduce stress and enhance development

Developmental care involves care processes that are designed to meet the developmental needs of an individual. A range of nursing interventions or strategies have been identified to modify the neonatal environment aiming to reduce the stressor on the developing brain while infants receive care in the Neonatal Intensive Care Unit. (Griffiths & Psalial, 2018; Symington, 2009). Parents are the most important caregivers in infant's life and are encouraged to participate in their infant's development. Parents can provide support and comfort by touch, skin to skin holding and speaking to their infant. [Parenting in the NICU](#) reflects on the importance of integrating parents in the care of their infant.

Sensory experience is the basis for learning in infancy. Abnormal sensory reactivity in infancy is associated with abnormal neurodevelopment at 24 months corrected age. (Chorna et al., 2014)

Painful or frequent procedures can also have long term adverse outcomes on brain development in preterm infants. It is essential that health care professionals utilise strategies to reduce pain and discomfort in their care practices. Refer to [Neonatal Pain Assessment and Management Guideline](#)

Autonomic Stress

Autonomic stress refers to the infant's response to fight or flight stress. Signs of autonomic stress include:

- Colour changes (pallor, flushing & turning red, cyanosis & turning blue)
- Changes in vital signs (HR, RR, Temp, BP)
- Sneezing or yawning
- Limp floppy or tense muscle tone
- Slumped or extended posture
- Large volume movements predominantly extending away from the body
- Repetitive cycles of movement

Self-Regulation

Self-regulation is the ability of the infant to manage their behaviours in response to stressful situations such as handling, investigations and interventions. Some key behaviour are outlined below

| Self-regulation Stability | Self-regulation Instability |
|--|---|
| <ul style="list-style-type: none"> • Hands together • Feet touching or bracing to each other • Moving hand to mouth • Rooting and sucking • Softly flexed posture • Snuggling when held • Easily consoled | <ul style="list-style-type: none"> • Pauses in breathing • Colour changes • Limp or stiff posture • Finger splay "stop sign" • Raising legs in a 'sitting position' • Agitation • Crying • Looking away • Staring or glazed look |

Strategies to Minimising Stress

- Support from parents/caregivers – cuddle, firm touch, soothing calm voice.
- [Skin to Skin holding](#) and/ or breastfeeding
- The use of sucrose for painful procedures

- Swaddling and positional boundaries
- Identifying and responding to signs of stress with comfort measures or pacing the procedure.
- Minimal handling / clustering cares to promote sleep.

Sound and Noise

The acoustic environment in the NICU often contains high sound level of short duration and at irregular intervals. Although the human cochlea and peripheral sensory end organs are developed by 24 weeks gestation, neurologically, the preterm infant is not well developed to handle these extra uterine stimuli. Excessive noise can damage the developing cochlea, especially the hair cells which ultimately could lead to hearing loss.

For staff, high noise levels are also associated with an increased rate of errors and accidents.

The current recommended ambient (background) noise levels in an intensive care unit should not exceed 45-50dB. In an average home, the quiet background sound level equates to about 40dB, whereas two or three people having a normal conversation in an office would produce a sound level of 60dB.

There are many sources of sound, generally categorised into 3 groups; sound generated from staff or equipment and building generated sound.

- Human activities: social conversation, handover, handling of equipment, falling objects.
- Equipment: ventilators, monitors' alarm, portable trolleys, IV pumps, incubators, radios, pagers
- Building: PA announcements, air conditioning, doors closing, fridge compressor, phone ringtones, running water in sink

Strategies to Reduce Noise

- Conversation should be held away from the bedside where possible.
- Clinical Handover should be performed in quiet speaking tones
- Restricted the use of radios in clinical area.
- Implement "quiet time" period in each nursery aiming between 1400hrs-1600hrs
 - Parents can provide care including holding their infant or skin to skin kangaroo care during quiet time.
 - Staff are to reduce environmental noise and avoid social conversations, limit clinical investigations if able, lights are to be dimmed.
- Respond quickly monitor alarms and review alarm volumes.
- Open and close doors of incubators carefully and quietly.
- Turn suction off at the wall after use.

- Prevent water build up in CPAP and humidity circuits.
- Avoid talking over the top of the incubator, leaning on/against incubators or tapping fingers on incubators.
- Avoid placing items on incubators as the sound generated is magnified inside e.g. Bottles, charts.
- Consider the use of ear muffs on infants

Lighting

Continuous bright light is stressful for infants as it interrupts with sleep/wake cycles. Eyelids of preterm infant are thin and maybe partially open at times, with pupil constriction reflex not mature until 32-34 weeks. Retinal development is not complete until term; therefore undesirable visual stimuli may effect retinal development.

Essential minimum lighting is to remain on at all times to allow for safe and accurate clinical observation. The use of incubator covers assists with regulating light in the incubators. Utilise down-lights and overhead lights when extra lighting is required. Consider eye masks if extra lighting is required for extended periods of time.

Strategies to Reduce Light

- Avoid direct lighting on the infant. If required for clinical observation or intervention/procedures, provide eye masks or shelter eyes with the use of incubator covers.
- Ensure eye masks are applied when phototherapy is in use.
- For term babies, provide visual stimulation with enough ambient light to allow the infant to focus.
- Screening for [Retinopathy or Prematurity](#) is a necessary screening and diagnostic procedure. The process involves a bright light to visualise the developing retina. The bright light can be uncomfortable for some infants; ensure comfort measures are followed as outlined in the clinical guideline and an eye mask is applied for 3-6 hours post dilation.

Smell and Taste

Olfactory experiences are processed by the same part of the brain that handles memories and emotions. Smell and taste/oral experiences should be positive between the infant and caregiver.

- Facilitate early, frequent and long skin to skin contact with the mother
- Provide non-nutritive sucking of mother's expressed breast milk to facilitate connection between food and mother's milk. This can be on the tip of a pacifier (obtain consent) or cotton bud.
- Promote and support breast feeding and breast experiences.
- Avoid negative smell experiences such as alcohol gel, cigarette, hospital detergent, alcohol wipes

Handling and Sleep

Moving preterm infants suddenly and quickly can be a very negative and stressful experience which may result in an autonomic stress response. Continuous handling by staff can also lead to stress, reducing the time available for sleep and development. During sleep, metabolic requirements are reduced in other organs which allow optimal availability of nutrients for brain growth and healing. Minimal handling by staff or clustering cares is a common practice in the neonatal unit to safeguard sleep and minimise stress.

Strategies to promote sleep and minimal handling by staff

- Parent involvement in cares will reduce the stress of cares for the infant. Discuss with parents when they will be in to see their infant and schedule cares as much as possible to include the parents.
- Use a calm, quiet voice and/or firm touch prior to handling allows the infant to sense change or gradually wake up without being startled
- Handle infants slowly and change positions gradually with extremities flexed and contained
- Before lifting the infant, support the infant in hand-to-mouth or hand clasping position with holding or swaddling.
- Provide support and boundaries and when positioning
 - Refer to Neonatal [Developmental Positioning Guideline](#)
- Collaborate with the multidisciplinary team to coordinate care and interventions to minimise continuous movement and position changes.
- Ensure infant behaviours are monitored during handling. Refer to autonomic stress responses and cues for self-regulation instability.
- Should the infant be displaying signs of stress:
 - If clinical deterioration, cease the procedure and respond to the infant ([Recognising and Responding to Clinical Deterioration](#))
 - Pace the procedure/cares and allow time out for the infant to recover before proceeding.
 - Provide comfort measures such as swaddling, firm touch, guiding infants hands together.
 - Postpone procedures (where clinically appropriate) to allow the infant to return to restful calm.

Related CAHS internal policies, procedures and guidelines

[Developmental Positioning Guideline](#)

[Pain Assessment and Management Guideline](#)

[Parenting in the NICU](#)


[Recognising and Responding to Clinical Deterioration](#)

[Skin to Skin Holding](#)

References and related external legislation, policies, and guidelines

1. Als., H & McNulty., G. B. (2011) The Newborn Individualized Developmental Care and Assessment Program (NIDCAP) with Kangaroo Mother Care (KMC): Comprehensive Care for Preterm Infants. *Curr Womens Health Rev.* 2011 August ; 7(3): 288–301. doi:10.2174/157340411796355216
2. Chang A, Kok Y, Coventry L, Sin M, Vines P, Sharp M. Noise Levels In The Newly Designed Neonatal Intensive Care Unit At King Edward Memorial Hospital. 2017
3. Chorna, O., Solomon, J., Slaughter, J., Stark, A., & Maitre, N. (2014). Abnormal sensory reactivity in preterm infants during the first year correlates with adverse neurodevelopmental outcomes at 2 years of age. *Archives of Disease in Childhood. Fetal and Neonatal Edition*, 99(6), F475-F479.
4. Morag, I., & Ohlsson, A. (2016). Cycled light in the intensive care unit for preterm and low birth weight infants. *Cochrane Database of Systematic Reviews*, (8), CD006982.
5. Park, J., Thoyre, S., Knafel, G., Hodges, E., & Nix, W. (2014). Efficacy of Semi elevated Side-Lying Positioning During Bottle-Feeding of Very Preterm Infants: A Pilot Study. *The Journal of Perinatal & Neonatal Nursing*, 28(1), 69-79.
6. Shonkoff, J. P., Garner, A. S., The Committee on Psychosocial Aspects Of Child and Family Health, Committee on Early Childhood, Adoption and Dependent care and section on developmental and behavioural Pediatrics. (2012). The Lifelong Effects of Early Childhood Adversity and Toxic Stress. *Pediatrics*, 129(1), e232. doi:10.1542/peds.2011-2663
7. Warren, I., & Bond, C. (2010). *A Guide to Infant Development in the Newborn Nursery*: Cherry Bond.

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