Clinical Guideline: Developmental Care

Authors: Sarah Carey – Practice Development Nurse, Peterborough (on behalf of the Benchmarking Group)

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Factor 3: Positioning
Factor 4: Environment – Lighting
Factor 5: Environment – Noise
Factor 6: Education of Staff
Factor 7: Parental Involvement
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1. Introduction
Neonatal units are stressful, busy environments where infants are cared for who have been born from 23 weeks gestation. This coincides with a period of rapid brain development during which they are vulnerable to neurological damage, which may lead to poor developmental outcomes.

Family involvement in delivering developmental care is essential, as they have the greatest influence on an infant's health and well-being.

The aim of Developmental Care is to support each infant and its family. To maintain infant stability by responding to the infants’ cues, handling them carefully, positioning them with support and involving their family in their care from day one. It promotes and supports the premature infants’ adaptability to external environmental events and improves bonding and attachment between the infant and their parents.

Preterm infants who receive developmentally supportive family-centred care demonstrate fewer behavioural stress cues ¹

Developmentally supportive Care has shown to be associated with:

- Improved short-term growth outcomes ¹
- Decreased respiratory support
- Decreased incidence of moderate/severe chronic lung disease
- Decreased length of stay
- Decreased cost of hospital stay
- Improved neurodevelopment outcomes to 24 months corrected age.

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2. Environment
Due to the very nature of a NICU the sick preterm infant is inevitably subjected to sensory overload. The advanced technology that is required to sustain life in these small infants, often results in bright lights, loud and unpredictable noise and a number of intrusive and multiple painful procedures. These can all have a detrimental effect on the developing baby and therefore modification of the
care-giving environment is required. These modifications include noise and light levels.

**Noise levels**

Loud noise can have a detrimental effect on preterm infants. It can increase stress causing increased blood pressure and heart rate and decreasing oxygen saturations and increased oxygen consumption.

American Academy of Paediatrics recommend below 45dB not to exceed 65dB

Above 90dB for more than 8 hours has potential to damage adult cochlea therefore the more immature cochlea is more sensitive to damage.

Ototoxic medication increases sensitivity to noise.

Actual noise level in an incubator can range between 56-72db this can be dependent on respiratory support CPAP and ventilators.

Audio development continues up to 42 weeks gestation.

**2.1 Reducing Noise**

Sound EAR are recommended in each defined area to highlight when noise levels are increasing.

Action to help reduce noise:

- Alarms should be set at quietest level and answered promptly.
- Conversations in the room should be low and away from the incubator where possible.
- Padded incubator covers to be used where possible.
- Double walled incubators where possible.
- Nothing to be placed on top of the incubator.
- Shutting the incubator doors and drawers quietly.
- Bin lids should close quietly.
- Radio’s should not be allowed in the clinical area.
- Phones should be set to low output if used in the clinical area and answered promptly.
- Audio tapes/musical mobiles should be used with extreme caution and individualised to each infant. Be aware of other babies gestation in same area/nearby bed space.
- Music therapy appropriate to gestation.
- Don’t tap the incubator.
- Remove water in tubing of ventilators/CPAP.
- Don’t talk over the incubator.
- Ward rounds and handover away from the incubator if possible. Avoid speaking over baby and placing notes on incubators.

**2.2 Reducing light levels**

The retina and visual cortex are the last of the senses to develop. Constant light disturbs diurnal rhythms and arouses the central nervous system.
The iris does not constrict until 32 weeks therefore the infant has very limited ability to reduce light entering the eye, the eyelid is very thin therefore more light can enter the eye even when the eye lids are closed.

Stress responses are demonstrated in these infants to sudden increases in light levels – lower oxygen saturation and poor weight gain.

Actions to support reducing light levels:

- Incubator covers
- Individual lighting
- Adjustable lighting levels
- No overhead lighting preferably indirect lighting
- Dimmer switches to gradually introduce brighter light where needed
- Opaque curtains and blinds
- Protect eyes post ROP screening
- Light given a circadian rhythm at near term/discharge with the use of individual, adjustable lighting +/- cot covers.

3. Understanding infant behaviour

At full term gestation a baby is born ready to communicate with their caregiver. A baby’s movements may look random, but every action that a baby makes has meaning. A baby will tell you what they need, and reveal their likes and dislikes through their behaviours however, the preterm infant develops the ability to participate in reciprocal social and/or environmental interactions gradually, and according to a developmental sequence. They need to attain a certain level of physiological homeostasis before they can begin to seek out and respond to social interaction.

New-born individualised developmental care and assessment program (NIDCAP) is a comprehensive program of systematic behaviour observations methodology. Observations of the infant occur before and during care giving and are used as a measure of the infant’s tolerance to the environment and caregiving activities.

They become the basis for individualised goals and developmental interventions that are aimed at reducing the determined effects of a NICU environment.

3.1 Behavioural organisation

This refers to the ability of the infant to maintain a balance between the five subsystems:

- Autonomic/physiologic
- Motor
- State organisation
- Attention/interaction
• Self-regulation
Examples would include the infant’s respiratory status, muscle tone, posture, facial expression, colour, visceral responses, and visual attention.

How these behaviours are affected by external stimuli, either positive or negative, give information about the infant’s ability to cope and organise their responses.

### 3.2 Cue based care
This is a system of caregiving in response to the infant’s behavioural cues, including the appropriate provision and modification of sensory stimulation.

While babies may not speak their first word for a year, they are born ready to communicate with a rich vocabulary of body movements, cries and visual responses; all part of the complex language of infant behaviour. Organisation or self-regulation of behaviour helps the infant’s ability to maintain a balance as they deal with the demands of the NICU environment. Example; calming measures to encourage self-consoling ‘self-quieting’, ‘shutting down’ ‘hand-to-mouth movement/action’ and ‘sucking’ have consoling effects. Introducing positive touch during cares/procedures is an essential element of care.

### 3.3 Signs of stability/coping
- Hands to face and mouth
- Tucked legs and arms
- Awake, looking around, relaxed
- Holding on, grasping, sucking
- Good pink colour
- Regular, easy breathing, stable heart rate
- Relaxed open face or concentrated frowning
- Perky attentive face
- Orientation to voices
- Smooth state change – sleep to wake
- Smooth movements
- Snuggling

### 3.4 Signs of distress
- Hiccups, sneezing, yawning
- Gagging, regurgitation of food, straining
- Tremors, twitches, frowning, squirming
- Gaze aversion, fussing, crying
- Arching, splayed fingers/toes, stiff straight legs or decreased tone
- Grimacing, tongue thrust, eyes floating, looking away, staring, glazed eyes

There are also some strong cues that the infant is not coping where you should stop any intervention until the baby recovers.

- Sudden changes in state from fussing to sudden drowsy states
• Colour changes; mottled, dusky, and cyanosed
• Changes in breathing pattern, heart rate and oxygen saturations

4. Touch
Premature and sick babies undergo many medical procedures that can cause them some discomfort. As the baby’s parents, they are the best people to balance this with a positive, reassuring touch. Infants experience touch long before they are born.

Positive touch is a way of communicating parents love and reassurance to their baby and hearing their baby’s needs in return. Babies do communicate, and by watching and listening to the baby you can learn what kind of touch to use and when it is appropriate, safe and pleasurable for your baby.

Sick and preterm infants do not always tolerate handling and can respond in a variety of negative ways. Touch provides the infant with the basis for both complex and intimate communication with the caregiver/parent.

The development of parent-infant relationships in the NICU is complex and includes the progression from touch to holding the infant. There could be days when the infant is tired or sick and contact needs to be keep to minimum in order to keep them well and rested.

4.1 Positive touch
• Supportive – comfort holding, supportive of the infant synchronising with the infants’ sleep-wake state as well as behavioural cues
• Observe how the infant handles during interventions and modify according to their response
• Finger grasping – allowing the infant to grasp a finger
• It is important to help parents to identify the type of touch that their infant likes and encourage them to become the primary provider of touch.

4.2 Negative touch
Negative behavioural responses to touch and handling of fragile infants can include signs of distress, and can include reflexive responses such as the startle reflex, increased movement, agitation and/or crying and observed avoidance responses.

Examples of negative touch are:
• Stroking, patting, weighing (Wrapping the baby may reduce stress) and
• Procedures commenced without comfort measures or analgesia.

4.3 Connection without touch
There may be times that the infant may be very ill and will not respond to touch in a good way. During these times it is important that handling is sensitively tuned to the individual baby to avoid stress and deterioration in the infant’s vital signs. It is also important to communicate this to parents and show them ways of non-touch comforting.

• Having their hands placed near the infant so they can sense and smell their parent
4.4 Still touch
A still resting hand can promote a sense of calm and settle an infant. The infant can recognise where they are being touched and aids in the physiological stability. Infants usually prefer firm still holding as it makes them feel secure. Examples of still touch is placing a firm hand on the infants back when in the prone position or placing a firm hand on the infants head when in the supine position. 

4.5 Cradle holding (containment holding/ facilitated tucking)
Cradle / containment holding is a developmentally sensitive non-pharmacological comfort measure that can both reduce the stress from procedural pain and also calm an unsettled infant.

Facilitated tucking has been proven to decrease pain scores in infants needing medical interventions such as blood sampling, NGT insertions, venflon / cannulation insertion and routine cares.

Facilitated tucking has also shown to decrease levels of active sleep, motor activity and behavioural stress and can be used by both staff and parents to help elevate the infant’s stress. This can be achieved by the caregiver ‘hand-cradling’ the infant by gently placing a hand on the infant’s body/head/feet while providing flexion and containment.

5. Taste and Smell.
The perception of smell and taste, though present in early development has not previously been considered in the care of pre-term infants. The primary olfactory receptors are formed by gestational week, and functional at week 24. Smell and taste are known to increase gut motility, insulin secretion and the release of digestive and metabolic hormones. Smell and taste receptors are functional in the foetus, and there is evidence to support antenatal learning of odours. Newborn infants are able to recognise the smell of amniotic fluid, the scent of breastmilk and odour components of human sweat. The sense of smell is very defined at birth40 it is therefore important to consider the influence that care givers can have by using strong smelling personal hygiene products and the type of equipment cleaning products used, which the infant is exposed to.
Taste cells begin to form at gestational week 7-8, and are considered fully functional and mature at 17 weeks gestation. Taste and smell is enhanced by sucking. The inhalation and swallowing of amniotic fluid in uterine are the first flavour and smell experiences of the foetus. Experience of flavour is influenced by experience of smell, a new-born infants taste buds will detect sweetness, bitterness sourness and Umami (found in milk and Meaty flavours), with a preference for sweetness. Saltiness is not detected until about 4 months of age. It is thought this preference to sweetness explains why giving a sugary solution to an infant prior to a painful procedure will have a soothing effect. Encouraging non-nutritive sucking may have a positive impact on taste and smell receptors.

It is known that infants who are extensively nasogastric tube fed on the neonatal unit are disadvantaged from those early taste and smell exposures normally associated with term gestation infants, it is therefore important during nursing episodes to expose the infant to breast or formula milk smells, taste, encouraging non-nutritive sucking where appropriate during a tube feed and skin to skin contact with parent / carers.

6. Kangaroo Care

Kangaroo care (also referred to as skin to skin) is a method of caring for stabilised low-weight or premature babies outside an incubator. Kangaroo Care is skin-to-skin contact when a baby is placed against the parent’s chest. Benefits can include improvements with lactation and with establishing breastfeeding, soothing to an infant in pain, and better weight gain for the baby. In the longer term, it helps parents to feel closer to their babies and more confident in caring for them. Kangaroo Care can be used with babies with high medical needs, but this will require careful planning and collaboration with the neonatal staff.

6.1 facilitation of kangaroo care / skin to skin

- Explain to the parents what the process involves and what they can do to help. Also consider advising appropriate clothing to facilitate skin to skin.
- Explain to parents that kangaroo care should take place for at least an hour to be fully beneficial to their baby.
- Reassure parents that all lines and tubes will be secure during the transfer.
- Make sure that parents have privacy whilst having kangaroo care.
- Make sure that all equipment is close by.
- Prepare the baby by getting the parent to talk to the baby before moving him/her ensure that he/she is only wearing a nappy and hat if required.
- Transfer the baby slowly and covered in a blanket or the bedding Take the baby out gently and place on their parent’s chest, position his/her head so that an ear is on the chest and wrap the shirt and blanket around the baby and parent. Make sure the baby is moved slowly in a side-lying position and very gradually moved into the lateral position when on the parent’s chest in a reclining position to avoid changes in intracranial pressures. Parents should be advised against attempting to do this independently. Clip any lines to the parent for security and ensure that ventilation tubing is secure.
- Reassure the parent that it may take a few minutes for the baby to settle and that the more relaxed he/she is the more quickly the infant will settle.

6.2 How to prepare parents for kangaroo care

Talk about Kangaroo care & give information if parents want it from the beginning so parents have time to plan and adjust to the idea.
Talk about the importance of hand washing, personal hygiene and odours such as strong scents/perfumes/smoking etc.

Parents wash their hands before picking up their baby
Prepare parents by asking them to wear a front opening top.
Discuss with them that the baby will be only wearing a nappy and a hat to keep warm and they could bring in hats and a blanket from home
Prepare for the procedure by showing the parents with a doll first
Place baby on their chest – for women between the breasts
Discuss what time of day is best for them and the unit and why they are better to stay for long periods of time and how they can achieve that
Wrap a top or blanket around parent and baby
Have them sitting in a comfortable chair preferably one that will recline so they can relax.

7. Supported Positioning

The aim of this is to provide a comfortable and supportive environment for the baby. It should promote optimal physiological, neurological and musculoskeletal development for the preterm and vulnerable infant and influence stability, skin integrity, thermal regulation, bone density, sleep facilitation and brain development. Preterm infants have weak muscle tone, which improves at around 36/40 and are unable to maintain flexion. In utero infants are supported by the amniotic fluid and contained by the limited space of the uterus. Excessive hip abduction occurs in infants positioned prone or supine without adequate support, which may cause infants to walk on their toes or on the outer surface of the foot, leading to difficulties with balance, upright posture and ability to walk.

7.1 The aim of positioning strategies:
To promote a comfortable and supportive environment for each individual baby
Encourage balance between flexion and extension.
Stimulate active flexion of trunk and limbs.
- Allow for more symmetrical posture.
- Enhances midline orientation.
- Achieves a more rounded head and permits active head rotation
- Mimics the physical boundaries of the uterus, encouraging and maintaining a more flexed position.
- Counteract the forces of gravity.
- Maintains a comfortable position whilst still allowing movement.
Positioning aids
- Gel pads
- Bendy bumpers
- Rolls
- High sided (folded not rolled) Nests
- Gel wedges
- Squishon
- Air mattresses

7.2 Supported side-lying (Lateral position)
This is a natural position for self-calming movements that allows for maximum flexion. The hands can be brought up towards the mouth, with the knees and hips flexed towards the abdomen. Ideally the neck should be slightly flexed top shoulder rounded slightly forward, and hips and knees flexed. Left lateral position is thought to reduce gastro-oesophageal reflux. This position should not be used for infants close to discharge, who should be placed on their backs to sleep, according to national guidelines.

Method
Assess the infant to ensure that this position is appropriate.
Ensure that monitoring is in place.
Support back and head in midline. Head positioned midline to less than 45° from midline left or right.
Support arms and hands in midline
Hips aligned and softly flexed.
Knees, ankles and feet are aligned and softly flexed.

7.3 Supine position
This position may be necessary when a baby is receiving therapeutic hypothermia. In stable preterm infants it has been found that there is higher overall cerebral oxygenation in the supine position when compared to prone. However this position can be stressful and should be avoided if possible in the sick neonate. In supine position the work of breathing is increased, gastro oesophageal reflux is more likely, and energy expenditure is thought to be increased.
Method
Support head in the midline with a high sided nest (i.e. chin in line with sternum).
Avoid lateral extension, where head falls towards shoulders (use gel pillow ring or wedge pillow).
Shoulders should be softly rounded and assisted with support, to attain a flexed position towards the chest.
Hands are drawn forward to each other to encourage and allow for hand/mouth co-ordination.
Create a nest supporting either side of the body.
The hips need to be aligned in a flexed position, where they are drawn towards the abdomen.
Avoid hip abduction.
Ankles and feet should be softly flexed.
Provide plantar surface contact in neutral position on the boundary sheet/towel.

7.4 Prone position
This position is thought to be preferable when compared to supine, in that it aids digestion, minimises reflux, stabilises the chest wall and improves the quality of sleep. Frequent use may result in flattening of the sides of the head. Prone position has also been associated with changes in cerebral blood flow velocity due pressure on the vertebral artery caused by neck movement. This position is not to be used for infants close to discharge; these infants should be placed on their backs to sleep, according to national guidelines.

Method
Assess the infant and make sure that this position is suitable.
Ensure that monitoring is in place.
The infant lies on his chest with the hands flexed towards the face, shoulders softly rounded, knees tucked under the abdomen and bottom in the air.
Hips aligned and softly flexed
The baby should be on a soft mattress or ‘Squishon’ to prevent head moulding.
Deep boundaries should be provided. The ideal position is with arms and legs flexed into the body, hands free to touch the face and rolls or ‘snuggler’ placed along both sides and around the flexed legs for containment and flexion if baby needs a high level of support.
8. Non-nutritive sucking

8.1 Definition
Non-nutritive sucking (NNS) occurs in utero and premature infants can suck intermittently on a pacifier as early as 27-28 weeks’ gestation. The suck–swallow-breath coordination is not developed before 34-38 weeks so infants before this age will usually be fed via a gastric tube. Non-nutritive sucking on a dummy or pacifier, an emptied breast or infants own fingers is for comfort, but not to receive nutrition.

8.2 Background
Non-nutritive sucking is recommended for preterm infants to assist digestion, to make the baby comfortable, especially during difficult procedures, and to satisfy suck demand when the mother is not available. Soother use at bedtime is associated with a lower risk of cot death in early infancy. The use of soothers with preterm babies does not to have an adverse effect on achievement of breast feeding.

NNS reduces behavioural distress due to interventions and helps organize physiological stability. Non-nutritive sucking;
Helps facilitate the digestion of enteral feeds as stimulation of vagal mechanisms and stimulation of nerve fibres in the oral cavity, increases levels of gastrin and somatostatin, which aid acid secretion, gastric motility and the growth of intestinal mucosa.
Facilitates easier transition from gastric tube feeding to full oral feeding.
It is a benign intervention and can have a calming effect and improve the development of sucking behaviour.
This leads to a significant decrease in the length of stay in hospital as the transition from tube feeding to full suck feeding is improved and there have been no reports of negative outcomes.

NNS reduces pain scores more than routine care during heel-stick procedures.
Helps to support parents to develop interaction with their infant and establish parent-infant bonding.
The instigation of NNS is simple and effective and has been proven to have significant benefits to preterm infants.

8.3 Consent for NNS
It is important to gain parental consent before giving infants NNS as some parents have strong views about soothers. if it is explained that this is only for whilst their infant is in need of support on the
neonatal unit and the reasons why NNS would be beneficial to their infant, most parents are willing to consent.

9. Applying Developmental Care on Transport

All infants should receive the same level of developmental care during a transfer, as they would be given in a NICU where possible. The goal should be to maintain comfort and safety of the infant in a stable, protective environment and prevent any stress caused by the transfer. One parent is usually invited to travel in the ambulance with their infant.

Strategies to ensure the comfort of infants travelling in transport incubators:
- Contain infant in a nest with boundaries to enable the infant to lie in a range of supported positions.
- Nurse on a ‘Squishon’ mattress to absorb some of the vibrations during the journey.
- Ear protectors can reduce the sound levels to at least 7 decibels.
- Incubator covers can reduce noise and lighting levels inside the incubator and provide privacy whilst being transferred between hospital departments and the ambulance.
- Offer a pacifier (with parental permission) to reduce pain and stress if the baby needs/wants it.
- Use a Trans warmer mattress to reduce thermal stress if the incubator temperature is not sufficient.
- Non-ventilated infants can remain clothed and be swaddled in the position most comfortable for their individual needs.

(Caution: no infant with an umbilical or peripheral arterial line should have line covered by blankets or swaddling)

On arrival at the receiving unit ensure that the staff are aware of the infants’ developmental care needs.

10. Parent involvement

Parents of premature or sick babies can experience a grief-like reaction to their infant being in a NICU. Bonding by holding and touching is often difficult as their infant is unwell and in need of critical care support. Parents often feel that the nurses know their baby better than they do which can undermine their confidence and parenting skills. Getting to know their baby in the busy and very public environment is not easy.

The practice of neonatal critical care may result in the isolation of infants from their families, therefore nursing and medical staff need to ensure that contact between infant and parent is maintained. The parent’s ability to tune into their baby’s behaviour is the essence of attachment and successful parenting. The aim is to facilitate/support the parents in caring for their infant through education and support.

NICU Parents experiences navigate through five stages of adaption, where the responsibility moves from nurse, to nurse and parent, then parent.

Fear – Being afraid to touch their baby, separation is physically painful.
Watch – Gazing at their new baby for long periods.
Touch- Parents need time to watch before they touch, and then may only dare to place hands in incubator near to baby.
Comfort- As parents become more confident about touch they feel able to comfort their baby.
Care – parents become increasingly involved in caregiving, starting with activities that do not involve much movement

Greater involvement in their infant’s care reduces anxiety/depression and improves parent-infant interaction.
10.1 Encouraging successful parenting

Promote Family-integrated care to achieve optimal health outcomes. Educating parents about the NICU environment, their infant’s condition and relevant procedures helps facilitate their active participation in family-medical discussions. Congratulate the parents on the birth of their infant. Encourage them by giving positive feedback when they’ve performed their infant’s cares.

Show the parents how their baby is responding to them, how the baby calms if the parents are handling him/her.

Teach the parent(s) how to recognise their own infant’s cues

Understanding when their baby has had enough stimulation

Observe with parents in watching for baby’s individual milestones that their infant has reached - each step forward is part of the process of getting home.

Parent information leaflets help parents understand their infant’s condition and any proposed treatment in order to make informed choices

Encourage parents to contact parent support groups.

Provide information for BLISS and online information bliss.org.uk.

Provide and encourage parents to keep memory boxes.

Make visiting hours for siblings and other family members as flexible as possible.
<table>
<thead>
<tr>
<th>Indicator</th>
<th>24-27 weeks</th>
<th>28-32 weeks</th>
<th>33-36 weeks</th>
<th>≥37 weeks plus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavioural Development</strong></td>
<td>• Behavioural states poorly differentiated</td>
<td>• Behavioural states more distinct by 32 weeks</td>
<td>• Behavioural states more distinct</td>
<td>• Behavioural states well defined with clear transitions</td>
</tr>
<tr>
<td></td>
<td>• Response to handling results in physiological instability</td>
<td>• Quiet/deep sleep increases around 30 weeks</td>
<td>• Smoother transition between states</td>
<td>• Tolerance of handling and interventions usually increase</td>
</tr>
<tr>
<td></td>
<td>• Diffuse ranging signs of instability from typical stress signs to exhausted</td>
<td>• Response to handling results in physiological instability</td>
<td>• Quiet/deep sleep continues to increase</td>
<td>• Periods of alertness for socialisation with development of longer attention</td>
</tr>
<tr>
<td></td>
<td>collapse</td>
<td>• Shows more typical signs of stress</td>
<td>• May arouse for feeding</td>
<td>spans</td>
</tr>
<tr>
<td><strong>Motor Development</strong></td>
<td>• Movements are mainly jerks, twitches and startles that can increase with</td>
<td>• Twitches and startles common at 28 weeks leading to more controlled</td>
<td>• Smoother more controlled movements</td>
<td>• Demonstrates a wide range of movements</td>
</tr>
<tr>
<td></td>
<td>stressful input</td>
<td>movements by 32 weeks.</td>
<td>• Stronger flexion of knees and hips during rest with further development of</td>
<td>• Controlled movements increase Trunk and extremities usually flexed at rest</td>
</tr>
<tr>
<td></td>
<td>• Weak muscle tone. Decreased flexion in limbs, trunk and pelvis</td>
<td>Muscle tone weak but develops slowly over this gestational period.</td>
<td>• Can turn own head from side to side</td>
<td>Can self-regulate behaviour with movement and posture</td>
</tr>
<tr>
<td></td>
<td>• Unable to control posture, movement and tone</td>
<td>Leg movements increase with the start of flexion in the hips and legs</td>
<td>• Has improved capability to use posture and movement to self-regulate</td>
<td></td>
</tr>
<tr>
<td><strong>Light and Vision Development</strong></td>
<td>• Eyelids may be fused at 23-25 weeks Cornea hazy until 27 weeks. Pupil</td>
<td>• Sluggish pupil response to light</td>
<td>• Increased ability to maintain lid tightening in response to bright light</td>
<td>• Generally shows preference for human face</td>
</tr>
<tr>
<td></td>
<td>reflex is absent</td>
<td>• Able to maintain lid tightening in response to bright light</td>
<td>• Eye opening and alert state are facilitated by low lighting</td>
<td>• Sees best at a distance of 20 - 25cm.</td>
</tr>
<tr>
<td></td>
<td>• Limited ability to maintain lid tightening in response to light</td>
<td>• Eye opening increases in dim light</td>
<td>• Infant may have difficulty breaking gaze on a highly stimulating object</td>
<td>• Sight is still immature with much development to follow at 0-6 months.</td>
</tr>
<tr>
<td></td>
<td>• Eyes may open but do not focus</td>
<td>• May focus briefly on visual stimuli</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Responds to light/visual stimulus with behavioural and physiological signs of stress</td>
<td>• Rapid uncoordinated eye movements</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Sound and Hearing Development | Inner ear has attained full adult size and function  
Infant may respond to soft voice and sound and may show preference for mothers’ voice  
May demonstrate physiological instability to noise/auditory activity | Middle ear and transmission section of auditory system is complete  
Orientation to soft sounds develop during this period  
Infant can quickly fatigue to auditory stimulation  
Infant is sensitive to loud noise and can demonstrate physiological instability to noise/auditory activity | Sensory and transmission portions of the auditory system are functional  
Increasing responsiveness to voice stimuli with a preference for a soft human voice  
Responses to noise and auditory environments begin to organise  
Startle response with loud noise still evident | Response to noise is more consistent and organised  
Can localise and discriminate sounds  
Stress behaviours may still be displayed to certain loud sounds  
Gradual onset of auditory stimuli preferred. |
| --- | --- | --- | --- | --- |
| Non-nutritive Sucking Development | Immature gastrointestinal system  
Gag reflex present at 26 weeks Sucking may appear but not synchronised to swallow | Rooting reflex present but a delayed response can occur  
Poor suck, swallow and breathe coordination that matures over this period | Suck, swallow and breathe co-ordination maturing with some rhythmicity but coordination can be inconsistent  
Rooting reflex emerges  
Can nuzzle at the breast | Suck, swallow and breathe coordination becomes more consistent and organised  
Endurance for oral feeding increases |
| Smell and Taste Development | Taste and smell receptors are thought to be functional across all gestations from 24 weeks | | Developmental Indicators from Preterm to Term [http://adhb.govt.nz/newborn/Guidelines/Developmental/DevCare](http://adhb.govt.nz/newborn/Guidelines/Developmental/DevCare) |
References

NIDCAP, 2014. The department of health and human services; state government of Victoria, Australia
Tommy’s having a premature baby handbook, 2012.
25. Non –nutritive sucking for promoting physiologic stability and nutrition in preterm infants


Appendix 1

Benchmark: Developmental Care

<table>
<thead>
<tr>
<th>Lead EOENBG member for the Unit:</th>
<th>Date to be scored:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>--/--/--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scored by:</th>
<th>Date scored:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-/--/--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date of next meeting to share good practice and compile action plan:</th>
<th>Re-score date agreed:</th>
</tr>
</thead>
<tbody>
<tr>
<td>--/--/--</td>
<td>--/--/--</td>
</tr>
</tbody>
</table>

Statement:

Developmental care is the humane counterpart to high tech medical and pharmacological care in the neonatal unit. It aims to offset the disadvantages of premature birth or perinatal problems by supporting each infant's personal development agenda, ensuring the best possible outcomes.

Developmental care includes a variety of activities designed to manage the environment and individualise the care of the premature infant based on behavioural observations. The goal is to promote a stable, well-organised infant who can conserve energy for growth and development.

Standards:

All staff within neonatal services will modify the environment and care-giving technique to support these vulnerable infants.

Neonatal nursing practice is provided based on the monitoring and control of the physiological stability of infants and decision making in relation to interventions, including controlling the neonatal environment.

Definition:

Developmental care is a broad category of interventions designed to minimise the stress of the neonatal environment.

Patient Group: Any infant nursed within the neonatal environment

Triggers for the development of the benchmark:
<table>
<thead>
<tr>
<th>Key Factors</th>
<th>Individual Scores</th>
<th>Possible Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>F:1 Evidence-based guideline</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>F:2 Procedures</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>F:3 Positioning</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>F:4 Environment - Lighting</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>F:5 Environment - Noise</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>F:6 Education of staff</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>F:7 Parental involvement</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td><strong>Total Score</strong></td>
<td></td>
<td><strong>35</strong></td>
</tr>
</tbody>
</table>

Criteria for scoring: Scoring to take place on day and night shift for 4 babies each shift. Activity levels will be documented; scoring may be done through observation of staff/parents, discussion and documentation.

Original version | July 2004 | 4th Version Agreed | Sept 2010
2nd Version Agreed | July 2006 | 5th Version Agreed | Sept 2011
3rd Version Agreed | August 2008 | 6th version Agreed | Sept 2013
7th version | Review | | 2018
### Factor 1: There is an evidence-based guideline to support clinical practice.

#### Statements

Clinical guidelines are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific circumstances, statements about different aspects of the patients' condition and the care to be given.

The aim of the guideline is to provide evidence-based information to enable the Health Care Professional to deliver individualised care, relevant to age and stage of development of the infant, to provide optimal outcomes.

#### Criteria for best practice

- The guideline is evidence-based and referenced.
- The guideline is reviewed regularly according to trust policy.
- The guideline is supported and used by all members of the multi-disciplinary team.

#### Table

<table>
<thead>
<tr>
<th>Score one for every criterion met &amp; justify.</th>
<th>Related to the criteria above.</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no evidence-based guideline.</td>
<td>There is an evidence-based guideline, reviewed regularly, that is supported and used by all practitioners.</td>
</tr>
<tr>
<td>0</td>
<td>1-2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

### Score 3

#### Factor 1: There is an evidence-based guideline to support clinical practice.

#### Statements to justify score:

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
Factor 2: Clinical Interventions

Statements
Caregivers must be alert and responsive to the needs of the infant, and medical/nursing procedures should be timed to minimise stress\(^1\).

The ultimate goal of intervention strategies in the neonatal setting is to facilitate and promote infant growth and development\(^1\).

Criteria for Best Practice
There is documented evidence of the following:
Deviations to planned care\(^1\)
The infants’ response to intervention\(^1\)
Actions taken to minimise discomfort and stress\(^1,18\).

<table>
<thead>
<tr>
<th>There is no documented evidence relating to clinical interventions</th>
<th>Related to criteria above</th>
<th>There is documented evidence of any deviation to planned care, the infants response to procedures and strategies implemented to minimise discomfort and stress</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Score 1 for every criterion met &amp; justify.</td>
</tr>
</tbody>
</table>

| 0 | 1-2 | 3 |

SCORE 3

Factor 2: Clinical Interventions

Statements to justify score:
Factor 3: Positioning

Statements

Increasing evidence suggests that supportive positioning and handling of sick and premature infants may promote more normal motor development and minimise the chances of developing abnormal movement patterns\(^1\).

Incorrect positioning of very preterm infants can have a deleterious effect on long term motor development and may also affect neurodevelopment\(^1\).

Criteria for Best Practice

Positioning should demonstrate a balance between flexion and extension, midline orientation and allow hand to mouth action\(^1,19,20\).

Positions should be changed when the baby appears uncomfortable (to prevent head moulding and help maintain skin integrity) and variances should be documented.

Infants are positioned with support aids which reflect their developmental needs\(^20,21\).

<table>
<thead>
<tr>
<th>There is no attempt to nurse sick or preterm infants in developmentally supported positions</th>
<th>Related to criteria above</th>
<th>All sick and preterm infants are nursed in a supported flexed position</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1-2</td>
<td>3</td>
</tr>
</tbody>
</table>

Score 1 for every criterion met + justify.

SCORE 3

Factor 3: Positioning

Statements to justify score:

- 
- 
- 
- 
-
Factor 4: Environment - Lighting

Statements
To minimise the potential adverse effects of prolonged, intense and varying light exposure, approaches should be developed to protect the infant from these stimuli. Careful observation and monitoring will provide clues about the impact of lighting on a baby. For example, light may affect the quality of the baby's sleep and awake states with a compound effect on physiological stability and attentive behaviour.

Criteria for Best Practice
Dimmer switches are provided and used to achieve lower levels of lighting and allow for a gradual increase to full lighting. There is provision for individual variable cot side lighting. Nursery windows have opaque curtains or blinds that are used at times during the day and at night. Infant's eyes are protected from direct light sources with the use of covered incubators or tinted head boxes. The infant’s eyes should be protected while receiving phototherapy and measures taken to limit the exposure of infant's who are adjacent to the light.

Light levels are reduced at night to promote the development of diurnal cycles.

<table>
<thead>
<tr>
<th>No consideration is given to lighting levels in the nursery</th>
<th>Related to criteria above</th>
<th>The lighting of the NICU is set to enhance neurodevelopment, reduce stress and promote diurnal rhythms in sick/preterm infants</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1-5</td>
<td>6</td>
</tr>
</tbody>
</table>

SCORE 6

Factor 4: Environment – Lighting

Statements to justify score:
Factor 5: Environment - Noise

Statements

Noise levels in the neonatal setting are a major source of environmental stress for premature/sick infants. Neonatal unit noise originates from three sources, the environment itself, patient care equipment and caregivers.

Criteria for Best Practice

Monitor alarms and telephones are set to the lowest audible level and are answered promptly. Conversations and unit rounds are conducted away from the cot side or outside the care giving area if possible.

Talking is reduced to a whisper by cot sides. Opening and closing of incubator ports, nursery doors, drawers and disposal bins is done with care.

Collections of water are removed from ventilator tubing promptly. Nursery floors are mopped not vacuumed.

Thickened incubator covers are used to dampen sound. Items are not placed on incubator surfaces.

Radios are removed from care areas.

Noise levels are monitored by a device manufactured for the neonatal setting such as a sound ear and it is observed that staff are responding to reduce noise as appropriate.

<table>
<thead>
<tr>
<th>No consideration is given to the levels of noise in the nursery</th>
<th>Related to criteria above</th>
<th>Noise levels of the NICU are minimised to enhance neurodevelopment and reduce stress in sick/preterm infants</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1-9</td>
<td>10</td>
</tr>
</tbody>
</table>

Score: 10

Statements to justify score:
**Factor 6: Education of Staff**

**Statements**

Developmental care is necessary to achieve an optimal outcome for sick and preterm infants therefore education of the multidisciplinary team is essential.

Education plays a key role in moving staff toward the philosophic change necessary for long term commitment and progress in the developmentally supportive care for infants and their families.\(^{41}\).

**Criteria for Best Practice**

All staff receive information about developmental care during induction, to include:

- Physiological and behavioural organisational states
- Effects of the environment
- Positioning and handling
- Parent teaching
- Resources and guidelines are available on the neonatal unit

All staff are taught that:

1. All touch episodes should be infant led and individualised whenever possible.\(^{35}\).
2. To look for signs of stress in infants and use positive touch to help them cope.\(^{36,16}\).
3. To document infant responses to touch/social interaction
4. To touch infant gently prior to all handling/interventions.\(^{17}\).

<table>
<thead>
<tr>
<th>There are no educational opportunities for of the multidisciplinary team relating to developmental care</th>
<th>Related to criteria above</th>
<th>All staff receive education relating to developmental care on induction and receive annual updates with opportunities to develop their knowledge and skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1-4</td>
<td>5</td>
</tr>
</tbody>
</table>

**SCORE** 5

**Factor 6: Education of Staff**

Statements to justify score:

- 
- 
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- 

**Factor 7: Parental / carer Involvement**
**Statements**

The parent/carer/infant relationship is the most important developmental intervention, as it is this relationship that will have the greatest impact on long term outcomes. The family are the most consistent caregivers in the infant’s life. By promoting support and education to the family the infant’s development will be optimised.

The notion of partnership between the healthcare professional and the patient whereby the patient and the professional meet as equals with different expertise, must be adopted by Health Care professionals in all parts of NHS including hospitals.

Criteria for Best Practice

Unit philosophy is based on family centred care

Parents are taught all aspects of Developmental Care for their babies individual needs (as assessed by asking parents):

- Positioning
- Behavioural cues
- Environmental aspects – noise / light / heat
- Touch and interaction

Parents are provided with supporting information digital or paper format.

There is documented evidence that parental education has taken place.

The developmental needs of both infant and parents are met by encouraging. Kangaroo care, containment or non-nutritive sucking

<table>
<thead>
<tr>
<th>There is no evidence of parental involvement</th>
<th>Related to criteria above</th>
<th>Documented evidence of parental education, which has been supported by the provision of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1-4</td>
<td>5</td>
</tr>
</tbody>
</table>

**SCORE**

5

**Factor 7: Parental Involvement**

Statements to justify score:

- 
- 
- 
- 
- 

Amanda Blake

Procedure

Review date

Version
References


34. NMC (2002) code of Professional Conduct for Nurses, Midwives and Health Visitors. London [IV]


Date of benchmarking activity.......................  
Data to be collected on a minimum of 4 babies  
Y= Yes       N= No       N/A= Not applicable  

<table>
<thead>
<tr>
<th>Factor/ criteria</th>
<th>Day shift</th>
<th>Night shift</th>
<th>Day shift</th>
<th>Night shift</th>
<th>Day shift</th>
<th>Night shift</th>
<th>Day shift</th>
<th>Night shift</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 2. There is documented evidence of  
  1. Deviations to planned care  
  2. Infants response to intervention  
  3. Actions taken to minimise stress | 1. 1. 1. | 1. 1. 1. | 1. 1. 1. | 1. 1. 1. | 1. 1. 1. | 1. 1. 1. | 1. 1. 1. | 1. 1. 1. |          |
| 3.1 Positioning demonstrates balance between flexion, extension, midline orientation and allow hand to mouth action |          |          |          |          |          |          |          |          |          |
| 3.2 Positions are changed  
  Variances are documented |          |          |          |          |          |          |          |          |          |
| 3.3 Infants are positioned with support aids which reflect their developmental needs |          |          |          |          |          |          |          |          |          |

Amanda Blake  
Procedure  
Review date  
Version
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5 Infants eyes are protected from direct light sources (covered incubators/ tinted light boxes)</td>
<td></td>
</tr>
<tr>
<td>5.1 Monitor alarms are set to lowest audible level</td>
<td></td>
</tr>
<tr>
<td>5.7 Thickened incubator covers are used to dampen sound</td>
<td></td>
</tr>
<tr>
<td>5.8 Items are not placed on incubator surfaces</td>
<td></td>
</tr>
</tbody>
</table>
7.2 parents are taught all aspects of developmental care

<table>
<thead>
<tr>
<th></th>
<th>1. positioning</th>
<th>2. behavioural cues</th>
<th>3. environmental aspects (noise/light/heat)</th>
<th>4. touch and interaction <em>(ask parent)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
<td>1.</td>
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<tr>
<td>2.</td>
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<tr>
<td>4.</td>
<td>4.</td>
<td>4.</td>
<td>4.</td>
<td>4.</td>
</tr>
</tbody>
</table>

7.3 parents are provided with supporting information about developmental care *(ask parent)*

7.4 There is documented evidence that parental education has taken place
| 7.5 Documented evidence that parents have been involved in Kangaroo Care, (skin to skin) Containment holding and / non-nutritive sucking. |
|---|---|---|---|---|---|

# Exceptional Circumstances Form

Form to be completed in the exceptional circumstances that the Trust is not able to follow ODN approved guidelines.

<table>
<thead>
<tr>
<th>Details of person completing the form:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Title:</td>
<td>Organisation:</td>
</tr>
<tr>
<td>First name:</td>
<td>Email contact address:</td>
</tr>
<tr>
<td>Surname:</td>
<td>Telephone contact number:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Title of document to be excepted from:</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Rationale why Trust is unable to adhere to the document:</th>
<th></th>
</tr>
</thead>
</table>

| Signature of speciality Clinical Lead:                  |
|---------------------------------------------------------|--|
| Date:                                                   |

| Signature of Trust Nursing / Medical Director:          |
|---------------------------------------------------------|--|
| Date:                                                   |

| Hard Copy Received by ODN (date and sign):             |
|--------------------------------------------------------|--|
| Date acknowledgement receipt sent out:                 |

Please email form to:  mandybaker6@nhs.net  requesting receipt.
Send hard signed copy to:  Mandy Baker  
EOE ODN Executive Administrator  
Box 93  
Cambridge University Hospital  
Hills Road  
Cambridge CB2 0QQ