MCN for Neonatology
West of Scotland
Neonatal Guideline

Developmental Care Guideline

This guideline is applicable to all staff involved in the care of neonates and infants in West of Scotland Neonatal Units and on Paediatric Wards.

Purpose of the Guideline
To provide clinical guidance which supports consistent delivery of Family Centred Developmental Care practices across the Network. It includes the primary principles involved in Developmental Care and supporting the developing brain.

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Introduction

Developmental guidelines follow age-appropriate care strategies to support infants born sick, preterm, with congenital anomalies, or those who require surgical intervention and support their family throughout their hospitalisation in the neonatal care unit.

Infants of all gestational ages who require hospitalisation are vulnerable to traumatic experiences associated with hospitalisation and life-threatening illness; these include stress, parental separation and pain and have cumulative effect on the short term and long-term health and well-being of the infant and family [1, 2]

Emerging evidence suggests that early life events are increasingly being recognised as influential in later physical and mental health outcomes [4]

Supporting the physiologic, neuro-behavioural, and psycho-emotional needs of the hospitalised infant improves neuro-developmental outcomes and reduces their risk of adverse health outcomes across their lifespan [3]

Creating a healing environment that buffers stress and pain while offering a calming and soothing approach to help keep the whole family involved in the infant's care and development is an important factor in the overall aim of reducing morbidity and mortality rates [5]

Developmentally supportive care has shown to be associated with:

- Improved short term-growth outcomes [6]
- Decreased respiratory support
- Decreased incidence of moderate/severe chronic lung disease
- Decreased length of stay
- Decreased cost of hospital stay
- Increased breastfeeding rates at discharge
- Improved neurodevelopment outcomes to 24 months corrected age.

The goals of developmental care for the infant are to:

- reduce stress
- conserve energy and enhance recovery
- promote growth and well being
- protect sleep
- support the transition to oral feeds
- support emerging behaviours at each stage of neurodevelopmental maturation.

The goals of developmental care for the family are to:

- encourage and support parents in the primary caregiver role [7]
- enhanced parent and infant bonding
- enhanced family emotional and social wellbeing along with supporting mental health and well being

The care interventions/recommendations presented in this guideline are not intended to be prescriptive, but to support health care professionals deliver individualised age-appropriate developmental care within their own area of practice.

Neonatal caregivers should seek further specialist support from the multidisciplinary team if required.

The Environment and Sensory Development

Developmental care creates an environment that minimises stress while providing a developmentally appropriate nurturing setting for the infant and their family.

Due to the nature of the NICU environment infants are subjected to sensory overload and invasive procedures which are detrimental to the developing brain.

Hearing and Noise Levels

Loud noise may cause stress resulting in physiological changes such as increased heart rate, fluctuations in blood pressure along with decreasing oxygen saturations and sleep disturbance [8]

The auditory system becomes functional at around 25 weeks' gestation. The cochlea and the auditory cortex in the temporal lobe are most important in the development of the auditory system. They are both easily affected by the environment and care practices in the newborn intensive care unit (NICU).

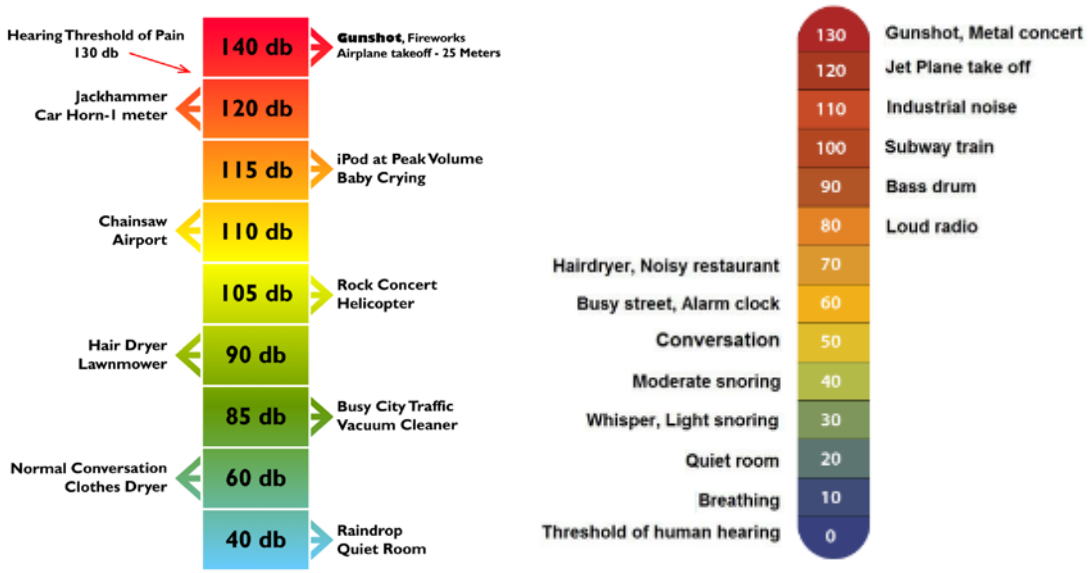
The British Safety Standards of noise within an incubator recommend a maximum of 65dB but The American Academy of Paediatrics suggests below 45dB as a safety threshold. [10, 11] Above 90dB for over 8 hours has the potential to damage the adult cochlea therefore the more immature cochlea is more sensitive to damage [12]

Research has shown noise in the neonatal unit and inside the incubator can exceed 120bB [14] which is exceeding the maximum recommendation; this can be dependent on respiratory support such as Vapotherm, CPAP or Ventilation.

Ototoxic drugs can increase an infant's sensitivity to noise due to the effect on the nerve supply such as diuretics and some antibiotics [13] However, we cannot avoid their use but should be aiming to stop antibiotics when infection is ruled out or the baby is responding to treatment.

It is crucial for staff to be proactive in reducing sound levels within the recommended guidelines.

Some units may find the use of a sound EAR helpful to highlight the current noise levels. However, general noise levels can also be acknowledged below.



To help reduce noise:

- Silence alarms as soon as practicable and set alarms at lowest safe level
- Close incubator doors and drawers softly and do not place items on top of incubators
- Use Double walled incubators where possible
- Don't tap on the incubators
- Remove excess water from any respiratory support system
- Aim to have conversations away from the incubator where possible
- Avoid speaking over incubators such as updating parents, ward rounds and handovers
- Bin lids should Be closed quietly
- Radios should not be allowed in the clinical area
- Phones to be placed as far away as possible from infants' incubators. Use low output and to be answered promptly where possible
- Use of musical toys appropriate to gestation and infant state (not recommended before term gestation)
- Parents should be supported and encouraged to talk and read to their infant during awake and alert times

Vision and Lighting Levels

The newborn infant's visual system is not fully developed at birth. Constant light disturbs diurnal rhythms.

The pupillary reflex is not fully developed before 32 weeks' gestation. The eyelid is very thin therefore more light can enter the eye even when the eye lids are closed [15]

Light intensity is measured in Lux, which measures the perceived intensity of light. Both artificial and natural light play several roles in the neonatal environment: it supports the visual function of staff, affects the infant's physiology and development, and regulates circadian function [15, 16, 17]

Cycled lighting does appear to induce patterns of rest and activity and it may improve the infant's ability to preserve circadian rhythms [18] Dim lighting has been reported to improve sleep, decrease motor activity, decrease heart rate, improve the feeding experience of the infant and increase weight gain. It has also been noted that when light levels in NICU are reduced, the actual frequency and duration of non-urgent care-giving activities by staff are also reduced [19]

Ambient lighting can vary from 10-600 lux.

LUX	DESCRIPTION
50,000	British summer sunshine
5,000	Overcast sky
500	Well-lit office
300	Minimum for easy reading
50	Passageway/outside working area
15	Good main road lighting
10	Sunset
5	Typical side road lighting
2	Minimum security risk lighting
1	Twilight

To help reduce light:

- Take the opportunity to 'dim' lighting whenever possible
- Use Incubator Covers for 23-32 weeks gestational age
- Avoid direct light into the infant's eyes at all times
- Use opaque blinds
- Aim to protect the eyes post ROP screening for 6 hours post procedure (phototherapy eye masks can be used)
- Shield the infant's eyes during any procedures that require overhead lighting
- From 32 weeks' gestation introduce a cycle such as Daytime 100-200 lux and natural light if possible, at Night aim for <50 lux [17]
- Use focused lighting such as an angle poise lamp at workstations to allow staff to do paperwork

Smell and Taste

Smell and Taste are closely interlinked, and one system will not fully function without the other.

The senses of smell and taste develop together in utero. The structures for tasting are present in utero from about 14 week's gestation. The developing sense organs are bathed in amniotic fluid which has a chemosensory profile specific to each pregnancy. The mother's diet has a particular influence on this profile [35]

The baby is born able to recognise the particular profile in which his/her chemoreceptive system matured. Even preterm babies from 28 weeks' gestation, have memorised their own amniotic profile and display the ability to recognise it in the presence of a competing amniotic smell [36]

Babies have a preference to sweet tastes [37] and mother's smell activates pre-feeding behaviours and influences state of arousal.

Providing exposure to the smell of breast milk and formula during tube feeding is a way of enriching the feeding experience through the olfactory sense [77]

How as health professionals can we help?

- Exposure of babies to unpleasant tastes and noxious smells should be minimised.
- With the above in mind staff and parents should avoid using scented hand cream before touching the baby and avoid wearing strong perfume, oil, aftershave
- After using hand sanitiser gel, hands should be allowed to dry before touching the baby or putting hands into an incubator.
- Alcohol wipes should be opened outside an incubator and allowed to aerate before being used.
- Sensitively explain to parents/visitors that smoke residue on clothing can be harmful to babies and be irritating to their eyes and airways. Advice should be given about the risks of smoke exposure and how this can be minimised. Ensure any clothing/blankets that the baby uses have been washed and dried in a smoke free environment.
- Use breastmilk for mouth care where possible as it gives the infant a positive oral experience and has a calming effect.
- Medicines – many medicines are administered orally on the neonatal unit, especially as the baby is preparing for discharge. Consideration should be taken as to how this can be made the least distressing for the infant as they often have an unpleasant or strong taste (e.g. consider giving Sodium Supplements divided into smaller doses more frequently and mixed with some milk).
- Use Miniboos or similar items approved by infection control, to allow infants to smell their parents scent.
- Use of non-nutritive sucking (see NNS section).

Miniboos

The Miniboo is a comforter being used throughout the UK. It was created to bring comfort, contentment and reassurance to babies, by stimulating the baby's awareness of their parent's unique scent [38]

To scent a Miniboo it should be placed against the skin of the parents, then placed in their baby's incubator, close to the baby then swapped over at regular intervals. When placed with the infant this can soothe, calm and comfort them.

The benefits of using Miniboos

- Infants ability to smell their mother is one of the most important steps in learning recognition
- Mothers breastmilk has a similar smell to amniotic fluid and when on the miniboo it he to reduce stress and calms the baby
- The unique scent of the infant can help stimulate milk production during times of separation
- Gives reassurance to parents at times when they are apart from their baby
- Shown to lower their heart rate, as well as reducing blood pressure
- Helps keep baby calm when undertaking uncomfortable medical procedures
- Encourages building the attachment bond when parents are unable to hold their infant

Miniboo is machine washable and retains its softness after washing [38]

Non-Nutritive Sucking

Non-Nutritive Sucking (NNS) is a developmentally supportive intervention in response to the behavioural cues of the infant when bottle or breast-feeding opportunities are not available [39]

The instigation of non-nutritive sucking is simple and effective and has been proven to have significant benefits to infants who have missed the opportunity to have any oral feeds due to being sick, preterm, requiring surgery or have other congenital abnormalities.

Infants born preterm can suck intermittently on a pacifier as early as 27-28 weeks' gestation. It can also be achieved by encouraging the infant to suck on his/her hand, by providing mouth care, or if possible, an expressed breast [40]

If mum is intending to breast feed, the baby should be allowed to lick/nuzzle, on an expressed breast during skin to skin prior to being mature enough to have a breastfeed. At the point where baby is transitioning to Breastfeeding NNS using a pacifier should be stopped.

Additionally, NNS 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 [41]

Benefits of NNS

- Pleasurable oral experience used to settle and comfort the distressed baby [42]
- Helps the pre-term regulate himself/herself [43]
- Assists with digestion
- Assists with the transition to oral feeding and full breastfeeding [44, 45]
- Matures the sucking reflex and helps improve co-ordination for babies who are struggling to bottle feed [45]
- Useful for the infant born with congenital abnormalities which preclude them from establishing feeding normally but can benefit from sucking on a pacifier [46]
- Used to improve infant's response to pain [47] most effective when used in conjunction with EBM or sucrose compared with any other single intervention [48]
- Decreases the length of stay in hospital as the transition from tube feeding to full suck feeding is improved.
- To help the stressed, disorganised infant settle [43]
- Reduces the risk of cot death in early infancy [49]

Nursing Considerations

- Encourage hand to mouth contact.
- Offer appropriate pacifier to support non-nutritive sucking.
- Encourage non-nutritive sucking during NGT/OGT feeds and for comfort.
- May be offered with/without EBM/sucrose prior to and during painful procedures [50]

Touch

Kangaroo Care

Skin to skin contact (kangaroo care) has many benefits to both the baby and their family. It helps improve the baby's respiratory rate, heart rate and oxygenation as well as maintain thermoregulation. When spending time in skin contact it promotes deep sleep and growth. Being close to their parent also provides comfort and induces calmness for both. The reassurance of parental touch together with a familiar smell and voice helps soothe the infant.

For mothers it is known to increase milk production and enhance parental emotional and psychological wellness.

Skin to skin should be initiated as soon as possible ideally in labour ward even if the opportunity is very brief.

It should be part of routine care offered to families every day for extended spells knowing that the benefits are dose dependant. Even infants who have complex needs including respiratory support should be offered KC where appropriate.

Benefits of Skin to skin or Kangaroo Care

- Helps to regulate baby's temperature, heart rate, breathing and oxygen saturation and is associated with fewer episodes of apnoea and bradycardia
- Analgesic effect
- Increases time spent in quiet sleep
- Reduces stress for the infant which promotes brain growth through decreased cortisol levels and increased oxytocin levels
- Promotes parent infant attachment can help to increase milk production
- Improved breastfeeding success and longer breastfeeding duration by supporting parents to recognise and respond to feeding cues as well as allowing the infant to practice instinctive feeding behaviours
- Faster growth rates [54] and earlier discharge from hospital
- Positive effect on parenting – reduces stress, triggers healing process and increases confidence
- Positive interactions with fathers during KC
- Recovery from birth-related fatigue for the mother [55]
- Longer alert states and less crying at six months [78]
- Promotes family centred care

After Discussion with the Medical Team

- Infants with Chest drains in situ
- Infants who are being actively cooled
- After surgery or major treatment – discuss with surgical team when it would be appropriate, NPASS scoring can assist with the decision
- ECLS (ECMO)
- Inotrope infusions – discuss on the ward round or with the duty consultant
- Infants requiring CFAM – discuss on the ward round or with the duty consultant
- Concerns regarding stability - discuss with a senior member of the medical team
- Previous unplanned extubation or an infant who has been a difficult intubation – make sure the duty consultant is aware

Special precautions

- Ensure within reach of a Neopuff and suction.
- Staffing numbers must be considered before offering KC for ventilated infants – should only be offered when there is sufficient nursing staff available, to support the safe transfer of the infant out of and into its incubator/cot. One person must be dedicated to holding the ET tube during the transfer.
- If staff are not familiar or confident to transfer an infant out for KC, seek support from an experienced staff member of staff.
- Umbilical lines arterial or venous are not a contraindication but need to be firmly secured.

Preparation for Kangaroo Care

- Offer a privacy screen and comfortable chair
- In partnership with parents plan for a suitable time and suggest that they parent to go to the toilet, have a drink or express first and wash their hands
- A loose-fitting top or buttoned shirt with an opening front is recommended ideally without a bra on for mum to maximise skin contact/access to the breast
- Ensure the infant has had any appropriate cares done prior to coming out of their incubator i.e. a temperature check and suctioning – allowing time for recovery before transfer commences.
- The infant should only wear a nappy.
- Disconnect any equipment not required for the transfer such as temperature cables, ECG leads can stay attached but can be disconnected whilst moving.
- Keep a saturation probe connected at all times.
- Check that the ET tube, CPAP mask/prongs or any nasal prongs are secured well before moving the infant.
- Ensure any lines such as PVCs, PICCs or Umbilical lines are also secured well.

Parent Transfer

Teaching video available - https://vimeo.com/522477070

The most stressful part of kangaroo care for the infant and their parents is the transfer in and out of the incubator/cot. Standing parent transfer decreases this and supports safer transfer for sicker infants.

Before any interaction it is important to talk to the baby to reassure them and let them know what is about to happen. Throughout the whole process maintaining a flex contained position, touch and the calming voice of the parent reassures the baby and reduces stress.

- When you are getting ready to move the infant make sure all lines and respiratory support are free to move and have enough give to reach the chair without stretching or dislodging them.
- Ensure infant is in a flexed midline position by gently swaddling in the sheet they are already lying on to minimise handling. This will allow uninterrupted skin contact once the infant has been lifted out of the incubator. Make sure infant's feet are free of the blanket which means as soon as the baby is turned round its feet will be touching the parent's tummy.
- The parent should stand at the incubator/cot side, place their forearm gently under the blanket, cup the head with the other hand, gently rotate their infant round lift the infant out of the incubator/cot resting the infant's head against their sternum. The parent should continue to support the infant's back and bottom with their forearm.
- The infants head should be placed to one side.
- The nurse should assist with any equipment i.e respiratory support, lines and monitoring.
- The parent sits back in the chair, guided by the nurse.
- The nurse should check that the infant's legs are in flexion, head turned to the side to protect the airway.
- The nurse should check again that respiratory support is secure now that the parent is in a sitting position.
- Once comfortable on their parent's chest, plug in all monitoring that was disconnected for transfer.
- Ensure the infant is not lying on any lines or wires and that any respiratory support is secured – Velcro adjusters can be used and attached to parents clothing.
- Check that the head of the infant is well supported and that you can see the infant easily.
- Place an extra blanket for warmth over the infant and parent if required.
- Offer a pillow for extra support.
- The longer the infant is out for kangaroo care the better. To maximise the benefits it should be at least an hour to mitigate for the stress response to transfer in and out of the incubator/cot.
- Kangaroo care allows the opportunity for the infant to develop their feeding behaviours and for parents to recognise their infant's cues. Mum can express some milk onto her nipple. This will encourage her baby to lick and nuzzle at the breast.
- It is important to encourage parents to alternate the infants head position whilst having Kangaroo Care.

Nurse Transfer (second nurse required)

This method can be used for mums who are post c-section and unable or uncomfortable to stand and lift their infant. It may also be helpful for parents who are initially anxious to lift/touch their infant until they become more comfortable to participate in a parent transfer.

- Get the parent into a comfortable chair that reclines back, ensure clothing is opened and ready to receive the infant
- Wash hands.
- Contain the infant's limbs and move gently.
- A second nurse is required to support ET tube, ventilator, CPAP, lines and wires.
- Gently place the infant on parent's chest, prone with head to the parent's sternum and with its head to one side to protect the airway.

- Ask the parent to support the infants head and body with their legs flexed.
- Once comfortable on their parents' chest, plug in all monitoring that was disconnected for transfer.
- Ensure the infant is not lying on any lines or wires and that any respiratory support is secured – Velcro adjusters can be used and attached to parents clothing.
- Check that the head of the infant is well supported and that you can see the infant easily.
- Place an extra blanket for warmth over the infant and parent if required.
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Ideally KC should continue for as long as both parent and infant are comfortable. However, if the infant is showing any of the following signs, consideration should be given to the ongoing benefit:

- Increased oxygen requirement of 20% (e.g., from 30% to 50%) after being allowed a period of time to settle
- Infants showing signs of distress i.e., apnoeic, bradycardic, desaturation, colour change
- Hypothermia - < 36.5
- Infant remains unsettled or distressed after being given an appropriate period of time to settle

Generally, infants having skin to skin are more stable than infants in an incubator or cot. It is encouraged that if the infant is unsettled try changing the infant's position slightly, ensure they are not lying on any wires/lines, try a little breastmilk on their lips. If the infant remains unsettled, then they may need to go back into their incubator/cot.

Feeding with Kangaroo Care

It is acceptable to give an infant NG/NJ feed whilst they are in the Kangaroo Care position. This should be encouraged to facilitate extended periods of skin to skin.

Proprioception and Vestibular

Therapeutic postural support and handling

Sensory motor development and postural control have been demonstrated to be critical for the short and long term neurodevelopmental and cognitive outcomes of NICU survivors [32]

Muscle tone develops in a caudal cephalic direction and the fluid-filled uterus unaffected by gravity is the optimal environment to support this development. However, infants born preterm and sick term infants can be compromised by the forces of gravity that can impact spontaneous movement and ongoing musculoskeletal development [56]

Ensuring appropriate postural alignment for comfort not only influences neuromotor and sensory development but also impacts on physiological function and stability, skin integrity, thermal regulation, bone density, sleep facilitation and brain development [57]

Preterm and sick term infants left in unsupported, extended positions frequently exhibit increased stress and agitation with decreased physiologic stability [58] Side lying decreases the effects of gravity and facilitates midline orientation of head and extremities. It is the position that best encourages hand to hand, hand to mouth/face activity and is therefore the position that provides the best developmental advantages [58]

Positioning should not compromise an infant's medical care or stability.

Proprioception:

The sense Proprioception is that of body position, location, orientation, and movement.
The information is received through receptors in muscles and joints – for example force, speed, and control, about how and where we are moving in the space around us. This is basically where each part of our body is in relation to others, and how much effort is required from each of the parts to get the desired movement. This can affect how we drink from a cup with control, throw a ball to hit a target, how to move our body to fit through a small space.

Vestibular:

The vestibular sense is our sense of movement and balance.
Along with the cochlea of the auditory system, it comprises the labyrinth of the inner ear. Movement of the fluids in these semi-circular canals inform us of changes in our head position, gravitational pull, and direction and speed of movement. The vestibular system signals to our other senses when it's necessary to make adjustments so that we can maintain balance, clear vision, adequate muscle tone, and coordination.

Dysfunction can present as hypo or hyper responsive. Like other senses you can have a mixture of both. Some infants might be movement seekers and like to be rocking or on the go. They have poor balance and posture, as Our vestibular system helps us to control our 'postural tone, If our postural tone is too high we might find it difficult to change positions smoothly and grade our movements, The vestibular system tells us where our body is in relation to gravity- This might present with excessive fear of falling, avoiding uneven surfaces.

Benefits of positioning for infants:

- Temperature – infants place prone have higher surface temperatures and narrow central to peripheral temperature gradients
- Comfort – physiological flexion promotes self-soothing
- Gas exchange – Sp02 is higher in left lateral and prone positions than supine. Premature infants have more hypoxic and apnoeic episodes when supine.
- Nutrition – premature infants have lower gastric residuals when placed prone
- Mobility – flexed positions promote proper join alignment and symmetry for preterm infants.

Infant's positioning is generally a nursing intervention which can improve patient outcomes. However, it should be everyone's job and it can be taught to parents.

Supporting Positioning

- Aim to give the baby a balance of positions over the 24-hour period- alternating between prone and lateral (left/ right side).
- Maintain a symmetrical flexed midline position using positioning aids, alternating between side-lying, supine, prone and semi-upright positions during skin-to-skin care.
- Infants should be positioned and handled to support postural alignment and spontaneous movement during caregiving and at rest.
- Provide containment during all care interventions to avoid unnecessary stress, discomfort and abnormal postures (always aim to maintain a mid-line flexed posture as much as possible).
- Use the smallest nappy possible to prevent excessive hip abduction and consider nappy changing in side-lying position.
- Swaddle the infant in a mid-line flexed posture during care activities e.g. transfer in and out of the incubator, weighing, feeding and bathing. Non-nutritive sucking can also be used to support infants during handling to provide stability and security.
- Record the infant's position on their nursing chart. As well as stating the position include which side of the face is touching the mattress i.e. right, left (or midline) so that the next staff member can see how they have been positioned over the last 24hours and position the baby accordingly.
- If the infant's bed is elevated provide support to prevent them from sliding down the bed, especially if they are on any respiratory support to prevent dislodgement of an ET tube or CPAP prongs.
- Ensure the infant is not lying on any lines, wiring or tubing that will make them uncomfortable and may cause a pressure sore or bruising of their skin.
- Check pressure areas when repositioning and note any change of skin integrity on their nursing chart (each infant should have a NPUDRA (Appendix 2) and complete a tissue viability assessment/referral if required).
- All positions should facilitate the infant's hands touching their mouth whenever possible. This promotes comfort and allows the infant to practice skills to support the transition to oral feeds.

Positioning equipment

There are a number of commercially available positioning aids and postural supports however understanding the rationale for providing postural support is vital to ensure appropriate choice and use to enhance developmental outcomes. Incorrect and inappropriate usage may result in negative consequences.

It is important that staff looking after infants within NICU understand the principles of providing postural support, however this needs to be individualised depending on the clinical needs.

Neonatal units and Paediatric Wards have access to a range of Allied Health Professionals (AHP). All staff working in NICU should have training on the use of postural supports and staff should seek support for more complex positioning advice from appropriate AHP.
Below as some examples of good practice using a variety of commercially available products as well as examples of use of soft rolls for some of the older neonates.
Examples of correct positioning for infants –

LEFT PRONE

LEFT SIDE LYING

SUPINE (RIGHT)

RIGHT PRONE

RIGHT SIDE LYING

SUPINE (LEFT) **LEFT SIDE LYING** **SUPINE (MIDLINE)** **RIGHT SIDE LYING**




In line with individualised care, experience would lead us to encourage postural support for preterm infants until they are established on oral feeds (feeding develops in line with Physiological flexion and sensory-motor development) in preparation for back to sleep for going home.

If infants require postural supports for longer or for other reasons, then they require individual assessment by Physio/OT/SALT."

Therapeutic Positioning in the Neonatal Intensive Care Unit

https://www.youtube.com/watch?v=pQwDUVJwiUM

Whilst no evidence-based guidance currently exists for the 'ideal' surface to nurse an infant on it is clear that surface firmness will have an effect on cranial moulding and tissue compromise.

It seems sensible to consider nursing the most vulnerable infant on the softer more gently supportive surfaces, if available.

For example, babies less than 28 weeks' gestation, babies with reduced mobility (due to being critically ill, muscular conditions, muscle relaxants), babies with skin integrity problems or with known surface: skin pressure vulnerabilities such as hydrocephalus or abnormal limbs/joints.

To ensure that the positioning aid meets the positioning needs of the baby –

- The edges are substantial enough to stay in place if a baby kicks or pushes against them – this is vital for the development of postural stability and physiological flexion.
- The edges are high enough to give a sense of containment for head, shoulders, body and legs, not only the baby's feet.
- The walls are high enough to offer bracing for the baby's feet.
- The edges come close enough to the baby to offer support and boundaries when they are quiet or asleep.

Safe practice

- Although positioning of the preterm and sick infants is very important, safety needs must always be prioritised above positioning needs. Such as regular checking of infusion sites, i.e. PVC or PICC line - even when this requires some disturbance of the infant.
- Staff should ensure they are aware of how to use the variety of available positioning aids safely. As some items may cause harm if used incorrectly. Always refer to the manufacturer's instructions, and do not use if any doubt exists.
- The full weight of a positioning bean bag or Zaky hand item should NEVER be put onto the baby, as the weight may restrict the baby's ventilation and spontaneous movement, especially in the extreme preterm infants.
- If a baby requires an x-ray, certain positioning equipment will show up on the x- ray and may be required to be temporarily removed from under a baby whilst the x-ray is performed. These can include - bean bags, tortoise positioning system, bendy bumpers, extra thick bedding and commercial nests.

Handling

Time repositioning or handling of an infant to coincide with their natural sleep/wake cycle. Whenever possible an infant should be touched gently before they receive any handling, allowing them time to become more wakeful before more handling occurs. This gives them an opportunity to self-regulate, and not to be 'startled' by a sudden position change or touch.
Position changes should be slow and steady, so the infant has time to adjust to care and is not distressed. This also ensures that invasive monitoring equipment is not dislodged.

When turning an infant try to use a palmar grip as opposed to fingertip pressure, reducing the risk of pressure damage to the fragile skin.

During handling and repositioning, the infant's arms and legs should be kept close to their body. Non-nutritive sucking can be used to support infants during re-positioning.

An infant should never be rapidly 'flipped over' 180 degrees –known in the literature as the 'preemie flip'. This sudden position change is likely to be distressing and destabilising.

All members of the multi-disciplinary team should remember to reposition an infant once they have completed a task, i.e. a blood test, examination or nursing care. If a staff member is uncertain how to do this, they should inform the infant's allocated nurse, who will educate and support them.

Recent research has shown that babies nursed in neonatal units continue to receive excessive handling. In a typical 24-hour period found that babies on average received 67 procedures [60]

Individualised assessment should take place, of the infant's needs and preferences. Staff should where possible, be guided in the timing of handling the infant by their cues.

It can be helpful to cluster 1-2 activities together for an infant, to reduce the overall amount and frequency of handling that they receive. However, this should be limited to what the baby can tolerate, as extremely sick and/ or preterm babies will not cope with a number of activities being performed close together. All infants will need time to recover following procedures.

Post term babies

Infants who are post term and older, and still requiring care on a neonatal unit will begin to have additional positioning needs related to their physical, sensory, cognitive and commination development.

Older neonates who remain in a hospital environment should have an individualised assessment and management plan from appropriate Allied Health Professionals. The plan may recommend additional or alternative positions and postures to physical and sensory development, early interaction, communication, and seating to support an upright posture if appropriate. AHP's work very closely with families and carers who are key to enhancing long term outcomes for high-risk infants.

Positioning for discharge

In preparation for discharge infants should sleep on their back 'back to sleep' without positioning aids and with the head of the bed in the flat position. Support can be removed gradually, but infants should have a minimum of have one week before discharge, and ideally two weeks, sleeping as they would at home. This helps to educate their parents and gives the infant time to adapt whilst still in hospital to the safest way of sleeping at home.

Actively involve parents in supportive positioning and explain the reasons for the importance of it.

- Educate parents on the differences in positioning between the neonatal unit and home. In particular after discharge, unless medically directed:
    - No nesting or positioning roles to be used.
    - No soft layers between the baby and the mattress- e.g., sheepskin or fleece. -Mattress to be level, head NOT elevated.
    - Baby to be laid supine for sleeping.
    - Emphasise cot death prevention guidelines including 'feet to foot' recommendation.

Development for Post Term Babies

Infants who remain in our care beyond the neonatal stage would be considered as post term babies. At this point corrected gestational age should be used to ensure an appropriate developmental environment.

Early intervention and interaction can be tiring for infants who have been sick or born early. It is important to consider if infants are medically stable to engage in additional activities and handling. **It is therefore important that this interaction takes place when the baby is awake and alert** [88] Infants must be carefully observed for any signs of stress or distress during interaction.

The full support of the multidisciplinary team is recommended to develop an individualised developmental care plan in partnership with parents who are central to their infant's developmental health and wellbeing.

In the early stages of both preterm and post term, the aim is to develop their attachment and interaction with parents and family. This can be done through during normal care activities, bathing, feeding, parents reading and singing to their baby, and the use of voice and touch to interact with the baby during wakeful times.

Parents may not always be present when the baby is awake and alert for early interaction and play. In these incidences, where possible, staff should engage in the above activities providing consistency with the baby to promote development and wellbeing.

Understanding Infant behaviours

Developmental care is an early interventional approach to enhance the infant's development, enhance parent- infant relationship, and reduce the risks of developing insecure attachment.

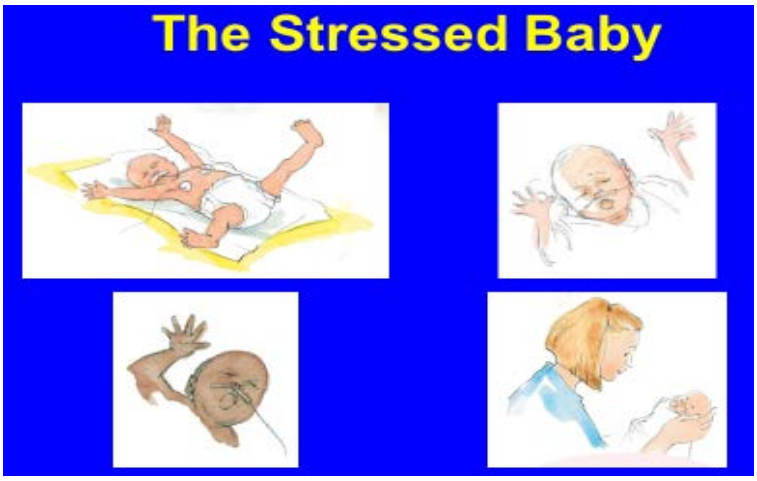
Caregivers should:

- understand the infant cues
- Work with the baby's states of arousal
- Understand the parent-infant relationship and how to guide parents/carers to accurately observe, interpret and respond to their infant's unique cues

Communicating with Babies:

Communication is a reciprocal activity; babies receive information through their senses.
Their behaviour is their language.

Infants' cues



Signs of Stress include

Posseting	**Hiccoughing**	**Gaze aversion**
Yawning	**Arching their back**	**Frowning**
Thrusting their arms and legs rigidly in the air	**Crying**	**Spreading their fingers and toes out**

Stress response starts with Behavioural cues, if the infant not contained, physiological response with changes in heart rate, blood pressure, oxygen saturation will follow, which will result in neurochemical response with increase release of stress hormones which can be harmful.

States of Arousal

There are six states or arousal and from 32 weeks' gestation, babies can display organised sleep and arousal state and can maintain a quiet alert state for a short period (<32/40 most of their awake is a drowsy awake and their sleep is light sleep).

1. Deep sleep
2. Light sleep
3. Drowsy
4. Quiet alert
5. Active alert
6. Crying

The best time to interact with a baby or have an intervention is during quiet alert state.

1. 
2. 
3. 
4. 
5. 
6. 

Sleep
Well organised sleep is associated with improved cognitive and psychomotor development as well as stress reduction, increased immune function, improved growth, stable oxygenation and autonomic stability [9, 56, 72]

Rapid Eye Movement (REM - light sleep) and non-rapid eye movement (NREM - deep sleep) sleep cycles are essential for early neurosensory development, learning, memory and preservation of brain plasticity [1]

REM is characterised by rapid eye movements under closed eyelids, periods of irregular and regular breathing, low level activity, occasional startles, whimpers, smiles, mouthing and sucking behaviours.

NREM is characterised by regular breathing, no rapid eye movements, relaxed facial expression, absence of spontaneous motor activity and occasional startles [1]

Evidence suggests that preterm infants spend up to 80% of their time in REM reducing to 50% in REM by the time they reach term. It is therefore vital for all caregivers to recognise and respect REM sleep.

As health professionals how can we help:

- Assess infant's sleep-wake states prior to undertaking non-emergency care interventions, based on the infant's readiness behavioural cues.
- Create and maintain cycled lighting within the patient care area.
- Protect sleep cycles with reduced lighting, incubator covers especially during REM sleep states.

Promoting Parent-Child positive relationship

Infants with prolonged stay in hospital are at risk of both over-stimulation and under-stimulation. It is important to promote positive relationship.

"Positive relationships promote good mental health" applies to both parent and infant.

Promoting Resilience:

- Create an environment that is enabling for baby to self-regulate (through developmental care)
- Enable parents to interact with baby and to understand their baby's unique cues
- Be aware of parent's mental state and discuss availability of professional help if required
- Promote mother's perception as primary caretaker ('Good enough' mothering)
- Understand the Father's mental health as he has lost his nurturing role, hence the father tends to focus on baby's physical status, equipment and monitors.
- Understand the impact on siblings and try to Create a family-friendly environment

Risks to Sensory Development:

- High noise levels
- Lack of pleasant touch
- Lack of pleasant smells
- Intrusive light levels
- Lack of visual stimulation
- Lack of light/dark cycle
- Interrupted sleep
- Lack of appropriate postural support

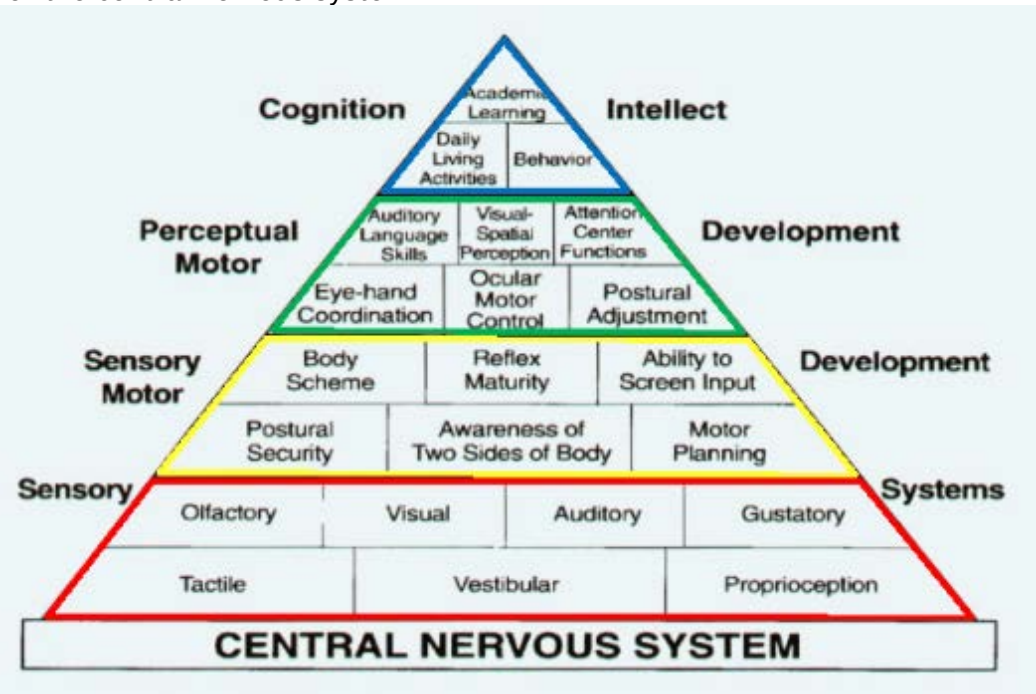
Importance of age-appropriate sensory stimulation / processing and potential long-term impact on the child

Long-term risks of dysregulation ('Sensory processing disorder'):

Difficulty forming attachment
Feeding and nutritional problems
Delayed play skills
Aggressive outbursts/withdrawn
Sleep deprivation
Delayed motor development

Impact on Learning:

The pyramid of learning is a visual illustration to help understanding how the sensory systems are truly the foundation for many other areas of development. Children's bodies need a strong foundation of nourishment for the central nervous system.



How can we help protect infants from sensory dysregulation?

- Respectful noise and light levels
- Appropriate postural support
- Age-appropriate handling, Kangaroo care / Skin-to-Skin
- Massage, pleasant touch
- Non-nutritive sucking
- Work with the baby's state of arousal
- Pain relief

References for Understanding Infants Behaviour - [20-34]

Developmental measures to minimise pain and stress

Infants exposed to adverse stressful experiences can result in long-term behavioural outcomes. Developmental care practices can be used to minimise the effects pain can cause along with the relief of discomfort [83]

Pain is defined as an unpleasant sensory and emotional experience associated with actual and potential tissue damage [67]

Neonates cannot verbally communicate their discomfort; however, evidence suggests that neonates do experience pain but lack the adaptive mechanisms that modulate painful stimuli in older children. They express their vulnerability to pain and stress through specific behaviours and with physiological and biochemical responses to pain [68]

Neonates are frequently exposed to acute, repetitive, and chronic pain within the NICU setting because of procedures, surgeries, and disease processes. Preterm neonates, especially those <30 weeks' gestation, can be exposed to up to 10-15 painful procedures per day [69]

How we can minimise pain

It is important to consider each procedure/event and avoid or limit where possible. Reducing Noise and Light within the environment also reduce pain caused by stress.

Limitation or avoidance of skin-breaking or other painful procedures

- Review proposed blood investigations daily and limit blood tests to those necessary for clinical care and management of the baby.
- Avoid multiple heel stick/venepunctures by clustering care.
- Consider purposely building in days when no "routine" bloods are done on selected babies.
- Evidence suggests that venepuncture is less painful to the neonate than heel stick, therefore venepuncture should be considered for blood tests in neonates who have no venous access issues. Venepuncture attempts should be limited as per Unit policy (e.g., a maximum of 2-3 attempts per person).
- Suctioning can be painful and should be performed only when necessary.
- Procedures which may cause pain or distress to the baby should not be carried out on the same day e.g. (retinopathy of prematurity exams, immunisations, etc.).

Use Pain Relieving Interventions (pharmacological and non-pharmacological)

- Breastfeeding when appropriate and the use of breastmilk during painful procedures
- Sucrose
- Lubrication
- Adhesive Remover
- Local analgesic eye drops
- Paracetamol
- For more invasive procedures – Lidocaine, Morphine, Fentanyl, Ketamine
- Containment and Non-nutritive sucking
- Parental involvement and interaction should be actively encouraged
- Care giving activities/procedures should be planned on an individualised basis to allow the infant to fully recover from painful interventions and ensure undisturbed rest.
- Kangaroo care/skin to skin
- Facilitated touch/gentle massage

Starting doses for each medication are as per the MCN for West of Scotland Guideline, but dosing and weaning should be individualised.

For more Information refer to WOS Neonatal Pain Guideline

Facilitating tucking

A key concept of Best Start: A Five-Year Plan (2017) is optimising normal processes to strengthen women's own parenting capabilities. During recent years there has been increased interest in parental participation in all aspects of neonatal care [56] The greatest source of stress that parents experience in the NICU comes from lacking a parental role and not being able to protect their baby from harm [81]

Both staff and parents can promote behavioral state organization of sick and premature infants, with the effective use of facilitated tucking (holding the infant's extremities flexed and contained close to the trunk) during heel stick, cannulation and PICC line insertion resulting in lowered mean heart rate, less crying time and more stability in the sleep-wake cycles post procedure [80]

Family Centred Developmental Care

The family is an integral part of supporting the infant's development and irreplaceable [1] Admission to the neonatal unit can significantly influence the immediate and long-term mental health of their parents [70, 71]

The family involvement is the key for potential long-lasting positive effects on development of all infants [73]

Parents should be an essential member of the team and become a partnership in care.

How to assist families:

- Unrestricted 24-hour access to the Neonatal Unit [78]
- Offer the family the opportunity to be present and/or participate in medical ward rounds and nursing handovers [78]
- The opportunity to be present during invasive procedures and any resuscitation interventions.
- Actively supporting teaching and training for the family in parenting activities to include skin-to-skin care, holding, feeding activities, dressing, bathing, Nappy changes, singing, reading and all infant care interactions [78]
- Clinical Psychology service should be offered to families who require the additional support.
- Family observations and input regarding their infant are considered when setting goals and making any decisions on their baby's care [78]
- Families are invited to participate in or use online resources to gain education on topics relevant to their baby or attend Family Awareness Sessions if available [78]
- If any multidisciplinary or discharge meetings are required, the family should be offered the opportunity to attend.
- Families are offered video messages of their infants at times when they cannot be present [78]
- Inky feet are offered on admission to assist with parental involvement.
- Resources for the social, spiritual and financial needs of families should be provided.

Care activities are best described as parenting activities which should validate the parental role identity, build competence and confidence and in turn reduce the infant's and parent's stress. The level of the family's emotional well-being, parental confidence, and competence should be assessed and

documented within the nursing notes. This will ensure consistency by all staff when working in partnership with the family. The family should have access to resources and support services that assist in short-term and long-term parenting, decision making, and parental well-being [74, 75, 76]

When stress occurs early in life, there is potential significant risk for the experience to affect the child's developmental trajectory. Research has demonstrated an association between the timing and chronicity of a highly stressful events during development with the risk for an adverse outcome [2] Furthermore, when children lack the presence of a stable and loving caregiver during times of stress exposure, the impact of the experience may be greater than it otherwise would be. This can be a common occurrence for hospitalised infants due to the intermittent presence of their parents, as parents juggle the needs of their home lives and their infant [2]

Although developmental supportive care has been separated to aid clarity it is important to note that all elements are integral to the holistic care of the infant and family.

Cue Based Feeding

Cue based feeding is perceived as a meaningful behaviour where the focus changed from the medical approach of volume driven to an infant driven approach [51] The infant's behaviour is the main driver for oral feeding. It requires staff to change their routine to respond to the feeding cues or stress cues of the infant [52]

Traditional Volume Driven Model
Volume intake is only measure of success
Gestation
Competitive practice
Inconsistent techniques
Task-orientated

Developmental Cue Based Model
Infant's cues drive feeding initiations and progression
Staff are support rather than directive
Consistent Techniques

It involves a continuous assessment, decision and action based on the infant's behaviour [53] Nutrition, gut health and weight gain are critical to address feeding in the NICU.

The medical approach volume driven feeding should be used until the infant begins to orally feed. Feeding is not a task of nutritional intake it has many social correlates not only in infancy but throughout life.

Benefits of Cue Based Feeding

- Parents can build confidence and competence and establish a pleasurable relationship with their baby
- It improves long-term neurodevelopmental outcomes for the most fragile infants
- Promote parental attachment and decrease parental anxiety
- Reduce length of stay and facilitating early discharge on partial tube feeding with our expanded liaison service.
- Improvement in weight gain

It is important to learn how to assess, respond and optimally support infants as they learn this new skill.

Most literature supports offering oral feeds from 32 weeks' gestation, according to readiness cues. But naturally there will be exceptions, breast feeding may be possible before this gestation.

Use of a systematic assessment tool, facilitates neonatal care units to develop a common language for feeding assessment and elevates understanding of the challenge of feeding for the preterm infant.

Principles of developmental supportive care are fundamental to the implementation of successful cue-based feeding practice –

- Documentation of oral feeding readiness and quality
- interventions of support are needed such as a slow or medium flow teat
- Position should also be considered to provide the infant support and optimise the postural stability and control such as side lying or supportive swaddling
- Provide the infant with external pacing during the feed
- Assess the infant's behaviour from moment to moment
- Avoid in coordination of swallowing and breathing

Skilful feeding assessment streamlines the process of selecting effective interventions that address the needs of the infant and joint reflection encourages consistency of care between parents and staff.

The path to feeding success begins long before the introduction of oral feeds. Feeding safely and achieving adequate intake for growth require the dynamic integration, maturation, and coordination of multiple subsystems.

Feeding Readiness Cues

- Stable respiratory rate
- Maintain oxygen saturations during gentle handling
- Infant transitions readily to an alert state
- The infant is able to lick, nuzzle or suck non-nutritively on the breast or sustain non-nutritive sucking on a pacifier
- Roots in response to touch around the mouth

Feeding Readiness Scale

5	**Alert or awake prior to feed. Rooting or turning head or mouth opening. Good flexed body posture.**
4	**Infant becomes more alert with gentle handling. May show signs of rooting or turning head or mouth opening. Able to maintain good flexed body posture with supportive handling.**
3	**Fluctuating state of alertness-unable to stay awake during cares. No signs of rooting. No sustained flexed body posture.**
2	**Does not wake for feed and remains sleepy during handling. No feeding readiness cues.**
1	**Unstable upon handling-changes in respiratory rate; heart rate and oxygen saturations during cares.**

Stress Cues and when to stop

- Crying; facial grimacing and irritability
- Pulling away, arching back and finger splaying
- Hiccups
- Vomiting
- Obvious fatigue
- Oxygen desaturations
- Any colour changes

If any stress signs are observed, offer a rest period.
If stress cues continue with further feeding attempts, then give the remainder via NG tube.

Cue based feeding is based on the quality of feeding rather than the volume.

Swaddle bathing

Bathing a baby should be a special shared moment between parent and infant. Involving parents in providing care for their baby can help with attachment, increased confidence and interaction between parent and baby [61]

It is widely accepted that bathing is a stressful experience for term infants therefore consideration should be given to its impact on vulnerable preterm infants.[62] Initially, feeling wet may be a little uncomfortable however infants who feel safe and secure during the process should relax more [63]

Supporting & handling a baby with gentle touch and containment during bathing should reduce signs & levels of stress [64]

In addition to the stress experienced by the infant during bathing, the preterm infant especially is at risk of heat loss due to large body surface area in comparison to body mass, low brown fat stores and thinner skin. Hypothermia can lead to increased morbidity and mortality in the neonatal population. Therefore, reducing stress whilst maintaining body temperature are key components to be considered when bathing preterm infants [65]

A method of bathing which is hypothesized to help maintain body temperature and reduce the stress associated with conventional bathing is swaddled bathing. Swaddled bathing involves placing the infant in a flexed midline position, swaddling in a soft towel, immersing in a tub of warm water, individually unswaddling each limb to be washed then reswaddling which maintains the midline flexed position throughout making it a developmentally supportive process.

Reported benefits include decreased stress; reduced crying; improved state control; increased self-regulatory behaviours; increased feelings of security; increased social interaction; and increased ability to feed following bathing [65]

A quality improvement project carried out in the Neonatal Unit at University Hospital Wishaw concluded that when swaddle bathed, infants do not loose heat, cry less and the bathing experience appears less stressful and much more enjoyable for infants and their families. The primary principal of developmental care is to create the optimum environment whilst applying developmentally supportive strategies to reduce stress for neonates and their families [66]

Swaddle bathing encourages family centred care and recognises parents as partners as the initial swaddle bath is demonstrated by staff with parental participation. Any subsequent swaddle baths can be performed by parents with staff support or independently when parents feel confident.

What you need to perform swaddle bath

- Traditional baby bath
- Bath thermometer
- Muslin
- Towel
- Bowl of water for face/hair

When to perform swaddle bath

Aim to perform prior to a feed at a time when cluster care would ordinarily be given. If this is not possible wait at least one hour after their feed [61]

Eligibility criteria for a swaddle bath:

- Babies of any weight/gestation can be included as long as they are deemed medically fit for bathing.
- Babies on respiratory support can be included.
- Babies nursed in incubators/babytherm/heated mattresses can be included.

Protocol for Swaddle Bathing:

- Fill bath with enough water to cover shoulders and use a thermometer to check the temperature is 37-38 degrees.
- It is optional to use soap. If parent wish they can add gentle bath soap to the water prior to the placing the baby in the bath.
- Show Parents how to provide support under the baby's shoulders/neck throughout the entire bath. Feet may be braced at the end of the tub for additional comfort of the baby.
- Note that the infant should not be in the water for more than 5-6 minutes approximately.
- Remove clothes and place baby on a muslin with the nappy still on.
- With a separate bowl of clean water clean the infant's face using a washcloth/gauze and no soap. Start with the eyes by gently wiping from nose to ears using a new washcloth or piece of gauze for each eye and then gently clean and dry around entire face. Keep bowl to use for hair washing at end.
- Remove nappy and clean napkin area as usual.
- Disconnect monitoring.
- Place baby still wrapped in the muslin in the tub. Provide support under the baby's shoulders and neck throughout the entire bath.

- Unwrap one of the infant's arms and wash gently including the chest then re swaddle with the muslin.
- Unwrap the other arm and wash gently including the chest then re swaddle with the muslin.
- Unwrap one leg including the stomach, wash gently then re swaddle with the muslin.
- Unwrap the other leg including the stomach then re swaddle with the muslin.
- The baby's back is washed with the water through the muslin.
- End the bath with hair washing using separate bowl of clean water.
- Once bathing is complete, unwrap the baby from the muslin leaving the wet muslin in the bath.
- Place a dry towel up against the Nurse or parent's chest. Remove baby from the tub and wrap in the towel.

In Summary:

Activities of Daily Living to Further Support Infants Development

- Each infant is positioned and handled in flexion, containment, and alignment during all caregiving activities
- Infant's position is evaluated with every infant interaction and modified to support symmetric development
- Positioning aides are gradually removed and Back to Sleep practices are implemented as the infant demonstrates physiologic flexion of the upper body in supine
- Non-nutritive sucking is offered with each non-oral feeding contingent on the infant's state
- Assessment of feeding readiness cues and the quality of the oral feeding is documented with each oral feeding encounter
- Education regarding the benefits of breastmilk is provided and family choice is supported
- Infants are bathed no more frequently than every 3 days
- Skin integrity is assessed using a reliable assessment tool at least once per shift and documented. (NPUDRA, appendix 2)
- The skin surface is protected during application, utilisation and removal of adhesive products
- Assess infant's sleep-wake states prior to undertaking non-emergency care interventions, based on the infant's state of arousal and behavioural cues.

Guideline name
WoS_DevelopmentalCare_Neonates

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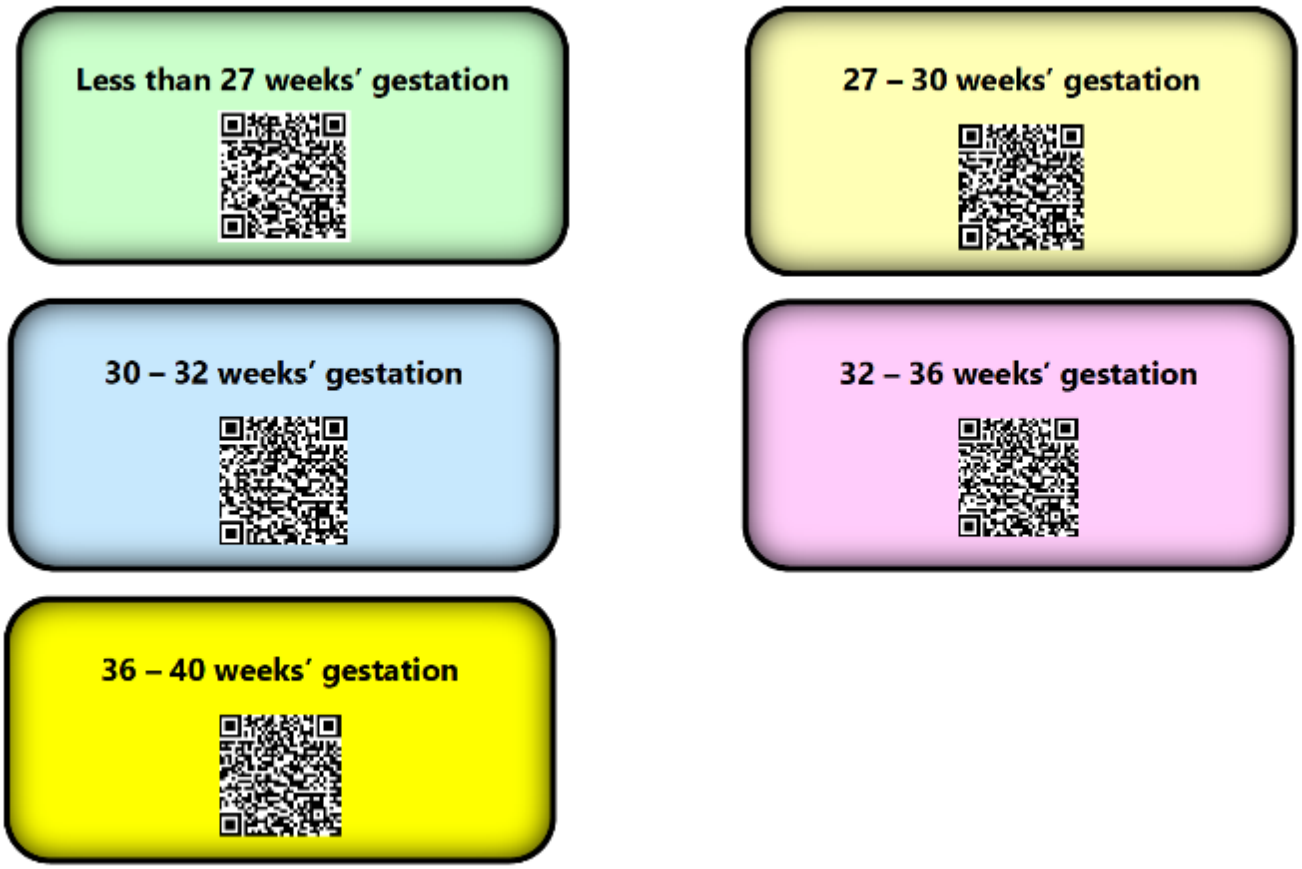
Implementation/Review Dates

Implementation Date – 12/11/21 Next Review – 01/11/24

Appendix 1
The Scottish Perinatal Network



Neonatal Pressure Ulcer Daily Risk Assessment (NPUDRA)

NHS Greater Glasgow and Clyde

Surname:	Forename:	Hospital:	**Points to consider:**
Sex:	DoB:	Ward:	• **Use within 12 hrs of admission to care area**
CHI			• **Re-assess daily and more frequently if a baby's condition changes**

1 Pressure Damage	**Does the baby have redness and/or existing pressure damage? (Detail in table below)**

Date	Location of redness / ulcer(s)	Grade of ulcer(s)	Date	Location of redness / ulcer(s)	Grade of ulcer(s)
/ /			/ /		
/ /			/ /		
/ /			/ /		

2	**Mobility**	**Is there a reason the baby cannot be re-positioned at least 6 hourly?**
3	**Nutrition**	**Does the baby require IV fluids or parenteral nutrition?**
4	**Skin**	**Is skin compromised by any other source: medical device (e.g. CPAP); neurological deficit; surgery; Neonatal Abstinence Syndrome; medication (e.g. Inotropes); very low birth weight; extreme prematurity?**
5	**Judgement**	**In your clinical judgement, is this baby at risk of developing pressure damage? If *Yes*, please give details:**

Record YES/NO answer in the grid below. If YES to any statement the baby is at greater risk of developing pressure damage. A neonatal SSKINS Care Plan must be implemented.

If NO to all statements, continue to re-assess risk daily.

Date	Time	Pressure Damage	Mobility	Nutrition	Skin Compromised	Clinical Judgement	Sign and Print Name
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Pressure ulcers may deteriorate from Grade 1 to Grade 4, but cannot be reversed and should be documented as a healing pressure ulcer, e.g. healing grade.

NHSGGC SPSI - Neonatal NPUDRA Test v7 June 2016

Attach Addressograph	**Neonatal SSKINS Pressure Ulcer Interventional Care Plan**	**Aim:** To incorporate effective pressure ulcer prevention strategies to reduce/eliminate potential for pressure ulcer development. **Outcome:** To prevent pressure ulcer development through establishment of effective work practices in line with SSKINS bundle.					
	S **SKIN INSPECTION**	**S** **SURFACE**	**K** **KEEP MOVING**	**I** **INCREASED MOISTURE**	**N** **NUTRITION**	**S** **SHARED CARE**	***Sign / Comments***
Date of initial plan:	*Check:* - Pressure areas _____ hourly. - Skin under devices _____ hourly. - Specify devices used:	*Specify:* - Mattress: - Detail additional pressure redistributing equipment:	*Specify:* - Reposition _____ hourly. If on CPAP change or reposition mask / prongs _____hrly.	*Specify:* - Skin care to be carried out ___ hourly. - Nappy to be changed _____ hourly. - Specify products required for increased moisture / continence management:	Nil enterally? Y / N *Specify:* Feed type: Mode of Administration: Parenteral nutrition	- Discuss and agree plan with family./ carer - "Prevent Pressure Ulcers" leaflet given to family / carer? ☐ YES ☐ NO	
Date reviewed:	*Check:* - Pressure areas _____ hourly. - Skin under devices _____ hourly. - Specify devices used:	*Specify:* - Mattress: - Detail additional pressure redistributing equipment:	*Specify:* - Reposition _____ hourly. If on CPAP change or reposition mask / prongs _____hrly.	*Specify:* - Skin care to be carried out ___ hourly. - Nappy to be changed _____ hourly. - Specify products required for increased moisture / continence management:	Nil enterally? Y / N *Specify:* Feed type: Mode of Administration: Parenteral nutrition	- Discuss and agree changes to plan with patient / family./ carer	
Date reviewed:	*Check:* - Pressure areas _____ hourly. - Skin under devices _____ hourly. - Specify devices used:	*Specify:* - Mattress: - Detail additional pressure redistributing equipment:	*Specify:* - Reposition _____ hourly. If on CPAP change or reposition mask / prongs _____hrly.	*Specify:* - Skin care to be carried out ___ hourly. - Nappy to be changed _____ hourly. - Specify products required for increased moisture / continence management:	Nil enterally? Y / N *Specify:* Feed type: Mode of Administration: Parenteral nutrition	- Discuss and agree changes to plan with patient / family./ carer	

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Developmental Indicators Preterm – Term

	24-27 weeks	28-32 weeks	33-36 weeks	37 weeks plus
Behavioural Development	Behavioural states poorly differentiated Response to handling results in physiological instability Diffuse ranging signs of instability from typical stress signs to exhausted collapse	Behavioural states more distinct by 32 weeks Quiet/deep sleep increases around 30 weeks Response to handling results in physiologic instability Shows more typical signs of stress	Behavioural states more distinct Smoother transition between state Quiet/deep sleep continues to increase May arouse for feeding Stress response to noxious stimuli varies but physiological instability still evident	Behavioural states well defined with clear transitions Tolerance of handling and interventions usually increase Periods of alertness for socialisation with development of longer attention spans
Motor Development	Movements are mainly jerks, twitches and startles that can increase with stressful input Weak muscle tone. Decreased flexion in limbs, trunk and pelvis Unable to control posture, movement and tone	Twitches and startles common at 28 weeks leading to more controlled movements by 32 weeks. Muscle tone weak but develops slowly over this gestational period Leg movements increase with the start of flexion in the hips and legs	Smoother more controlled movements Stronger flexion of knees and hips during rest with further development of tone in the lower extremities Can turn own head side to side Has improved capability to use posture and movement to self-regulate	Demonstrates a wide range of movements Controlled movements increase Trunk and extremities usually flexed at rest Can self-regulate behaviour with movement and posture
Light and Vision Development	Eyelids may be fused at 23-25 weeks Cornea hazy until 27 weeks. Pupil reflex is absent Limited ability to maintain lid tightening in response to light Eyes may open but do not focus Responds to light/visual stimulus with behavioural and physiological signs of stress	Sluggish pupil response to light Able to maintain lid tightening in response to bright light Eye opening increases in dim light May focus briefly on visual stimuli Rapid uncoordinated eye movements	Increased ability to maintain lid tightening in response to bright light Eye opening and alert state are facilitated by low lighting Infant may have difficulty breaking gaze on a highly stimulating object	Generally, shows preference for human face Sees best at a distance of 20 -25cm. Sight is still immature with much development to follow at 0-6months.

Developmental Indicators from Preterm to Term

	24-27 weeks	28-32 weeks	33-36 weeks	37 weeks plus
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

References

Acknowledgements to – East of England Neonatal ODN Clinical Guideline: Developmental Care, Southampton NICU Developmental Care Guideline and The Northern Neonatal Network

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