

Clinical Guideline



HNEkidshealth
Children, Young People & Families



Health
Hunter New England
Local Health District

Skin Care for Neonates

Sites where Clinical Guideline applies	All Newborn Service sites in HNELHD
This Clinical Guideline applies to:	
1. Adults	No
2. Children up to 16 years	No
3. Neonates – less than 29 days	Yes
Target audience	Clinicians in neonatal units in HNELHD
Description	Provides information for neonatal clinicians regarding clinical care to support skin integrity in neonates

[Hyperlink to Guideline](#)

Keywords	Neonate, newborn, NICU, SCU, skin, breakdown, integrity, pressure, excoriation, skin care, bath, bathing
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Related Legislation, Australian Standard, NSW Ministry of Health Policy Directive or Guideline, National Safety and Quality Health Service Standard (NSQHSS) and/or other, HNE Health Document, Professional Guideline, Code of Practice or Ethics:

- [HNELHD Policy Compliance Procedure PD 2014_007:PCP 1 Pressure Injuries: Prediction, Prevention and Management](#)
- [NSW Health Policy Directive PD2104_007 Pressure Injury Prevention and Management](#)
- [NSW Health Policy Directive PD2017_013 Infection Prevention and Control Policy](#)
- [HNELHD Clinical Guideline HNELHD CG 20_60 Thermoregulation in Neonates](#)

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PURPOSE AND RISKS

This document has been developed to provide support and guidance to the health clinician to provide high quality, safe and timely care for neonates through assessment and management of skin integrity and skin care. It ensures that the risks of harm to the infants skin whilst caring for an infant are identified and managed.

The risks are:

- *Patient injury*
- *Skin integrity compromise or breakdown*
- *Increased risk of infection*
- *Long term complications secondary to skin injury*

The risks are minimised by:

- *Preventative strategies to promote skin integrity as outlined in this document*
- *Routine assessment, early identification of skin integrity compromise*
- *Introduction of supportive measure to treat and/or manage skin integrity issues*

Any unplanned event resulting in, or with the potential for injury, damage or other loss to infants/staff/family as a result of this procedure must be reported through the Incident Management System and managed in accordance with the NSW Health Policy Directive PD2020_020: Incident Management Policy. This would include unintended injury that results in disability, death or prolonged hospital stay.

*It is mandatory for staff to follow relevant: "Five moments of hand hygiene", infection control, moving safely/safe manual handling, documentation practices and to use HAIDET for patient/carer communication: **H**and hygiene **A**cknowledge, **I**ntroduce, **D**uration, **E**xplanation, **T**hank you or closing comment.*

Risk Category: *Clinical Care & Patient Safety*

CLINICAL PROCEDURE SAFETY LEVEL

Every clinician involved in the procedure is responsible for ensuring the processes for clinical procedure safety are followed. The following level applies to this procedure (click on the link for more information):

[Level 1 procedure](#)

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SKIN CARE SUMMARY

- Skin injury is associated with significant financial and social costs including increased morbidity and mortality, pain, discomfort and decreased mobility
- Skin injury prevention is key, and requires an on-going risk assessment, consideration of causal factors, implementation of prevention strategies
- When an assessment identifies a risk of skin injury, interventions should be implemented immediately
- Documentation and reporting is required for any skin breakdown for any inpatient

GUIDELINE

While not requiring mandatory compliance, staff must have sound reasons for not implementing standards or practices set out within guidelines issued by HNE Health, or for measuring consistent variance in practice.

Introduction

Preservation of skin integrity, reduction of risk factors and skin care education for parents are key priorities in the care of the term and preterm neonate.

The skin contains three separate layers; epidermis, dermis and hypodermis. The uppermost layer of the epidermis is the stratum corneum. This provides the barrier function of the skin and has 10-20 layers in adults and term neonates. It protects against toxins, irritants, pathogens, and retains heat and water as well as maintaining a normal microbiome. During the first year of life the stratum corneum is not fully mature and is approximately 30% thinner than that of adult skin. Directly under the stratum corneum is the basal layer of the epidermis and then the dermis which are also thinner and underdeveloped in neonates compared to adults. In preterm neonates the stratum corneum has only 2-3 layers. This deficiency and immaturity of the stratum corneum results in increased fluid and heat loss leading to electrolyte imbalance, reduced thermoregulation and increased infection risk.

The preterm epidermis is not fully formed at birth, the stratum corneum has only 2-3 layers. This deficiency and immaturity of the stratum corneum results in increased fluid and heat loss leading to electrolyte imbalance, reduced thermoregulation and increased infection risk. Maintaining skin integrity in this cohort is one of the greatest challenges in the first few weeks of life, yet vital as it impacts on neonatal morbidity and mortality.

In premature infants the fibrils that connect the dermis to the epidermis are fewer in number and more widely spaced. Due to this weak structure the skin of the premature infant is more easily damaged by products such as adhesives that may, when being removed, strip the epidermis. Vernix is also absent in infants born at less than 28 weeks gestation. This may also have implications for infection defences as vernix has been shown to contain anti-infective agents such as lysozyme and lactoferrin. Additionally infants aged 24 weeks to 34 weeks gestation have a skin pH at birth ≥ 6 , and take three weeks to drop to a pH level of 5 therefore increasing the risk of infection during this time.

Neonatal Skin Care Goals

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- Maintaining skin integrity
- Reducing traumatic injury
- Avoiding exposure to toxins
- Minimizing exposure of irritants
- Promoting microbiome development

The neonatal care environment therefore aims to:

- Minimize transepidermal water loss (TEWL)
- Reduce the risk of infection
- Minimise skin breaks, such as bloodletting and intravenous (IV) insertion attempts
- Preventative care to protect against potential wounds (i.e. epidermal stripping, extravasation, excoriation etc.)
- Minimize the risk of pressure injury
- Provide appropriate wound care (where required)
- Reduce acid mantle disruption (from bathing)
- Encourage microbiome development (through kangaroo care/parental touch)

Skin Assessment

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For all infants admitted to a neonatal unit it is essential to perform and document an assessment of the infant’s skin integrity on admission, and for each day of their hospital stay at a minimum (see Table 1). All infants are prone to developing skin or pressure injury from medical devices.

SKIN ASSESSMENT FRAMEWORK	FREQUENCY REQUIREMENT
Modified Glamorgan Scale (MGS)	Once per shift
Neonatal Skin Condition Score (NSCS)	Attend at care times
Hourly Patient Rounding	Every hour

Table 1: Skin Assessment Tools and Frequency Guide

The NSCS is used to measure skin condition objectively (see Figure 1). The relevant medical team must be notified if the infant scores a single score of 3 in one area or a combined score of 6 and above.

Neonatal Skin Condition Score (NSCS)					
DRYNESS		ERYTHEMA		BREAKDOWN	
1	normal, no sign of dry skin	1	no evidence or erythema	1	none evident
2	dry skin, visible scaling	2	visible erythema, <50% body surface	2	small, localized areas
3	very dry skin, cracking/fissures	3	visible erythema, ≥50% body surface	3	extensive
Score 1-3 for each category: Perfect Score = 3, worst score = 9					

Figure 1: Neonatal Skin Condition Score Tool*

*This tool is designed to facilitate assessment of skin condition. It is copyright of the Associations of Women’s Health, Obstetric and Neonatal Nurses (AWHONN), and is reproduced with their kind permission.

Prevention of Skin Injury

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Newborn skin acts as a barrier to microorganisms and toxins', therefore maintaining this barrier is an important factor for assisting newborns to adapt to extra uterine life.

Newborn skin integrity is subject to potential disruption and trauma during required clinical care or clinical practices. Potential causes of skin breakdown during clinical practices include epidermal stripping, bloodletting and IV insertions, dehiscence of surgical wounds, pressure injuries, skin excoriation, chemical burns and extravasation.

Epidermal Stripping

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One of the most common practices in neonatal units is the use of adhesives to a range of devices, lines and tubes. The use of, and particularly the removal of, adhesives has been found to be the primary cause of skin breakdown in neonatal patients. Prevention of this kind of skin trauma includes minimizing the use of tapes or adhesives where possible and delaying the removal of these adhesives until adherence is reduced.

Adhesives have been shown to disrupt the skin surface of infants resulting in skin breakdown. The breakdown may be from epidermal stripping or due to sensitivity to the adhesive. When removing adhesives, it should be done very slowly, pulling at a low angle, parallel to the skin surface, while holding the surrounding skin in place which may reduce epidermal stripping. To support removal the use of water or sting free adhesive removal wipes may be employed.

Recommendations include:

- Minimising use of adhesives on all infants (where able)
- Use of hydrocolloid dressing underneath adhesives (where able)
- Delay the removal of adhesive for at least 24 hours after application
- Always gently remove adhesives, pulling at a low angle, parallel to the skin surface, while holding the surrounding skin in place
- Consider using water or sting free adhesive removal wipes
- Use alternative adhesive applications directly to the skin such as hydrocolloid, silicone based barriers, silicone tapes (i.e. Mepitac™)
- Use only gel electrodes (inspect and change as required)

Nappy Dermatitis

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Nappy dermatitis (also known as nappy rash) is a non-specific term used to describe inflammatory irritations in the nappy region. It is a condition that commonly occurs in infants causing discomfort to the infant and anxiety to the caregivers. Symptoms can range from chafing and ulceration to swollen red erythema with a confluent rash which is commonly associated with concurrent infection, generally *Candida Albicans*.

The skin in the nappy environment is constantly in contact with strong alkalinizing agents (urine and faeces, bile salts and faecal enzymes) and the pH in this area is prone to high alkalinity that damages the skin integrity. Mechanical friction (both skin to skin and nappy to skin) makes the skin prone to maceration and increases its permeability to other irritants. Prolonged wetness of the skin makes it more prone to damage.

These factors predispose the skin to opportunistic infection by faecal microbes such as *Candida Albicans* thereby causing a more severe and potentially chronic nappy dermatitis. The vulnerability of newborn infant's (especially preterm infants) skin to mechanical injury and nappy dermatitis makes this group worthy of separate consideration.

Recommendations include:

- Early intervention to minimize or eliminate potential causes
- Skin should be monitored closely at each nappy change
- Risk factors need to be assessed e.g. loose or frequent stools, drug withdrawal or medication-induced diarrhoea

- Early detection and treatment of subsequent fungal infections
- Nappy rash can be reasonably prevented by reducing moisture and contact between urine, faeces and the skin by the frequent changing of nappies
- Use gentle skin cleansing methods and minimise rubbing
- Cleanse the nappy area with water or pH neutral cleanser as soon as possible after soiling
- Apply a barrier cream (i.e. Sudocrem™), the cream used should contain a skin protectant such as zinc oxide to promote healing, provide a shield or barrier to further damage, and be easy to remove to prevent epidermal stripping
- Skin should be thoroughly dried each time the nappy is changed by exposing it for a few minutes The infant's bottom should be wiped from front to back to avoid faecal matter from reaching the genitourinary area
- Regular assessment, re-evaluation and modification of treatments should be carried out to monitor any deterioration in the area. Document the area of involvement and severity of damage (erythema, rash, bleeding etc.) and always re-evaluate and modify the care plan as required

Skin Excoriation

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Skin excoriation occurs when the skin or epidermis is traumatised or abraded due to a range of factors which can include external trauma, infection, scratching or even during the healing process. The presence of minor skin damage in the high-risk infant increases the likelihood of further injury, thus prevention and intervention of skin excoriation in the neonate is necessary.

Recommendations include:

- Attend and document the Neonatal Skin Condition Score at each care times ([see Figure 1](#))
- Notify medical team if infant scores;
 - Single score of 3 in one area or
 - A combined score of 6 and above
- Decide and document a plan of care/treatment plan;
 - Treatment for skin excoriation includes cleansing the wound with sterile water to help gently cleanse away any dead tissue from the wound area, allowing for a better healing surface
 - Once the wound surface is clear, ointments may be used to help promote healing
 - In some cases the use of a transparent dressing may also be used as this can help promote moist healing and will allow for the migration of epithelial cells across the site. It is important to note that when using a transparent dressing, there must always be a rim of intact skin around the wound for dressing adherence
 - Dressing should be left in place until they become loose, as removing and reattaching the dressings on a regular basis can cause further injury to the skin around the wound and further impede the healing process
 - Dry skin/scaling skin may require an emollient
 - Refer to an appropriate wound care specialist (where required)

Chemical Burns

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The use of skin disinfectants is never completely innocuous, even though they have been shown to reduce the risk of bacteraemia, catheter related infections and skin contamination during blood culture sampling. Selecting a disinfectant should be based on evaluating risks and benefits of each product relative to efficacy, potential for toxicity, and skin irritation as there is insufficient evidence to recommend a single product for neonates.

Using a disinfectant in infants less than 1500 grams in weight and who are less than 7 days old carries a risk of skin injury particularly with chlorhexidine gluconate containing solutions, however, removing all disinfectants as completely as possible using sterile water or 0.9% sodium chloride (normal saline) may prevent these risks.

Pressure Injuries

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Pressure injuries (PI) are defined as any injury caused by unrelieved pressure that result in the damage of the skin and its underlying tissue. PI can occur due to prolonged pressure or insufficient blood supply, particularly at bony prominences. In order to promote healing of these PI, the pressure on the particular area must be eliminated. Non-blanching erythema is a very concerning sign that blood supply is compromised and requires pressure off-loading immediately.

For all infants admitted to a neonatal unit it is essential to perform and document an assessment of the infant's skin integrity on admission, and for each day of their hospital stay at a minimum. PI assessment should occur in line with the Skin Assessment Tools and Frequency Guide outlined in [Table 1](#) (see relevant practice guideline).

Extravasation

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Extravasation is defined as the leakage of IV fluid from the vein into the surrounding tissue. This can occur from the cannula piercing the vessel wall or even an occlusion of the distal veins causing backpressure within the vessel walls. Both peripheral cannulas and central lines are capable of causing extravasation.

Recommendations include:

- Prevention of IV extravasation includes ensuring adequate taping and use of a transparent dressing so that the insertion site is clearly visible
- For continuous infusions; assess and score the site hourly (at a minimum) and document hourly score
- If extravasation has occurred, stop infusion immediately leaving the device in place and notify the medical team (see relevant practice guideline)

Neonatal Skin Care Strategies

Bathing

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Neonates are considered contaminated with blood borne pathogens until they are cleansed of blood and amniotic fluid, therefore until the first sponge/bath is attended standard precautions are required (i.e. use of gloves).

The purpose of bathing is to remove waste materials, potentially reduce microbial colonisation and increase aesthetics. However, bathing may be detrimental by inducing changes in skin pH. As the skin antibacterial effect is optimal at pH values below 5.0, and an acidic pH is also important for preventing nappy dermatitis from faecal enzymes, frequent bathing may compromise this protective aspect of the skin's antimicrobial defence.

Bathing Techniques

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The choice of bathing technique depends on the infant's gestational age and clinical status. Provide the first bath once the infant has achieved cardiorespiratory and thermoregulatory stability. Consider a sponge/bath after clinical and thermal stability is reached, ideally at 6 hours of life to remove maternal debris. If infant unstable it is preferable to delay the bath, and attend a sponge or modified sponge within the first 24 hours. Always ensure that the bath equipment is disinfected before and after each use. Maintain an adequately heated external environment, with an ideal room temperature of 21-24°C (close the doors to the room to minimise convective heat loss).

Swaddled-Immersion Bath

Recommended technique where clinically able. Benefits include a reduction of behavioural and physiological stress including temperature variation.

The technique includes swaddling the infant in a light swaddling cloth (i.e. muslin wrap), submerging their body to the level of the shoulders, gently exposing each limb one at a time to wash and if distress is shown at any point, pausing and providing containment holding.

Sponge Bath

The least recommended technique as this method can result in haemodynamic compromise (i.e. heat loss) and behavioural distress. If sponge bathing is required, ensure the infant has containment strategies in place where possible to reduce behavioural distress, a warm environment is utilised (i.e. radiant warmer or crib) and physiological monitoring is continued. The sponge is completed in sections, from top to toe. Small sections are washed then dried prior to moving onto next section.

Modified Sponge Bath

Recommended technique for clinically unstable infants. Sponge bath is completed in a warm environment with physiological monitoring in place. The sponge is modified to wash high risk regions (i.e. under neck, axillas and groin).

Bathing Recommendations[Top](#)**Preterm Infants < 1000 grams**

- Until first sponge/bath is attended use standard precautions (i.e. use of gloves)
 - Sponge only if condition allows. If unstable; sponge under the neck, axillas and groin only, within the first 24 hours
 - Do not use soap free–cleansers for these infants
 - Wash using warm clean water only
- *Note; consider using warm sterile water if areas of skin breakdown are evident

Preterm Infants ≥ 1000 gram and < 37 weeks

- Until first sponge/bath is attended use standard precautions (i.e. use of gloves)
- Delaying the first bath to at least 6-24 hours after birth is preferential
- Use of pH neutral soap-free cleansers is recommended
- Keep bath time short (≤ 5 minutes)
- Leave vernix on as much as possible. Remove the debris only and do not vigorously scrub the skin
- Implement measures to reduce stress and maintain body temperature (i.e. containment holding, swaddling or swaddled immersion bath where able)
- Encourage parental involvement for infant bathing. Frequency of bathing and time of day should be based on individual need in consultation with the family
- Preterm infants can be safely bathed every 4 days (if clinical stability allows)
- At 5-6 weeks after birth skin has sufficiently matured, thereafter preterm infants may be bathed daily (if clinical stability allows)

Term Infants ≥ 37 weeks

- Until first sponge/bath is attended use standard precautions (i.e. use of gloves)
- Delaying the first bath to at least 6-24 hours after birth is preferential
- Use of pH neutral soap-free cleansers is recommended
- Leave vernix on as much as possible. Remove the debris only and do not vigorously scrub the skin
- Implement measures to reduce stress and maintain body temperature (i.e. containment holding, swaddling or swaddled immersion bath where able)
- Encourage parental involvement for infant bathing. Frequency of bathing and time of day should be based on individual need in consultation with the family
- Term infants may be bathed daily after one week of life (if clinical stability allows)

Special Considerations

- For infants born to a HIV-positive mother, the first bath should occur as soon as possible after birth
- Routine bathing is not recommended for unwell/ill infants

Umbilical Cord Care

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When caring for the infant's umbilical cord, current evidence supports the use of standard infection control procedures only.

Recommendations include:

- Clean the umbilical cord and surrounding skin as a part of the initial bath using standard precautions including gloves and dry thoroughly
- Leave cord clamped, stump clean, dry and uncovered. *Note; cord clamp removal is only required if a risk of pressure injury to an infant. Cord clamps should not be routinely removed and left to fall off with the cord where possible
- Keep the umbilical cord area clean and dry, position cord out of nappy at all times
- Avoid use of topical agents near/on cord area
- Allow for natural separation/detachment at around 7-10 days after birth
- Redness, swelling and drainage are abnormal findings and require reporting and action

Eye Care

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Routine eye care is not required for neonates and can actually pose a greater risk to infant if practised. However, routine assessment should be utilised to identify abnormalities. This includes assessment for exudate, signs of infection and surrounding skin condition.

Recommendations include:

- If exudate appears, eyes should be wiped from the inner corner outwards with a single-use cotton ball soaked in 0.9% sodium chloride (normal saline). If additionally wiping required, a fresh single-use cotton ball soaked in 0.9% sodium chloride must be used. Never use gauze to clean the eyes as the material may cause an abrasion to the eye
- Exudate from the eyes can be a common occurrence in the neonate however, an increase in exudate, purulent in colour may signify an infection and as such require medical review
- The neonate with reduced functioning of the eyelids (i.e. preterm infants, sedated/muscle relaxed infant) may require eye care to maintain lubrication

Oral Care

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The neonate with normal anatomy and physiology of the mouth does not require routine oral care. Routine assessment should be utilised to identify abnormalities, skin condition and moisture level. The infant requiring regular oropharyngeal suction, intubation or other oral supportive devices (i.e. repleg tube) may require oral care to reduce injury to the lips and oral mucosa.

Recommendations include:

- Assessment of the skin condition around the mouth in particular, pressure injuries caused by equipment
- Cleaning of the lips with sterile water, ensuring not to pull away any skin that may be lifting prematurely
- Application of paraffin ointment to the lips
- Provision of immuno-supportive oral care (ISOC)

Emollients

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Emollients are used to act as a barrier for the skin and decrease TEWL. While the use of emollients may improve skin condition, some studies have shown this practice can increase the

incidence of nosocomial bacterial infection and fungal infections. The use of emollients is controversial, and the literature remains inconclusive.

Recommendations include:

- Routine use of emollients is contraindicated due to the increased risk of infection. *Note; infants 23-30 weeks gestation should not have routine emollient care due to the proven increased risk of bacterial and fungal infection, as TEWL can be controlled by other means such as humidity
- However emollients may be considered to promote skin barrier function, restore integrity to dry or cracked skin, and potentially prevent atopic dermatitis in the term infant. Risk factors for the development of eczema and dermatitis such as epidermal barrier dysfunction and family history should be identified

Humidity

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Caring for the infant in a humidified environment such as a humidified incubator is an effective strategy used to significantly reduce skin injury as well as heat and TEWL. Recent studies however have shown high humidification for prolonged periods may result in a slower rate of skin barrier formation, potentially prolonging the increased rates of TEWL. Other aspects of skin barrier function may also be affected but recent studies are inconclusive.

Recommendations include:

- Humidity should start at 80% (> 85% results in excess rainout and temperature instability)
- Humidity should be reduced with respect to gestation and temperature stability;
 - **Infants of 28-30 weeks gestation:** if the infant's temperature is stable after 24 hours humidity can be reduced by 5% each day
 - **Infants < 28 weeks gestation:** maintain humidity at 70-80% for the first 7 days of life, and then reduce by 5% daily if infant's temperature stability is maintained

Humidity should be discontinued when a level of 50% is reached and temperature stability is maintained. Consideration of the infant's skin integrity is vital, if the infant has compromised skin integrity consultation with the medical team should occur prior to cessation of humidity. In this instance, consider continuing 50% humidity until the infant is 28 days old or skin integrity improves (whichever is reached first).

In order to reduce rain out in the humidicrib, place a cover and bubble wrap over the humidicrib. Ensure the bubble wrap is bubble side down to trap air.

Always record humidity level hourly on observation flow chart and check the water level regularly and refill with distilled sterile water as required/or when humidicrib alarms.

IMPLEMENTATION PLAN

The clinical guideline will be:

- Circulated to General Managers and Cluster Managers.
- Circulated to the clinicians via the Tiered Neonatal Network/Newborn Services, Children, Young People and Families Services and the Women’s Health and Maternity Network.
- Made available on the intranet (PPG) and HNEKids website.
- Presented at facility/unit meetings and tabled for staff to action.

MONITORING AND AUDITING PLAN

- The person or leadership team who has approved the clinical guideline is responsible for ensuring timely and effective review of the guideline.
- Evaluation will require a review of the most current evidence as well as consideration of the experience of HNELHD staff in the implementation of the clinical guideline.
- Data derived from incidents, monitoring and evaluation should inform the review of the clinical guideline either as required or scheduled.
- Implementation, education support and monitoring compliance be completed by local Clinical Educators and Managers.
- Amendments to the guideline will be ratified by the Manager and Head of Newborn Services & WHaM Network (where applicable) prior to final sign off by Children, Young People and Families Services.

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APPENDICES

1. Glossary & Abbreviations

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FEEDBACK

Any feedback on this document should be sent to the Contact Officer listed on the front page.

APPENDIX 1

GLOSSARY & ABBREVIATIONS

Acronym or Term	Definition
HNELHD	Hunter New England Local Health District
ISOC	Immuno-supportive Oral Care (oral care with expressed breast milk)
IV	Intravenous
MGS	Modified Glamorgan Scale
NICU	Neonatal Intensive Care Unit
NSCS	Neonatal Skin Condition Score
pH	Power of Hydrogen
PI	Pressure Injury
SCU	Special Care Unit
TMH	The Maitland Hospital
TRRH	Tamworth Rural Referral Hospital
WHaM	Women's Health and Maternity Network