

# Time to review newborn skincare

Preterm babies have very thin, friable skin due to the immature development of the stratum corneum and this makes their skin particularly vulnerable to damage. This article provides information about the structure of newborn skin and identifies evidence to promote safe and effective skincare in the neonatal period. In addition the skincare guideline developed in the North Trent Neonatal Network is included.

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A review of newborn skincare being practised in 2007 in the nine neonatal units of the North Trent Neonatal Network, revealed nine different approaches to bathing babies. There was a lack of consistency with potentially conflicting advice for parents and inappropriate practice. Some babies were bathed with toiletries, others weren't, some were bathed soon after birth, and some waited. Which approach to caring for newborn skin was right? Why were some parents being told one thing, while others in neighbouring units were told something different? Surely all newborn skin should be treated in the same way, regardless of where the baby is cared for?

These were the questions which prompted the development of a guideline about newborn skincare for use in all nine neonatal units and associated maternity departments in the Network. What initially appeared to be a simple task, easily and quickly completed, turned out to be a much more complicated affair.

## Reviewing the evidence

Although in 2006 the National Institute for Health and Clinical Effectiveness advised that staff should avoid using toiletries for bathing babies during the first month of life, there is a lack of research-based studies

specific to neonatal skincare. Information that is available does not always clearly identify the potential harm that can occur to newborn skin if age-old bathing rituals are continued. Since it was obvious the National Institute for Health and Clinical Effectiveness (NICE) advice was not always being followed within the Network, it was high time to do something to address the lack of consistency in how staff cared for neonatal skin.

Surprisingly it has taken a whole year to sort out an evidence-based document and educate staff from the neonatal multidisciplinary team about the need to tighten up practice and make sure staff do the very best to protect the delicate, easily damaged skin of these small patients.

Newborn skincare should be taken seriously. The largest organ in the body, the skin begins its complex process of development about a week after conception, and continues to evolve throughout pregnancy and following birth<sup>1</sup>. Preterm babies have immature skin and are at risk of morbidity due to reduced skin development and compromised integrity of their stratum corneum – the skin's protective barrier<sup>2</sup>.

The stratum corneum of a preterm baby is immature and thinner than that of a term baby, child or adult. Mature stratum

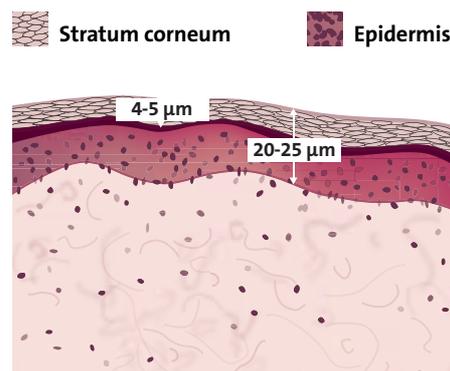
## Keywords

skincare; immature stratum corneum; vernix caseosa; bathing; bath water temperature; nappies; care of umbilical cord

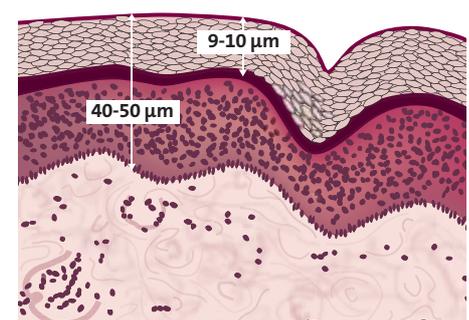
## Key points

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1. Professionals working with neonates should be knowledgeable about the structure and function of newborn skin.
2. Preterm babies have immature skin and are more susceptible to skin damage in the postnatal period.
3. Staff should utilise evidence to promote safe skincare practices and help reduce or prevent skin conditions in later life.



FIGURES 1 Fetal skin at 25 weeks' gestation.



FIGURES 2 Full term neonatal skin.

corneum is made up of between 10-20 layers of cells – a thickness of 2mm (FIGURE 1); whilst the stratum corneum of preterm babies <30 weeks may only have 2-3 layers and be 0.9mm thick<sup>3,6</sup> (FIGURE 2). Thickness of the stratum corneum plays a role in its barrier function – full thickness of newborn skin is considered to be 40-60% that of adult skin. An intact mature stratum corneum helps to regulate the body's fluid and electrolyte balance, maintains thermoregulation, prevents toxicity from percutaneous absorption of medications and chemicals in toiletries, and protects the skin from surface microorganisms<sup>2,7,8</sup>.

Evidence suggests that the stratum corneum begins to develop at approximately 24 weeks' gestation with a developed barrier function evident between 32-34 weeks<sup>9</sup>. Complete maturation of the stratum corneum may take 8-10 weeks depending upon gestation at birth<sup>10-11</sup>. Interference with the development of the stratum corneum and associated barrier function may be a risk factor for nosocomial infection<sup>12</sup>.

At birth the newborn's skin is virtually sterile and subsequent colonisation of the skin is important to help protect against potentially harmful bacteria. Garcia-Gonzalez and Rivera-Rueda suggest colonisation occurs within 2-7 days, but may vary depending upon exposure to bacteria<sup>13</sup>. Effective colonisation and normal stratum corneum formation is dependent on an acidic environment. The skin is alkaline at birth with a pH of >6, but within approximately four days an 'acid mantle' has developed resulting in a skin pH <5.0<sup>8,14,15</sup>.

Acid mantle development may not occur as speedily for preterm babies and hence their skin may not be as well protected from bacteria<sup>5</sup>. It is therefore imperative for newborn skin to be protected to enable the stratum corneum to effectively adapt to the extrauterine environment and establish efficient barrier function<sup>16</sup>.

### Considering vernix

During the last trimester of pregnancy, vernix caseosa helps protect fetal skin from damage from bacteria and amniotic fluid<sup>6</sup>. Vernix caseosa is composed of sloughed cells from the stratum corneum and may contribute to earlier skin acidification by protecting it from injury, infection and transepidermal water loss<sup>17-19</sup> (FIGURE 3).

Evidence identifies that vernix is a



**FIGURE 3** Vernix on a newborn baby should not be removed.

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natural skin cleanser and moisturiser, with anti-infective, anti-oxidant and wound-healing properties, that should be left to absorb into the skin<sup>19-24</sup>. Guidelines for newborn care from the World Health Organisation specify that vernix should not be removed from a baby's skin<sup>25</sup>.

### Developing the guideline

It was clear that an evidence-based guideline was required for use in all units in the North Trent Neonatal Network to include information about bathing and the use of toiletries, nappy area care, umbilical cord care and the use of emollients to improve skin condition. The following information outlines the key aspects of the guideline.

#### Bathing

##### Timing of the bath

There is a lack of information within the literature relating to the timing of the first bath for babies on neonatal units. However clinical knowledge and experience indicates that bathing can be detrimental to a preterm or sick baby, and ill-effects may include hypothermia, destabilisation of vital signs, contact with skin-irritating substances and absorption of chemicals found in common toiletries. Bathing should therefore be delayed until a preterm baby is physiologically stable.

##### Temperature of the bath water

Medves and O'Brien suggest that bath water should be maintained at approximately 37°C for all babies<sup>26</sup>. The temperature of bath water is not always monitored

within the Network, and all units are being encouraged to buy baby bath thermometers to reduce the risk of hypothermia whilst the baby is being bathed.

##### Frequency of bathing

The general consensus within the literature is that frequent (i.e. daily) bathing should be discouraged due to its potential to adversely affect maturation of the acid mantle, and cause irritation and drying of the skin<sup>14,27,28</sup>. Franck et al<sup>29</sup> suggest that stable preterm babies can be bathed every four days without increasing the risk of infection, and additional evidence indicates that babies should not be bathed daily, but 2-3 times a week if necessary, to reduce the potential for skin irritation, absorption of chemicals and pH changes<sup>5,30</sup>.

##### Use of toiletries

Synthetic bathing products commonly used for neonatal skincare contain chemicals which may affect skin pH and be potential irritants to the skin<sup>8,29,31</sup>. Tupker et al suggest that the use of soap is unnecessary due to its skin drying potential<sup>32</sup>. This view is supported by NICE who advise against the use of cleansing products, including baby wipes, for all babies during the first month of life<sup>33</sup>. Similarly, the Association of Women's Health, Obstetrics and Neonatal Nursing and the National Association of Neonatal Nurses advise that only water is used for bathing babies <32 weeks' gestation<sup>27</sup>.

Cetta et al<sup>34</sup> and Tupker et al<sup>32</sup> concur that the degree of skin irritation depends upon the length of contact with products

and frequency of bathing. In view of all the available information relating to bathing, the consensus within the North Trent Neonatal Network is that physiologically stable babies are bathed 2-3 times a week in plain water only. Toiletries are no longer available in the majority of units, and their use is not promoted.

### Nappy area care

Borkowski states that effective care of the nappy area should result in the maintenance of skin integrity and prevention of damage to the stratum corneum<sup>35</sup>. This may prove to be a particular challenge for staff on neonatal units, especially since minimal handling and reduced cares are often encouraged if a baby is unwell and unstable. However, the need to appropriately protect this vulnerable area of a baby's body cannot be over-emphasised if skin damage is to be prevented.

#### Which nappies to use

Information from the National Library for Health identifies that disposable gel matrix nappies have greater absorbency than cellulose core disposable nappies or reusable nappies<sup>36</sup>. However, a Cochrane Database systematic review of 17 randomised controlled trials comparing the effectiveness at preventing nappy rash of different kinds of nappies, concluded that there is insufficient evidence to support or refute the use and type of disposable nappies for the prevention of nappy rash<sup>37</sup>. Therefore within the guideline it is suggested that parents are advised to use the best quality nappy available for their baby.

#### Changing nappies

Evidence suggests that the incidence of nappy rash may be reduced if nappies are changed frequently during the day and at least once during the night, with the baby being nursed with skin exposed as often as possible. This will help to minimise damage to the stratum corneum which may occur when urea, from faeces and urine mixes within the nappy and irritates the baby's skin<sup>35,38</sup>.

#### Cleaning the nappy area

The nappy area should be cleansed using water, or if necessary, un-perfumed, alcohol-free baby wipes<sup>35,36,39</sup>. For babies potentially at risk of developing nappy rash, for example babies with neonatal abstinence syndrome, the use of a thin layer of barrier ointment in the nappy area is

### Main recommendations

1. Leave vernix caseosa to absorb into the skin – do not rub it off.
2. Only bath a preterm baby or a baby who has been ill when he/she is physiologically stable.
3. If necessary, bath a 'well' baby when his/her temperature has been within an acceptable range for 2-4 hours after delivery, but preferably delay the first bath until the second or third day of life to assist with skin maturation.
4. Ensure temperature of bath water is maintained at 37°C. Use a bath thermometer.
5. Avoid baby toiletries and other cleansing products until the baby is at least a month old – use plain water to cleanse baby's skin.
6. Only bath baby 2-3 times a week – 'top and tail' in-between bathing.
7. Use the best quality nappy available to the baby – change soiled nappies frequently and cleanse nappy area with plain water or unperfumed, alcohol-free baby wipes.
8. Expose nappy area as often as possible and consider using a thin layer of barrier ointment in nappy area to protect the stratum corneum – ensure ointment is preservative-free and does not contain antiseptic, fragrance or colourings.
9. Avoid the use of ointments/lotions to improve the appearance of newborn skin.
10. Ensure the umbilical cord is kept clean and dry, allowing it to be exposed to air as frequently as possible.

TABLE 1 Summary of skincare guidelines.

beneficial to protect the stratum corneum from over-hydration and irritation due to contact with urine and faeces<sup>36,38,40,41</sup>.

Ointments are generally more effective than creams and lotions, as they provide an improved moisture barrier. Ideally the barrier preparation should be preservative-free, and should not contain antiseptic, fragrance, or colouring as these can increase skin irritation. Suggested barrier preparations include zinc ointment and soft white paraffin<sup>36</sup>.

#### Care of the umbilical cord

The umbilical cord must be kept as clean and dry as possible in order to minimise the risk of infection. It is important to use only plain water for cleaning, as there is no evidence that other cleaning or drying agents, including creams, sprays or powders, are more beneficial than keeping the baby's cord clean and dry<sup>42-45</sup>. If the cord is soiled with urine or faeces, use cotton wool and water to wash the cord and surrounding area. Dry with a clean towel rather than dry cotton wool as this may leave fibres on the cord which could pose a contamination risk. For best results:

- keep the cord area clean
- keep the cord area dry (additional reason for infrequent bathing)
- expose the cord to the air as much as possible – this will help to keep the area dry and accelerate separation
- ensure nappy is secured below the cord –

this will assist with drying and will prevent irritation

- change the nappy as frequently as possible to prevent prolonged contamination of the cord with urine or faeces.

#### Use of emollients to improve skin condition

Previously within the Network, dry skin may have been treated with baby lotion or oil. Whilst the appearance of the skin improved, it was unclear as to what effect the lotion had on the skin itself. A Cochrane Database systematic review of four randomised controlled trials examining the use of prophylactic topical ointment therapy was undertaken by Conner et al<sup>12</sup>. This identified that whilst all of the studies reported improved skin condition, the use of topical ointment increases the risk of nosocomial sepsis and coagulase negative staphylococcal infection. The review also concluded that topical ointment for preterm babies must not be routinely used. Therefore, within the Network the move has been away from the routine use of emollients to improve skin condition, with a focus more on educating parents about the importance of allowing newborn skin time to rejuvenate itself without the use of lotions or oils.

#### Progress of the initiative

Following the development of several drafts and incorporation of numerous

comments from the multidisciplinary team, the guideline is almost ready to be made available to staff across the North Trent Neonatal Network (TABLE 1). In addition it is important to ensure that parents receive useful consistent skincare information in all nine neonatal and maternity units in the Network and a variety of strategies relating to the information provided to parents are currently being considered. For example, a parent information leaflet is being compiled which will provide evidence-based information to allow parents to make an informed choice about how they care for their baby's skin. Development of this initiative was made possible by the author winning a financial award in May 2008. Similarly, the messages being communicated to parents when they are provided with certain 'Bounty' packs, which may include skincare products, are being debated.

### Staff education

Due to the numerous inconsistencies relating to newborn skincare occurring across the Network, it was apparent the multidisciplinary team would benefit from contemporary information sessions about appropriate skincare. This has been achieved through the facilitation of numerous skincare update sessions over recent months for a variety of different professionals within the network, including neonatal nurses, midwives, health visitors, healthcare assistants, nursery nurses, children's nurses and medical staff. The sessions have been generally well-received, with most staff keen to update their practice and provide more consistent evidence-based care for newborn babies.

### Conclusion

While the majority of staff who have been updated about appropriate skincare routines are keen to adapt their own practice and empower parents with relevant information, a minority of staff are reluctant to change their opinions and age-old practices and move away from the use of common baby toiletries.

Thankfully these staff represent a very small minority, and hopefully with a combination of peer pressure and on-going promotion of the available evidence, some day very soon, the skin of all babies in the North Trent Neonatal Network will be treated with the respect it deserves.

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