AWHONN
PROMOTING THE HEALTH OF WOMEN AND NEWBORNS

Neonatal Skin Care
State of the Science and Ongoing Challenges

Debra Brandon, PhD, RN, CNS, FAAN

Poll

- How many people are viewing at your facility?
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7-15
  - 16+

AWHONN
2

Poll

- Select which most represents those attending at your site today:
  - Staff nurses
  - Staff nurses, clinical educators, CNS's
  - All of the above plus nurse managers/administrators
  - All of the above plus physicians
  - Nurse managers/administrators only
  - Other

AWHONN
3

Welcome to the Webinar!

For questions not answered during the presentation, e-mail the AWHONN Practice Reference Service:

Practicereferenceline@awhonn.org

AWHONN
4

AWHONN Accreditation Statement

- Association of Women's Health, Obstetric and Neonatal Nurses is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.
- AWHONN is approved by the California Board of Registered Nursing, Provider #CEP580.

AWHONN
5

Continuing Education

- The maximum Continuing Nursing Education (CNE) credit that can be earned for participation in the webinar is **1.25 contact hours**.
- The CNE credit expires December 31, 2021. (For updated CNE information, visit AWHONN web site at www.awhonn.org).
- To obtain the contact hours for this educational activity, you must attend the entire webinar session and complete a participant feedback form. CNE instructions are available in your handouts.
- You must retrieve your CNE certificate online within 60 days of today's webinar.

AWHONN
6

Disclosures

- This webinar was supported through an educational grant by Johnson & Johnson Consumer Companies, Inc.
- Dr. Brandon disclose no relevant financial or commercial conflicts related to this webinar.
- The content reviewers and nurse planners report no relevant financial or commercial conflicts related to this webinar.

AWHONN
7

Objectives

- Identify problems in neonatal skin that increase risk for alterations in skin integrity and skin function.
- Implement skin care interventions essential to the maintenance of skin integrity and function as well as decrease skin risk.
- Describe areas needed for future knowledge development for neonatal skin care.

AWHONN
8

Polling Question #1

Where do you currently spend most of your clinical hours?

- Newborn nursery/postpartum
- Labor and delivery
- Special care nursery/NICU

AWHONN
9

Today's Speaker

Debra Brandon, PhD, RN, CNS, FAAN

AWHONN
10

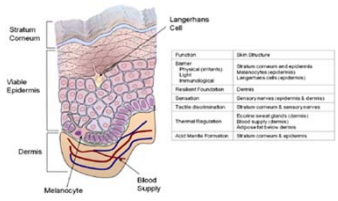
Skin Structure & Function

- Structure
  - Stratum corneum
  - Epidermis
  - Dermis
- Function
  - Barrier
  - Acid-mantle formation & infection control
  - Temperature regulation
  - Water and electrolyte regulation
  - Tactile sensory function

AWHONN
11

Preterm vs. Term Neonates

- Surface to body area/weight ratio is up to 5 times greater than adults
- Early 20-23 week periderm-single layer



Used with permission: Visscher, M. O., Adam, R., Brink, S., & Odio, M. (2015). Newborn infant skin: Physiology, development, and care. Clinics in Dermatology, 33, 3, 271-280.

12

Structure and Function

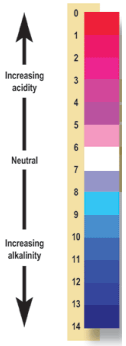
Term	Preterm
• Maturation begins at delivery • Well-developed epidermis • Epidermal and stratum corneum thickness similar to adult skin	• Epidermal maturation complete at 34 wks gestation • Comparable to term at 2-3 weeks (>25 wks) • Comparable at at 8 wks if (≤25 wks) • ↓ Epidermal and stratum corneum thickness compared to adults • Dermal instability compared to adult and term • Diminished cohesion compared to adult and term

(Oranges, Dini, & Romanelli, 2015)

AWHONN
13

Acid Mantle

- Newborn skin is alkaline
  - (pH 6.34 - 7.5 depending on anatomical
- Normal infant skin is acidic
  - (pH 5 - 5.5)
- Acidification - acid mantle development essential for barrier function
  - Exogenous influences
  - Endogenous influences



14

Skin Assessment

- Assessment goal:
  - Assessing risk vs. status
- Dedicated interdisciplinary skin care teams can improve outcomes:
  - certified wound, ostomy, continence nurses (CWOCN) & APNs

Courtesy of D. Brandon

AWHONN
15

Assessment Tools

Neonatal Skin Condition Score-NSCS
For VLBW to full-term neonates

Dryness
1 = Normal, no sign of dry skin
2 = Dry skin, visible scaling
3 = Very dry skin, cracking/fissures

Erythema
1 = No evidence of erythema
2 = Visible erythema, <50% body surface
3 = Visible erythema, ≥50% body surface

Breakdown
1 = None evident
2 = Small, localized areas
3 = Extensive

Note: perfect score = 3, worst score = 9.

(AWHONN, 2018)

AWHONN
16

Routine Skin Care Practices

- Bathing
- Umbilical Cord Care
- Emollients & Atopic Dermatitis
- Diaper Dermatitis

Courtesy of D. Brandon

AWHONN
17

First Bath

- Timing of first bath—between 6 and 24 hours of age (WHO, 2015: Preer et al., 2013)
  - Exception: Infants born to HIV + mothers should be bathed as soon as possible after birth (AAP, 2015).
- Frequency—every few days
- Cleansing product
  - Antiseptic cleaners not currently recommended
  - Cleansers should be neutral or slightly acidic pH and safety tested on newborns.

AWHONN
18

Polling Question #2

Which type of bathing is recommended for all neonates?

- Immersion bathing
- Sponge bathing
- Swaddled immersion bathing

AWHONN

Swaddled Immersion

- Stable body temperature during and following bath
- Stable vital signs
- Induces calm, quite state
- No delay in cord healing
- No increase in cord infections

Courtesy of J. Kuller

AWHONN

Bathing Literature

Author	Sample	Findings
Çaka, & Gözen, 2017	80 newborns in NICU – 40 tub bathing & 40 swaddled tub bathing, bathed after 24 hours of age.	Temperature at 10 minutes post bath > in those swaddled, NIPS score change from baseline: lower swaddled and higher in tub alone Results: Swaddled tub bathing decreased stress experience
Edraki et al., 2014	RCT 50 preterm infants, 30-36 weeks gestation, 7-30 days of age.	Mean temperature loss and crying time were significantly less in swaddled newborns
Loring et al. , 2012	RCT 100 stable LPIs in well baby nursery comparing sponge to tub bathing.	LPIs who were bathed in a tub had less variability in body temps and higher temps at 10 and 30 minutes post bath
Bryanton, Walsh, Barrett, & Gaudett, 2004	RCT of 102 mother-baby pairs, tub bath or sponge bath.	Infants bathed in a tub experienced significantly less temperature loss, reduced crying and higher maternal satisfaction than those bathed by sponge.

Umbilical Cord Care

- Clean during initial bath and with routine bathing.
- Keep clean and exposed to air – "dry cord care" (Gras-Le Guen et al., 2017).
- Topical alcohol and triple dye prolongs cord separation (Blume-Petayvi, 2012; Steward et al., 2016).
- Chlorhexidine application may be indicated in low resource settings for infants born outside a hospital (WHO, 2015).

AWHONN

Emollients / Atopic Dermatitis

- Risk for AD
  - Epidermal barrier dysfunction
  - Family history
  - Allergens
  - Gene defects

Courtesy of L. Heimall

(Deckers et al., 2012; Horimukai et al., 2014; Nierengarten, 2017: III)

AWHONN

Prevention of Atopic Dermatitis

- Prevention
  - Breastfeeding exclusively for at least 6 months (Foisy et al., 2011).
  - Oral probiotics / prebiotics (Cuello-Garcia et al., 2015).
  - Topical emollients applied daily (Simpson et al., 2014)
  - Gentle bathing techniques (de Ward-van der Spek et al., 2013)
- Oils/ massage

AWHONN

Risk for Diaper Dermatitis

- Frequent loose stools
  - short gut, infectious diarrhea
- Antibiotic use
- Opiate withdrawal
- Abnormal rectal sphincter tone
  - extrophy of the bladder, spina bifida
- Allergies
  - foods

AWHONN
25

Diaper Dermatitis Prevention

- Breastfeeding vs. formula feeding
  (Alonso et al., 2013; Kayaoglu, Kivanc-Altunay, & Sarikaya, 2015).
- Dye-free absorbent diapers
  (Counts, Weisbrod, & Yin, 2017; Klunk, Domingues, & Wiss, 2014; Odio & Thaman, 2014)
- Frequent diaper changes in context of developmentally supportive care
- Alcohol and perfume free wipes with minimal additives

AWHONN
26

Polling Question #3

What do you currently use most often in your facility for cleansing of the diaper area?

- Soft cloths and water
- Soft cloths, water, and cleanser
- Diaper wipes

AWHONN
27

Types of Diaper Dermatitis

- Contact Irritant
- Candida Albicans
- Combination
- Alternative

Diaper Dermatitis Treatment

- Evidence-based consistent care
  - Matched to severity
- Ongoing systematic assessment
  - Intact to denuded skin

(Stamatas, Zerweck, Grove, & Martin, 2011; Heimall, Storey, Stellar, & Davis, 2012).

APPENDIX F

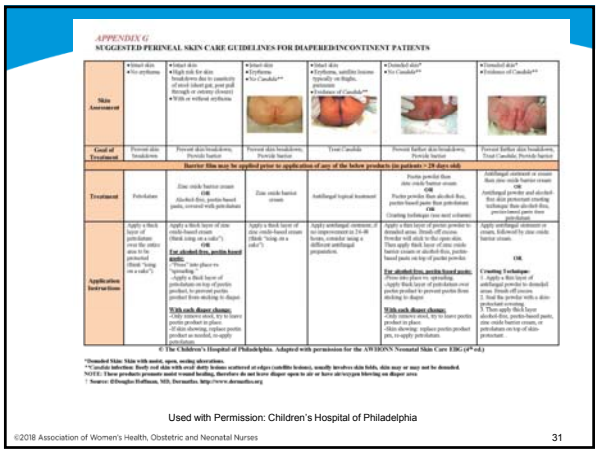
TABLE 1. ***Clinical Evaluation Scale for Characterization of the Severity of DD***

Score	Degree	Definition
0	None	Skin is clear (may have some very slight dryness and/or a single papule but no erythema)
0.5	Slight	Faint to definite pink in a very small area (<2%); may also have a single papule and/or slight dryness
1.0	Mild	Faint to definite pink in a small area (2%–10%) or definite redness in a very small area (<2%) and/or scattered papules and/or slight dryness/scaling
1.5	Mild/moderate	Faint to definite pink in a larger area (10%) or definite redness in a small area (2%–10%) or very intense redness in a very small area (<2%) and/or scattered papules (<10% area) and/or moderate dryness/scaling
2.0	Moderate	Definite redness in a larger area (10%–50%) or very intense redness in a very small area (<2%) and/or single to several areas of papules (10%–50%) with five or fewer pustules, may have slight desquamation or edema
2.5	Moderate/severe	Definite redness in a very large area (>50%) or very intense redness in a small area (2%–10%) without edema and/or larger areas (>50%) of multiple papules and/or pustules; may have moderate desquamation and/or edema
3.0	Severe	Very intense redness in a larger area (>10%) and/or severe desquamation, severe edema, erosion and ulceration; may have large areas of confluent papules or numerous pustules/vesicles

Figure 1. Visual digital images demonstrating the range of severity of DD: (**A**) slight, (**B**) mild, (**C**) moderate, (**D**) moderate to severe, (**E**) severe. Although this scale was used in the studies mentioned in the text, pediatricians have reported even more severe cases.

TABLE 1. & FIGURE 1. Clinical Evaluation Scale for Characterization of the Severity of DD. Stamatas, G. N. and Tierney, N. K. (2014), Diaper Dermatitis: Etiology, Manifestations, Prevention, and Management. Pediatric Dermatology, 31: 1–7. Used with Permission from John Wiley and Sons.

Used with permission: Stamatas, G. N., & Tierney, N. K. (2014). Diaper Dermatitis: Etiology, Manifestations, Prevention, and Management. Pediatric Dermatology, 31, 1, 1-7.


APPENDIX G
SUGGESTED PERINEAL SKIN CARE GUIDELINES FOR DIAPERED/INCONTINENT PATIENTS

Used with Permission: Children's Hospital of Philadelphia

 31

Circumcision Care

- Benefits of circumcision outweigh the risks
  (AAP & ACOG, 2017; AAP Task Force on Circumcision, 2012).
  - UTI prevention
  - ↓ penile cancer risk
  - ↓ STI transmission
- Parents must receive accurate information to guide a decision.
- Should have opportunity to discuss benefits and risks with a healthcare provider.

 AWHONN 32

Risk Factors for Skin Injury

- Infant characteristics
  - Gestational ≤ 32 weeks, low birth weight, immobility
- Physiologic
  - Edema, dehydration
- Pharmacologic
  - Sedatives, pain medications, vasopressors
- Medical devices
  - IV catheters, nasal cannula, nasal CPAP
- Medical Adhesives
  - Tapes, dressings
- Surgical Wounds
  - Postoperative, circumcision

 AWHONN 33

Polling Question #4

Which of the following leads to the highest rate of skin injury in neonates?

- Low birth weight
- Medical devices
- Disinfectants

AWHONN

Risk Assessment

No perfect risk assessment tool!

- Neonatal Skin Risk Assessment Scale—6 subscales: Physical condition (gestational age), Mental state, Mobility, Activity, Nutrition, Moisture

  (Huffines & Logsdon, 1997)
- Neonatal/Infant Braden Q—5 subscales: Sensory perception: responsiveness, Gestational age, Tissue perfusion and oxygenation, Nutrition, Friction/shearing

  (Curley et al., 2018)

AWHONN

Medical Device Injury

- Assess a minimum of every 12 hours
  - Pulse oximeters
  - Nasal CPAP interfaces
  - Vascular access devices

Courtesy of D. August

Courtesy of L. Heimall

Courtesy of L. Heimall

Medical Adhesives

- Neonates are at high risk for MARSI -Medical Adhesive Related Skin Injury
  (Cheng & Kroshinsky, 2011; Lund, 2014; McNichol et al., 2013).
- Consider adhesives that cause the least amount of skin trauma (Oranges et al., 2015)
- Remove medical adhesives slowly using one of the following:
  - Saline gauze
  - Saline pledgets
  - Silicone based adhesive removers
- Consider pain control measures during removal.

AWHONN
37

Disinfectants

Procedures requiring disinfectants:

- Intravenous access
- Circumcision
- Heel stick or venous blood draws
- Intramuscular injections
- Chest tubes or umbilical lines

AWHONN
38

Disinfectants

- Disinfection of skin with antiseptic solution before invasive procedures reduces the infection risk.
- No single product recommended for all patients and procedures.
  - CHG
  - Povidone-Iodine
  - Isopropyl alcohol
- Risk of chemical burns with all products, especially in premature population (Beresford, 2015)

Courtesy of C. Lund

AWHONN
39

IV Care

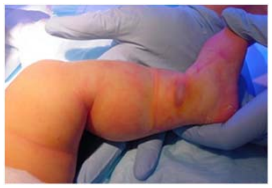
- Adoption of algorithms to assess need for line.
- Frequent observation in the first 48 hours after insertion.
- Do not rely on infusion pumps to identify infiltrates.
- Minimum of hourly PIV assessments
  - Touch, Look, Compare
  - Assess, Compare, Touch

(Tofani et al., 2012; Wilder, Kuehn, & Moore, 2014)

AWHONN

Routine IV Care

If signs of extravasation are noted, immediately stop the infusion.



Courtesy of C. Lund

AWHONN

Extravasation Treatment

- Non-pharmacologic
  - Elevation
  - Multiple puncture technique
  - Early irrigation
- Pharmacologic (dependent upon infusate)
  - Hyaluronidase
  - Phentolamine

AWHONN

Stages of Wound Healing

Stages **	Descriptions	Definitions
Stage 1: Hemostasis Phase	Hemostasis is the process of the wound being closed by clotting.	Vasoconstriction limits blood loss while the effects of vasoactive mediators cause temporary blanching at the site of the injury. Exposed subendothelium activates platelet aggregation which leads to clot formation.
Stage 2: Inflammatory Phase	Inflammation begins right after the injury when the injured blood vessels leak transudate causing localized swelling.	Inflammation helps to control bleeding and prevent infection while allowing healing, as repair cells migrate to the site of injury. During the inflammatory phase, damaged cells, pathogens, and bacteria are removed. This physiologic process creates edema, warmth, pain, and redness which can commonly be seen during this phase of healing.
Stage 3: Proliferative Phase	Proliferation begin when the wound is rebuilt with new tissue made up of collagen and extracellular matrix.	The wound contracts as new tissues are built. A new network of blood vessels forms allowing granulation tissue to receive sufficient oxygen and nutrients to promote healthy growth. Healthy granulation tissue is pink or red and uneven in texture. Epithelialization happens faster when wounds are kept moist and hydrated.
Stage 4: Maturation Phase (Remodeling)	Maturation is when collagen is remodeled and the wound fully closes.	The repair cells are removed by apoptosis. Collagen is disorganized and the wound becomes thicker. Slowly, collagen aligns with tension lines and as water becomes reabsorbed collagen fibers move closer together and cross link. Remodeling begins about 21 days after injury and can continue for up to 1 year.

Created by AWHONN for the 4th ed. of the Neonatal Skin Care EBG

AWHONN
43

Treatment for Skin Injury

- Medical grade honey
  - Safe and effective for wounds requiring debridement (Pressure injuries, infected surgical wounds, extravasation injury)
  - Safe in premature infants

(Boyar, Handa, Clemens, & Shimborske, 2014; Esser, 2017; Mohr, Reyna, & Amaya, 2014)

- Silver impregnated dressings
  - Antibacterial properties
  - Safe in premature infants

AWHONN
44

Product Considerations

- Read Labels
- Natural and organic do not equal better
- Preservatives are not always bad
- Choose products with safety testing on neonates / infants
- Limiting exposure – reduce contact sensitization risk
- Consider cultural practices
- Use Provider & Consumer Resources

AWHONN
45

Parent Education

- Bathing
- Vernix
- Umbilical Cord Care
- Dermatitis
- Product considerations
- Diaper care / Circumcision
- Emollients / Cradle Cap

Courtesy of L. Heimall

AWHONN

Parent Pages

- Free download at Health4mom.org

AWHONN

Future Research

- Valid risk assessment tool for hospitalized infants
- Treatment efficacy regarding skin care.

Courtesy of D. Brandon

Courtesy of L. Heimall

AWHONN

Questions?

Courtesy of D. Brandon

AWHONN

Thank you for attending!

For questions not answered during the presentation, e-mail the AWHONN Practice Reference Service:

Practicereferenceline@awhonn.org

AWHONN