



How-to-guide Pediatric supplement Preventing Pressure Ulcers

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I. Scope of Problem and Description of Need in Pediatrics

Goal: Prevent hospital-acquired pressure ulcers in pediatric patients by reliably implementing the six components of care recommended in this Guide.

What is a Pressure Ulcer?

Pressure ulcers are defined as localized areas of tissue destruction that develop when soft tissue is compressed between a bony prominence and an external surface for a prolonged period of time. Pressure ulcers are then staged to classify the degree of tissue damage observed.

Pressure Ulcers in Adults: Prediction and Prevention. Clinical Practice Guideline Number 3. AHCPR Publication No. 92-0047. Rockville, MD: Agency for Health Care Policy and Research; May 1992.

The Case for Preventing Hospital-Acquired Pressure Ulcers

- The development of pressure ulcers in children has been less studied compared to adults. Little research has been conducted to determine prevalence, incidence, and risk factors associated with pressure ulcers in infants or children.

Gray M. Which Pressure Ulcer Risk Scales Are Valid and Reliable in a Pediatric Population? *J WOCN.* 2004; 31: 157-160.

- In 2003, a multisite pressure ulcer prevalence survey of 1,064 children in nine US pediatric hospitals by McLane et al found the prevalence rate to be 4% (n = 43). Study participants ages ranged from less than 10 days to 17 years of age. Patients were hospitalized on general pediatric units and ICUs. The majority of pressure ulcers found were Stage I (61%) and Stage II (13%), and pressure ulcers were most commonly located in the occiput (31%), followed by the sacrum (20%) and foot areas (19%).

McLane KM, Bookout K, McCord S, McCain J, Jefferson LS. The 2003 national pediatric pressure ulcer and skin breakdown prevalence. *J WOCN.* 2004;31:168-178.

- Increased risk factors for developing pressure ulcers in infants and children include the following: significant prematurity; critical illness, neurologic impairments (including myelomeningocele and spinal cord injury), nutritional deficits, poor tissue perfusion or oxygenation, and exposure to prolonged pressure from hospital apparatus or tubes.

Gray M. Which Pressure Ulcer Risk Scales Are Valid and Reliable in a Pediatric Population? *J WOCN*. 2004; 31: 157-160.

- Pressure ulcers cause considerable harm to patients and may lead to increased hospital costs and length of stay. Pressure ulcers may predispose the patient to infection, sepsis, and treatment that may require surgical intervention. Occipital pressure ulcers may cause permanent alopecia, embarrassment, and body image disturbances.

McCord S, McElvain V, Sachdeva R, Schwartz P, Jefferson L. Risk Factors Associated With Pressure Ulcers in the Pediatric Intensive Care Unit. *J WOCN*. 2004;31: 179-183.

- The estimated cost of managing a single full-thickness pressure ulcer is as high as \$70,000, and the total cost for treatment of pressure ulcers in the US is estimated at \$11 billion per year.

Reddy M, Gill SS, Rochon PA. Preventing pressure ulcers: A systematic review. *JAMA*. 2006;296:974-984.

- The US Department of Health and Human Services document, *Healthy People 2010: Understanding and Improving Health*, lists reducing pressure ulcer incidence as an objective for all health care providers.

US Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health*, 2nd ed. Washington DC: US Government Printing Office; November 2000.

II. 6 Essential Elements of Pediatric Pressure Ulcer Prevention

Most pressure ulcers are preventable.

Brandeis GH, Berlowita DR, Katz P. Are pressure ulcers preventable? A survey of experts. *Advances in Skin and Wound Care*. 2001;14(5):244-248.

Preventing pressure ulcers boils down to two major steps: first, identifying patients at risk; and second, reliably implementing prevention strategies for all patients who are identified as being at risk.

1. Conduct a Pressure Ulcer Admission Assessment for All Patients

The admission assessment should include both a risk assessment (to evaluate risk of developing a pressure ulcer) and a skin assessment (to detect existing pressure ulcers). These two assessments should be thought of as a single process step: a pressure ulcer admission assessment.

Many patients are at risk for developing a pressure ulcer. The key factors contributing to the development of pressure ulcers include the following: age, immobility, incontinence, inadequate nutrition, sensory deficiency, multiple co-morbidities, circulatory abnormalities, and dehydration.

The prompt identification of at-risk patients using a validated risk assessment tool is essential for accurate, prompt identification of at-risk patients and timely implementation of prevention strategies. The risk assessment must include an assessment of several components: mobility incontinence, sensory deficiency, and nutritional status (including dehydration).

Wound Ostomy and Continence Nurses Society. WOCN Clinical Practice Guideline Series: Guideline for Prevention and Management of Pressure Ulcers. Glenview, IL. 2003.

- Braden Q Scale

The Braden Q Scale is a modification of the adult Braden Scale and has been developed and tested in the pediatric population. (*See attached tool: Modified Pediatric Braden Q Scale*). Its subscales reflect the developmental needs of the pediatric patient. The Braden Q Scale consists

of 7 subscales: (1) mobility, (2) activity, (3) sensory perception, (4) moisture, (5) friction-shear, (6) nutrition, (7) tissue perfusion and oxygenation. Scores range from 7 to 28. Like the original Braden Scale, low scores indicate high risk for pressure development and high scores indicate low risk.

Bergstrom N, Braden BJ, Laguzza A, Holman V. The Braden Scale for Predicting Pressure Sore Risk. *Nurs Res.* 1987;36:205-210.

Quigley SM, Curley MAQ. Skin integrity in the pediatric population: preventing and managing pressure ulcers. *J Soc Pediatric Nurses.* 1996;1:7-18.

Limited evidence exists to support the use of the Braden Q among children who are at risk for pressure ulcers. Until the validity and reliability can be further verified, use of the Braden Q should be combined with individualized and subjective risk assessment and combined with the appropriate preventive measures. (*See attached tool: Children's Healthcare of Atlanta Braden Q General Interventions for High Risk Patients*)

The following pressure ulcer risk assessment instruments have also been identified: Gosnell Scale, Cubbins Scale, Douglas Scale, Norton Scale, and Risk Assessment Pressure (RAPS) scale. However, no literature reviews reveal any studies testing validity or reliability of these scales in the pediatric population.

Gray M. Which Pressure Ulcer Risk Scales Are Valid and Reliable in a Pediatric Population? *J WOCN.* 2004; 31: 157-160.

- Neonatal Skin Risk Assessment Scale (NSRAS)

The NSRAS is based on the Braden Scale. (*See attached tool: Neonatal Skin Risk Assessment Scale*). Its subscales reflect the developmental and physical needs of the neonatal patient and comprises of 6 subscales: (1) general physical condition, (2) mental status, (3) mobility, (4) activity, (5) nutrition, (6) moisture. General physical condition is based on gestational

age. Scores range from 6 to 24. Unlike the original Braden Scale, a low score indicates a low risk for pressure development and a high score indicates a high risk.

Bergstron N, Braden BJ, Laguzza A, Holman V. The Braden Scale for Predicting Pressure Sore Risk. *Nurs Res.* 1987;36:205-210.

Huffines B, Lodgson MC. The neonatal skin risk assessment scale for predicting skin breakdown in neonates. *Issues Comprehensive Pediatric Nurs.* 1997;20:103-114.

Limited evidence exists to support the use of the NSRAS among the neonatal population. Until the validity and reliability can be further verified, use of the NSRAS should be combined with individualized and subjective risk assessment and combined with the appropriate preventive measures. *(See attached Children's Healthcare of Atlanta NSRAS Neonatal/Infant General Interventions for High Risk Patients).*

The Neonatal/Infant Braden Q Risk Assessment Scale has also been identified and is currently being studied for validity and reliability.

Gray M. Which Pressure Ulcer Risk Scales Are Valid and Reliable in a Pediatric Population? *J WOCN.* 2004; 31: 157-160.

What processes can be put in place to ensure the pressure ulcer admission assessment of all patients?

Hospitals can test the following process changes to ensure compliance with the assessment and identification of neonatal/infant/pediatric patients at risk for pressure ulcers:

- Identify the at risk population (for example PICU, NICU).
- Improve processes to ensure that risk assessment is conducted within four hours of admission for all patients.
- Include a visual cue on each admission documentation record for the completion of a total skin assessment and risk assessment.
- Agree on the use of a standard risk assessment tool (for example, Braden Q Scale or NSRAS).

- Utilize multiple methods to visually cue staff as to which patients are at risk. For example, consider automatic incorporation of scale and score into admission database and/or nursing assessment flowsheet.
- Build shared pride in progress. Post “Days since Last Pressure Ulcer” data.

2. Reassessing Risk for Patients

Reassessment of risk factors should be based on the acuity of the patient and awareness of when pressure ulcers occur in a particular clinical setting. For example, infants and children at risk for pressure ulcer development, including all children managed in an intensive care unit, should be routinely completed. Perform initial assessment at admission into the ICU and reassess at least every 48 hours or whenever the patient’s condition changes or deteriorates. For example, changes in mobility, nutrition, or tissue perfusion/oxygenation may change the patient’s risk of developing pressure ulcers. Assessing risk provides caregivers the opportunity to adjust prevention strategies according to the changing needs of the patient. The degree of risk, as specified in several standardized risk assessments, allows providers to implement targeted strategies specific to the neonatal/infant/pediatric population.

Ayello EA, Braden B. How and why to do pressure ulcer risk assessment. *Advances in Skin & Wound Care*. 2002;15(3):125-131.

McCord S, McElvain V, Sachdeva R, Schwartz P, Jefferson L. Risk Factors Associated With Pressure Ulcers in the Pediatric Intensive Care Unit. *J WOCN*. 2004;31: 179-183.

What processes can be put in place to identify high-risk settings and groups to target prevention efforts to minimize risk?

The complexity and acuity of neonatal/infant/pediatric hospitalized patients require initial assessment and reassessment of the potential and degree of risk of pressure ulcer development. The following key points outline specific risk groups in the neonatal/infant/pediatric population.

- Neonates and very young children (i.e., younger than 5 years old) are at high risk for skin breakdown, with the head (occiput) being the most common site of pressure ulcer occurrence.
- Marked edema or anasarca creates an increased risk for pressure ulcer development.
- Decrease or no spontaneous activity (i.e., sedated, paralyzed, neurologically impaired) creates an increased risk for pressure ulcer development.
- Limited positioning options (ECMO, high-frequency ventilation, postop gastroschisis) creates an increased risk for pressure ulcer development.
- The PICU population is at risk for skin breakdown.
- Spinal cord injury (SCI): Patients with SCI are considered at high risk for developing pressure ulcers and have high rates of recurrence.
- Neurologic impairments, including myelomeningocele are considered at high risk for developing pressure ulcers and have high rates of recurrence.
- Nutritional deficits including metabolic disorders are at an increased risk for pressure ulcer development.
- Poor tissue perfusion or oxygenation, including cardiac disorders are at an increased risk for pressure ulcer development.
- Exposure to prolonged pressure from hospital apparatus or tubes creates an increased risk for pressure ulcer development.

McCord S, McElvain V, Sachdeva R, Schwartz P, Jefferson L. Risk Factors Associated With Pressure Ulcers in the Pediatric Intensive Care Unit. *J WOCN*. 2004;31: 179-183.

Quigley, S.M., & Curley, M.A.Q. (1996). Skin integrity in the pediatric population: Preventing and managing pressure ulcers. *Journal of the Society of Pediatric Nurses*, 1(1), 7.

Gray M. Which Pressure Ulcer Risk Scales Are Valid and Reliable in a Pediatric Population? *J WOCN*. 2004; 31: 157-160.

Association of Women's Health, Obstetrics and neonatal Nurses (AWHONN) & National Association of Neonatal Nurses (NANN). (2001). Evidenced-Based Clinical Practice Guideline: Neonatal Skin Care. Washington, DC: AWHONN.

What processes can be put in place to ensure reassessment of risk?

Based on identification of neonatal/infant/pediatric high risk setting, risk assessment in the neonatal/infant/pediatric population can be best met by using the following:

- Adapt documentation tools to prompt daily risk assessment, documentation of findings, and initiation of prevention strategies as needed. For example, include this information in daily clinical notes.
- Educate all levels of staff about potential risk factors of pressure ulcer development and the process for implementing prevention strategies.
- Use validated risk assessment tools for staff to easily identify degree of risk and potential prevention strategies.

3. Inspect Skin Daily

Skin integrity may deteriorate in a matter of hours in hospitalized patients. Because risk factors change rapidly in acutely ill patients, daily skin inspection is crucial. Patients identified as being at risk need a daily inspection of all skin surfaces, “from head to toe.” Special attention should be given to areas at high risk for pressure ulcer development such as the occiput, sacrum, back, buttocks, heels, and elbows.

Common sites for pressure ulcer formation in adults include the sacrum, heel, elbow, lateral malleolus, greater trochanter of the femur, and ischial tuberosities, whereas the primary site for pressure breakdown in pediatric patients is the occiput in infants and toddlers and the sacrum in children.

Kemp M, Keithley J, Smith D, Morreale B. Factors that contribute to pressure sores in surgical patients. *Res Nurs Health*. 1990; 13:293-301.

Bryant RA. Acute and chronic wounds. *Nurs Manage*. St.Louis: Mosby: 1992

Okomoto GA, Lamers JF, Shurtleff DB. Skin breakdown in patients with myelomeningocele. *Arch Phys Med Rehab*. 1983;64: 20-23

Solis MD, Krouskop T, Trainer N, Marburger R. Supine interface pressure in children. *Arch Pys Med Rehab*. 1988;69: 7-12.

A greater head-to-body proportion in infants and toddlers compared to adults predisposes infants and toddlers to occipital pressure ulcers.

Garvin G. Wound healing in pediatrics. *Nurs Clin North Am.* 1990;25:190.

McCord S, McElvain V, Sachdeva R, Schwartz P, Jefferson L. Risk Factors Associated With Pressure Ulcers in the Pediatric Intensive Care Unit. *J WOCN.* 2004;31:179-183.

What processes can be put in place to ensure daily inspection of the skin?

- Adapt documentation tools to prompt daily skin inspection, documentation of findings, and initiation of prevention strategies as needed.
- Educate all levels of staff to inspect the skin any time they are assisting the patient, for example, when assisting patient to the chair, moving from one area to the other, and while bathing. Upon recognition of any change in skin integrity, notify staff so that appropriate interventions can be put in place.

4. Manage Moisture: Keep the Patient Dry and Moisturize Skin

Wet skin is conducive to the development of rashes, is softer, and tends to break down more easily. Fecal incontinence is a greater risk factor for pressure ulcer development than urinary incontinence because the stool contains bacteria and enzymes that are caustic to the skin. Skin should be cleansed at time of soiling and at routine intervals. The process of cleaning the skin should include gentle use of a mild, non-alkaline cleansing agent that minimizes irritation and dryness of the skin.

Pressure Ulcers in Adults: Prediction and Prevention. Clinical Practice Guideline Number 3. AHCPR Publication No. 92-0047. Rockville, MD: Agency for Health Care Policy and Research; May 1992.

Wound Ostomy and Continence Nurses Society. WOCN Clinical Practice Guideline Series: Guideline for Prevention and Management of Pressure Ulcers. Glenview, IL. 2003.

Care should be taken to minimize exposure of the skin to moisture due to incontinence, perspiration, or wound drainage. When these sources of moisture cannot be controlled, use underpads made of materials that absorb moisture and present a quick-drying surface to the skin. Also use topical agents that act as moisture barriers and moisturize the skin.

Reddy M, Gill SS, Rochon PA. Preventing pressure ulcers: A systematic review. *JAMA*. 2006;296:974-984.

Gibbons W, Shanks HT, Kleinhelter P, Jones P. Eliminating facility-acquired pressure ulcers at Ascension Health. *Joint Commission Journal on Quality and Patient Safety*. 2006;32:488-496.

Ayello EA, Braden B. Why is pressure ulcer risk assessment so important? *Nursing*. 2001;31(11);74-80.

Wound Ostomy and Continence Nurses Society. WOCN Clinical Practice Guideline Series: Guideline for Prevention and Management of Pressure Ulcers. Glenview, IL. 2003.

Association of Women's Health, Obstetrics and neonatal Nurses (AWHONN) & National Association of Neonatal Nurses (NANN). (2001). Evidenced-Based Clinical Practice Guideline: Neonatal Skin Care. Washington, DC: AWHONN.

What process can we put in place to ensure effective management of moisture?

- Look for opportunities to design a process for periodic activities such as repositioning, assessing for wet skin, applying barrier agents, and offering toileting opportunity. By combining routine activities in a protocol such as a “pressure ulcer prevention protocol,” staff can complete multiple tasks while in the room every two hours and document them all at once.
- Provide supplies at the bedside for each at-risk patient who is incontinent. This provides the staff with the supplies that they need to immediately clean, dry, and protect the patient’s skin after each episode of incontinence.
- Provide underpads that pull the moisture away from the skin, and limit the use of disposable briefs or containment garments if at all possible.
- Provide disposable briefs or diapers with gel or polymer-based linings that absorb and wick moisture from skin.
- Institute a bowel and bladder program customized to each patient.
- Decrease baths and address a patient’s need for skin cleansing individually and by body region.
- Apply barrier creams that remain in contact with the skin despite cleansing. Examples include zinc oxide, dimethicone and other high-quality silicones. Avoid products containing petrolatum-based protectants since

they protect for a short time, do not remain in contact with the skin and interfere with absorption by diapers.

Fleck C. Young Patients, Age-Old Wounds. *Advance for Nurses*. Feb 2006: 25-27.

Wound Ostomy and Continence Nurses Society. WOCN Clinical Practice Guideline Series: Guideline for Prevention and Management of Pressure Ulcers. Glenview, IL. 2003.

Association of Women's Health, Obstetrics and neonatal Nurses (AWHONN) & National Association of Neonatal Nurses (NANN). (2001). Evidenced-Based Clinical Practice Guideline: Neonatal Skin Care. Washington, DC: AWHONN.

5. Optimize Nutrition and Hydration

Assessment of the patient for possible risk of pressure ulcer development should include a review of nutritional factors and an assessment of hydration. Numerous nutritional factors such as impaired intake, low birth weight, low body weight or unintentional weight loss, and dehydration may contribute to development of pressure ulcers.

Reddy M, Gill SS, Rochon P. Preventing pressure ulcers: A systematic review. *JAMA*. 2006;296:974-984.

Gibbons W, Shanks HT, Kleinhelter P, Jones P. Eliminating facility-acquired pressure ulcers at Ascension Health. *Joint Commission Journal on Quality and Patient Safety*. 2006;32:488-496.

Association of Women's Health, Obstetrics and neonatal Nurses (AWHONN) & National Association of Neonatal Nurses (NANN). (2001). Evidenced-Based Clinical Practice Guideline: Neonatal Skin Care. Washington, DC: AWHONN.

Fluid, protein, and caloric intake are important aspects of maintaining adequate general nutrition. Nutritional supplements or support may be needed if dietary intake is insufficient. If a patient is identified with significant nutritional needs, a registered clinical dietician should be consulted to assess and suggest feasible nutritional interventions.

What changes can we make to optimize nutrition and hydration?

- Nutritional assessment should be performed on entry to a new healthcare setting and whenever there is a change in an individual's condition that may increase the risk of malnutrition.
- Assist patient with meals, snacks, and hydration. Every effort should be made to allow patient preferences when medically appropriate.
- Document the amount of nutritional intake, and notify the dietitian or physician if the patient does not have adequate intake.

Wound Ostomy and Continence Nurses Society. WOCN Clinical Practice Guideline Series: Guideline for Prevention and Management of Pressure Ulcers. Glenview, IL. 2003.

6. Minimize Pressure

Relieving pressure, especially over bony prominences, is of primary concern.

Patients with limited mobility are especially at risk for the development of pressure ulcers. Every effort should be made to redistribute the pressure on the skin, either by repositioning or by utilizing pressure-relieving surfaces.

Pressure Ulcers in Adults: Prediction and Prevention. Clinical Practice Guideline Number 3. AHCPR Publication No. 92-0047. Rockville, MD: Agency for Health Care Policy and Research; May 1992.

Reddy M, Gill SS, Rochon PA. Preventing pressure ulcers: A systematic review. *JAMA.* 2006;296:974-984.

Gibbons W, Shanks HT, Kleinhelter P, Jones P. Eliminating facility-acquired pressure ulcers at Ascension Health. *Joint Commission Journal on Quality and Patient Safety.* 2006;32:488-496.

Currently, there are few pediatric studies on low-air-loss beds to determine if these beds provide pressure relief or reduction in children. A foam overlay with and without a gel pillow provides an effective and cost effective pressure reducing surface in pediatric patients ages infant through 16 years of age. Current pediatric practices using positioning and support surfaces are adapted on those recommended for adults.

- **Turn/reposition patients every two hours.**

The aim of repositioning is to reduce or eliminate pressure, thereby maintaining circulation to areas of the body at risk for pressure ulcers. The

turning or repositioning of the at-risk patient temporarily shifts or relieves the pressure on the susceptible areas, diminishing the risk of pressure ulcer development. Turning every 4 hours in combination with the use of a pressure-reducing mattress was shown to decrease the occurrence of pressure ulcers compared to turning every 6 hours on a pressure-reducing mattress or turning every 2-4 hours on a nonpressure reducing mattress. However, turning patients every two hours is a foundational element in most pressure ulcer prevention protocols. For chair-bound individuals who are able to reposition themselves, pressure-relief exercises should be performed every 15 minutes. For chair-bound individuals who are not able to reposition themselves, they should be repositioned at least every hour by a caregiver.

Frequent small position changes using pillows and wedges reduce pressure on bony prominences. When used wisely, they may expand the weight-bearing surface by molding to the body. Use pillows or foam devices under the calf to elevate the patient's heels off the bed surface. Place cushioning devices between the legs/ankles to maintain alignment and prevent pressure on bony prominences (NPUAP clinical guidelines, 1992). Often the skin of patients identified at risk for pressure ulcers is easily torn inadvertently during repositioning. Clinicians should take care while actually turning the patient to protect the skin. Clinicians should consider using lift devices or "drawsheets" to move, rather than drag, individuals who are not able to assist during transfers and position changes. One positioning technique specific to the pediatric population is holding the pediatric patient in the caregiver's arms.

Wound Ostomy and Continence Nurses Society. WOCN Clinical Practice Guideline Series: Guideline for Prevention and Management of Pressure Ulcers. Glenview, IL. 2003.

Association of Women's Health, Obstetrics and neonatal Nurses (AWHONN) & National Association of Neonatal Nurses (NANN). (2001). Evidenced-Based Clinical Practice Guideline: Neonatal Skin Care. Washington, DC: AWHONN.

McCord S, McElvain V, Sachdeva R, Schwartz P, Jefferson L. Risk Factors Associated With Pressure Ulcers in the Pediatric Intensive Care Unit. *J WOCN*. 2004;31:179-183.

Dixon M, Ratliff C. Pediatric Pressure Ulcer Prevalence - One Hospital's Experience. *Ostomy/Wound Manage*. June 2005;51:6:44-60.

- **Use pressure-redistribution surfaces.**

Specialized support surfaces (such as mattresses, beds and cushions) redistribute the pressure that the patient's body weight exerts on the skin and subcutaneous tissues. If a patient's mobility is compromised, and this interface pressure is not relieved, the pressure can lead to impaired circulation and ulcer formation. Many studies have examined the benefits demonstrated by pressure-redistributing surfaces in the prevention of pressure ulcers.

Pressure-redistribution surfaces may be either static support surfaces or dynamic support surfaces. Static support surfaces include mattresses, or mattress overlays filled with air, water, gel, foam or a combination of any of these. Dynamic support surfaces mechanically vary the pressure beneath the patient, thereby reducing the duration of any applied pressure. Foam rings and donuts should be avoided because they concentrate the pressure to surrounding tissue.

Reddy M, Gill SS, Rochon PA. Preventing pressure ulcers; A systematic review. *JAMA*. 2006;296:974-984.

Courtney BA, Ruppman JB, Cooper HM. Save our skin: Initiative cuts pressure ulcer incidence in half. *Nursing Management*. 2006;37(4):35-46.

Gibbons W, Shanks HT, Kleinhelter P, Jones P. Eliminating facility acquired pressure ulcers at Ascension Health. *Joint Commission Journal on Quality and Patient Safety*. 2006;32:488-496.

Wound Ostomy and Continence Nurses Society. WOCN Clinical Practice Guideline Series: Guideline for Prevention and Management of Pressure Ulcers. Glenview, IL. 2003.

Because surgical patients who are under anesthesia for extended periods of time often have an increased risk of developing pressure ulcers, all surgical patients (pre-operative, intra-operative, post-anesthesia) should receive a skin assessment and a risk assessment. Caregivers should then implement prevention strategies such as ensuring repositioning and placing patients on

appropriate redistribution surfaces for all surgical patients who are identified as being at risk.

Courtney BA, Ruppman JB, Cooper HM. Save our skin: Initiative cuts pressure ulcer incidence in half. *Nursing Management*. 2006;37(4):35-46.

Wound Ostomy and Continence Nurses Society. WOCN Clinical Practice Guideline Series: Guideline for Prevention and Management of Pressure Ulcers. Glenview, IL. 2003.

Current pediatric practices are based on those recommended for adults. There are few pediatric studies on low air loss beds to determine if these beds provide pressure redistribution in children. Other pressure-redistribution devices, such as 2 or 4 inch convoluted foam mattress overlays and gel pillows, may provide an effective and more cost-effective pressure-redistribution surface in children from infancy through 16 years of age rather than a low air loss bed. Pediatric patients on low air loss beds in the turning modes have an increased risk for skin breakdown; they may pivot on the occiput, contributing to a shear/friction and/or pressure ulcer injury. Therefore, pediatric patients on low air loss beds should be manually turned every 1-2 hours as their condition permits.

Agency for Health Care Policy and Research. *Treatment of Pressure Ulcers*. Rockville, Md: US Department of Health and Human Services; 1994. AHCPR Publication 95-0652.

Jay R. Pressure and shear; their effects on support surface choice. *Ostomy/Wound Manage*. 1995;41:36-45.

McLane KM, Krouskop TA, McCord S, Fraley JK. Comparison of interface pressure in the pediatric population among various support surfaces. *J WOCN*. 2002;29:242-251.

McCord S, McElvain V, Sachdeva R, Schwartz P, Jefferson L. Risk Factors Associated With Pressure Ulcers in the Pediatric Intensive Care Unit. *J WOCN*. 2004;31:179-183.

The use of pressure-redistribution surfaces in neonates and infants differs from pediatrics. Soft bedding such as sheepskin, cloth diapers, or receiving blankets is beneficial in redistributing pressure surfaces in the neonate and infant population. Covering the sheepskin with a receiving blanket or cloth diaper beneath the infant's head minimizes the risk of fabric particles entering

the infant's mouth and nose. Use of blanket rolls or positioning aids can help to optimize the infant's position and minimize the risk for friction injury and skin breakdown. Water mattresses or oscillating air may help to maintain skin integrity by promoting circulation and decreasing pressure areas. Frequency of turning the infant should be based on clinical condition and tolerance of handling. Infants with skin breakdown or pressure areas or immobilized infants should be turned or repositioned approximately every 2 hours. Infants with intact skin and poor handling tolerance may be turned or repositioned every 3-4 hours. The benefit of turning should be weighed against the cost of stress to the infant when establishing a turning schedule.

Association of Women's Health, Obstetrics and neonatal Nurses (AWHONN) & National Association of Neonatal Nurses (NANN). (2001). Evidenced-Based Clinical Practice Guideline: Neonatal Skin Care. Washington, DC: AWHONN.

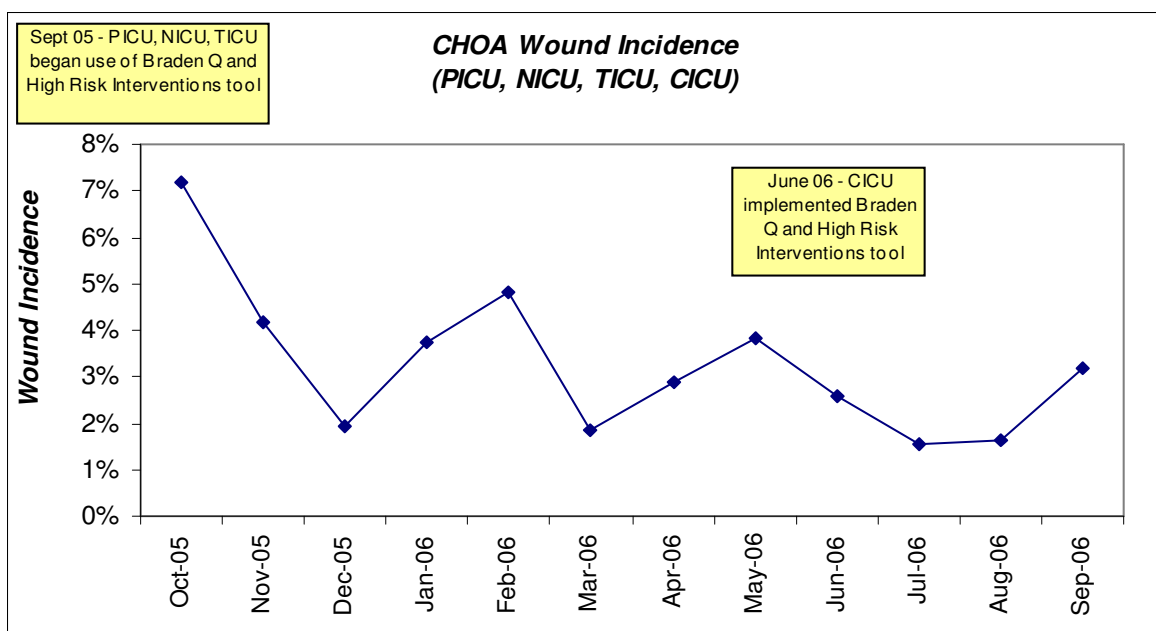
What process can we put in place to minimize pressure?

- Use tools inside the patient room to remind caregivers to turn/reposition the patient at least every two hours, or as clinical condition tolerates.
- Utilize positioning, transferring, and turning techniques to minimize friction/shear injury.
- Use pressure redistribution mattresses/overlays to assist with minimizing pressure.
- Use decision tool or algorithm to aid staff in choosing appropriate pressure redistribution mattresses/overlays specific to the neonate/infant and pediatric populations. *(See attached tool: Children's Healthcare of Atlanta Night, Night Sleepyhead Bed and Mattress Pressure Redistribution Guidelines)*

Examples of Success

The Children's Healthcare of Atlanta Wound Prevention Team was formed in 2005 to reduce the number of hospital-acquired pressure ulcers. Patients at risk for hospital-acquired pressure ulcers were identified through a systemwide risk assessment. The team implemented the modified Pediatric Braden Q scale in the Pediatric Intensive Care Units (PICU), the Technology Dependent Intensive Care Units (TDICU), the Cardiac Intensive Care Unit (CICU), and the Comprehensive Rehabilitation Unit (CIRU). The Neonatal Skin Risk Assessment Scale (NSRAS) was trialed and then implemented in the Neonatal Intensive Care Units (NICU). After extensive literature review and using evidence-based wound prevention guidelines, the team created interventions for patients who scored as high risk on each scale. The interventions are specific to either the Pediatric Braden Q scale or the NSRAS. The team also developed systemwide education on pressure ulcer identification, reporting incidents, and wound prevention. The education was disseminated through department inservices, ongoing new nurse orientation, and ongoing nurse resident orientation.

Children's Healthcare of Atlanta began measuring the incidence rate of hospital acquired pressure ulcers systemwide in 2005 and determined a baseline rate of 4.0%. As the team worked to implement the risk assessment tools and high risk interventions our incidence rate dropped to 2.87%, a 28% reduction.



IV. Appendices

A. Modified Pediatric Braden Q Risk Assessment Scale

B. Children's Healthcare of Atlanta Modified Pediatric Braden Q General Interventions for High Risk Patients

C. NSRAS Risk Assessment Scale

D. Children's Healthcare of Atlanta Neonate/Infant General Interventions for High Risk Patients

E. Children's Healthcare of Atlanta Night, Night Sleepyhead Bed and Mattress Pressure Redistribution Guidelines

Modified Braden Q Scale (for Pediatric Use)

Mobility	<p>1. Completely immobile: Does not make even slight changes in body or extremity position without assistance.</p> <p>2. Very limited: Makes occasional slight changes in body or extremity position but unable to completely turn self independently.</p> <p>3. Slightly limited: Makes frequent though slight changes in body or extremity position independently.</p> <p>4. No limitations: Makes major and frequent changes in position without assistance.</p>	
Activity <small>The degree of physical activity</small>	<p>1. Bedfast: Confined to bed</p> <p>2. Chairfast: Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.</p> <p>3. Walks occasionally: Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.</p> <p>4. All patients too young to ambulate; OR walks frequently: Walks outside the room at least twice a day and inside room at least once every 2 hours during waking hours.</p>	
Sensory Perception	<p>1. Completely limited: Unresponsive (does not moan, flinch, or grasp) to painful stimuli due to diminished level of consciousness or sedation, OR limited ability to feel pain over most of the body surface.</p> <p>2. Very limited: Responds to only painful stimuli. Cannot communicate discomfort except by moaning or restlessness; OR has some sensory impairment that limits ability to feel pain or discomfort over half the body.</p> <p>3. Slightly limited: Responds to verbal commands, but cannot always communicate discomfort or need to be turned; OR has some sensory impairment that limits ability to feel pain or discomfort in one or two extremities.</p> <p>4. No impairment: Responds to verbal commands. Has no sensory deficit that would limit ability to feel or communicate pain or discomfort.</p>	
Moisture <small>Degree to which skin is exposed to moisture</small>	<p>1. Constantly moist: Skin is kept moist almost constantly by perspiration, urine, drainage, etc. Dampness is detected every time patient is moved or turned.</p> <p>2. Very moist: Skin is often, but not always, moist. Linen must be changed at least every 8 hours.</p> <p>3. Occasionally moist: Skin is occasionally moist, requiring linen change every 12 hours.</p> <p>4. Rarely moist: Skin is usually dry, routine diaper changes: linen only requires changing every 24 hours.</p>	
Friction-Shear <small>Friction: Occurs when skin moves against support surfaces Shear: occurs when skin and adjacent bony surface slide across one another</small>	<p>1. Significant problem: Spasticity, contracture, itching, or agitation leads to almost constant thrashing and friction.</p> <p>2. Problem: Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance.</p> <p>3. Potential problem: Moves feebly or requires minimum assistance. During a move, skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relative good position in chair or bed most of the time but occasionally slides down.</p> <p>4. No apparent problem: Able to completely lift patient during a position change, moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair at all times.</p>	
Nutrition <small>Usual food intake pattern</small>	<p>1. Very poor: NPO and/or maintained on clear liquids, or lvs for more than 5 days OR albumin < 2.5 mg/dl OR never eats a complete meal. Rarely eats more than half of any food offered. Protein intake includes only 2 servings of meat or dairy products per day. Takes fluids poorly. Does not take a liquid dietary supplement.</p> <p>2. Inadequate: Is on liquid diet or tube feedings/TPN, which provide inadequate calories and minerals for age OR albumin < 3 mg/dl OR rarely eats a complete meal and generally eats only about half of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take dietary supplement.</p> <p>3. Adequate: Is on tube feedings or TPN, which provide adequate calories and minerals for age OR eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement if offered.</p> <p>4. Excellent: is on a normal diet providing adequate calories for age. For example, eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.</p>	
Tissue Perfusion & Oxygenation	<p>1. Extremely compromised: Hypotensive (MAP < 50mm HG; < 40 in a newborn) or the patient does not physiologically tolerate position changes.</p> <p>2. Compromised: Normotensive oxygen saturation may be < 95%; hemoglobin may be < 10 mg/dl; capillary refill may be > 2 seconds; serum pH is < 7.40.</p> <p>3. Adequate: Normotensive oxygen saturation may be < 95%; hemoglobin may be < 10 mg/dl; capillary refill may be 2 seconds; serum pH is normal.</p> <p>4. Excellent: Normotensive oxygen saturation > 95%; normal hgb; capillary refill < 2 seconds.</p>	
TOTAL SCORE		
<small>Reprinted with permission, Nursecom, Inc. * Braden Q Scale for children < 5 years - Adult Braden Scale for children > 5 years * Available online at www.mc.vanderbilt.edu/learning-center/publist.html</small>		

GENERAL INTERVENTIONS FOR HIGH RISK PATIENTS (MODIFIED PEDIATRIC BRADEN Q SCORE 7-16)



- Turn q2hrs (minimal shift of 15 degrees with head shifts). Document actual position change on flow sheet.
 - *Exception neonates per NICU protocol*
 - *For CIRU patients:* Turn q2hrs in bed. Increase turn times ½ hour every week to maximum of q4hrs as tolerated
 - *For wheelchair-bound patients:* Wheelchair tilt with weight shifts every 20 - 30 minutes
- Float heels OFF mattress with pillows.
- Decrease HOB while repositioning patient.
- Use draw sheet to reposition and avoid dragging patient across bed.
- Remove urine/stool q2hrs and prn.
- Prop all tubing off patient.
- Evaluate pulse ox probe sites q12hrs and alternate sites q24hrs (policy 20.08). Document location on flow sheet.
- Avoid use of donuts on head or under bony prominences.
- Use moisturizers with AM care except on Neonates (< 1 month age).
- Cushion bony prominences with pillows or gel cushions.
- Avoid placement of feet at foot of bed rest.
- Evaluate need for pressure reduction mattress overlay or bed & obtain physician order when indicated.
- Complete an ONS for hospital-acquired pressure ulcers.
- For active pressure ulcers (Stages I-IV), obtain a WOC Nurse consult.

Perform initial identification of high-risk patient on admission then general reassessment q12hrs using Pediatric Braden Q.
(PICU, TICU/TDICU, CICU, & CIRU Departments only)

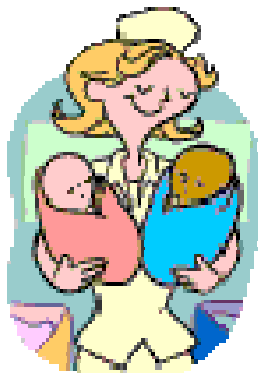
NEONATAL SKIN RISK ASSESSMENT SCALE (NSRAS)

					Score
General Physical Condition	4. Gestational age < 28 weeks	3. Gestational age > 28 weeks but < 33 weeks	2. Gestational age > 33 weeks but < 38 weeks	1. Gestational age > 38 weeks to postterm	
Mental Status	4. Completely limited Unresponsive (does not flinch, grasp, moan, increase blood pressure, or heart rate) to painful stimuli due to diminished level of consciousness or sedation.	3. Very limited Responds only to painful stimuli (flinches, grasps, moans, increased blood pressure or heart rate).	2. Slightly limited Lethargic.	1. No impairment Alert and active.	
Mobility	4. Completely immobile Does not make even slight changes in body or extremity position without assistance (e.g., Pavulon).	3. Very limited Makes occasional slight changes in body or extremity but unable to make frequent changes independently.	2. Slightly limited Makes frequent though slight changes in body or extremity position independently.	1. No limitations Makes major and frequent changes in position without assistance (e.g., turn head).	
Activity	4. Completely bed-bound In a radiant warmer with a clear plastic "saran" tent.	3. Limited bed bound In a radiant warmer without a clear plastic "saran" tent.	2. Slightly limited In a double walled isolette.	1. Unlimited In an open crib.	
Nutrition	4. Very poor NPO on intravenous fluids.	3. Inadequate Receives less than optimum amount of liquid diet for growth (formula/ breast milk) and supplemented with intravenous fluids.	2. Adequate Is on tube feedings which meet nutritional needs for growth.	1. Excellent Bottle/breastfeeds every meal which meets nutritional needs for growth.	
Moisture	4. Constantly moist Skin is moist/damp every time infant is moved or turned.	3. Moist Skin is often but not always moist/damp; linen must be changed at least once a shift.	2. Occasionally moist Skin is occasionally moist/damp. Requiring an extra linen change approximately once a day.	1. Rarely moist Skin is usually dry, linen requires changing only every 24 hours.	

If score \geq 13 begin infant on Standard of Care of Neonate at risk for skin injury.

Used with permission from "The Neonatal Skin Risk Assessment Scale for Predicting Skin Breakdown in Neonates" Issues in Comprehensive Pediatric Nursing Volume 20 Issue 2, 1997

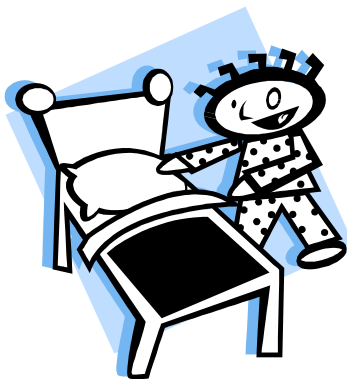
**GENERAL INTERVENTIONS FOR HIGH RISK NEONATE/INFANT
(NSRAS SCORE ≥ 13)**



- Reposition q2-4hrs (minimal shift 15 degrees, including head)
- Document actual position change q2-4hrs
- Cushion bony prominences & occiput with gel cushion
- Initiate use of sheepskin or foam, gel, or air mattress
- Remove urine/stool q2-4hrs and prn
- Prop all tubing off patient
- Evaluate pulse ox probe sites q12hrs and alternate sites q24hrs (policy 20.08). Document location on flow sheet.
- Minimize use of adhesives

Perform initial identification of high-risk patient on admission then general reassessment q12 hours using Neonatal Skin Risk Assessment Scale (NSRAS) (NICU Department only)

Night Night, Sleepyhead



Deciding if your patient needs a specialty bed or crib can be a difficult decision. Using the wrong bed for the wrong patient can be costly, not only for us but also for the patient. Below is a primer, giving you information regarding the bedding surfaces Children's has access to and the appropriate time to utilize them.

Surface Type	Indications for use	Patient Weight	Patient Length	Location of Product
Geo Matt Foam Mattress Overlay	Prevention of skin breakdown; treatment of Stage I/II pressure ulcers; pain management	<250 lbs	N/A-fits on top of standard hospital bed	PICU Omnicell Materials Management SR call: 5-2848 ECH call: 5-6698
KCI – First Step Air Mattress Overlay	Prevention of skin breakdown; treatment of Stage I/II pressure ulcers; pain management <u>Contraindications:</u> unstable cervical, thoracic, and/or lumbar fracture; cervical/skeletal traction	<250 lbs	N/A-fits on top of standard hospital bed	SR call: 5-2848 ECH call: 5-6698 *Orderable in EPIC
KCI – Kinair III	Prevention of pressure ulcers in high risk patient; s/p skin flaps & grafts; pain management; treatment of existing pressure ulcers; burns; built in digital scale & heater <u>Contraindications:</u> unstable cervical, thoracic, and/or lumbar fracture; cervical traction	<300 lbs	<93"	SR call: 5-2848 ECH call: 5-6698 *Orderable in EPIC
KCI – Kinair IV	Prevention of pressure ulcers in high risk patient; s/p skin flaps & grafts; pain management; treatment of existing pressure ulcers; burns; assist with turning <u>Contraindications:</u> unstable cervical, thoracic, and/or lumbar fracture; cervical/skeletal traction	<300 lbs	<84"	SR call: 5-2848 ECH call: 5-6698 *Orderable in EPIC

Surface Type	Indications for use	Patient Weight	Patient Length	Location of Product
KCI – Bariatric	Prevention of pressure ulcers in the high-risk patient; s/p skin grafts and flaps; pain management; treatment of existing ulcers; assist with turning. <u>Contraindications:</u> unstable cervical, thoracic, and/or lumbar fracture; cervical/skeletal traction	>300 lbs		SR call: 5-2848 ECH call: 5-6698 *Orderable in EPIC
KCI – Pedidyne Crib	For pulmonary care only in treatment & prevention of pulmonary complications in patients needing pulsation, percussion, & continuous rotation from side-to-side. <u>Contraindications:</u> unstable cervical, thoracic, lumbar, and/or pelvic fracture; cervical/skeletal traction. Percussion therapy <u>contraindicated</u> in multiple rib fractures; persistent intracranial hypertension; bronchospasm; post-op cardiac surgery	15-60 lbs or max 5 yrs old	<43”	SR call: 5-2848 ECH call: 5-6698 *Orderable in EPIC
KCI - Triadyne	For pulmonary care only in treatment & prevention of pulmonary complications in patients needing pulsation, percussion, & continuous rotation from side-to-side. <u>Contraindications:</u> unstable cervical, thoracic, lumbar, and/or pelvic fracture; cervical/skeletal traction. Percussion therapy <u>contraindicated</u> in multiple rib fractures; persistent intracranial hypertension; bronchospasm; post-op cardiac surgery	<300 lbs	<83”	SR call: 5-2848 ECH call: 5-6698 *Orderable in EPIC

****Specialty mattresses & beds require a written physician order****

For further assistance:

ECH WOC Nurse office extension 50113, pager 404-225-2946
SRCMC WOC Nurse office extension 54858, pager 404-225-1394

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