

## Pressure Ulcers: Overview

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The Agency for Health Care Policy and Research (AHCPR) convened a multidisciplinary panel of clinicians and experts to review the literature and build a scientific basis of knowledge for the “Clinical Practice Guideline #3: Pressure Ulcers in Adults: Prediction and Prevention” (1992). This panel defined pressure ulcers as “any lesion caused by unrelieved pressure resulting in damage of underlying tissue” (Panel for the Prediction and Prevention of Pressure Ulcers in Adults, 1992).

### **Prevalence and Incidence of Pressure Ulcers**

Pressure ulcers have been identified across all health care settings. Using national data collected during nursing homes’ annual survey process, the prevalence of pressure ulcers in nursing homes varies from 1-30% depending on the type of nursing home and types of pressure ulcers included in the count. This data also reveals that, on average, 6.6% nursing home residents have a pressure ulcer. The incidence of pressure ulcers also varies from 0-31% with 13% of residents, on average, developing a pressure ulcer over a two-year period.

### **The Problem**

Pressure ulcers have been documented as a significant problem across the lifespan and across all health care settings, as well as a significant source of pain and human suffering. The elderly may be at greater risk to develop pressure ulcers due to the changes in the skin related to aging (Knox et al., 1994), as well as the many comorbidity factors present in this population. Millions of dollars are spent annually on the prevention and treatment of pressure ulcers. In addition, pressure ulcers have been used as an indicator of quality of care and their development in long-term care residents has constituted grounds for litigation.

### **Causative Risk Factors**

Current literature identifies multiple factors that put individuals at risk to develop pressure ulcers. Some of these factors include immobility, incontinence, inadequate dietary intake, chronic illness, altered level of consciousness, altered sensory perception, and prior history of pressure ulcer(s). It is also recognized that many pressure ulcers result from a failure of microcirculation with impaired blood flow to the skin. This may occur in hypotension, sepsis, and shock (Braden and Bryant, 1990). Research discussed by Braden and Bryant (1990) looks at other factors that may also contribute to pressure ulcer risk. These include hemodynamic changes such as low blood pressure (systolic < 100, diastolic <60), elevated body temperature, and increased blood viscosity and high hematocrit which contribute to tissue damage. Cigarette smoking is also cited as a contributing factor.

Systematic risk assessment will help to identify those nursing home residents at risk to develop pressure ulcers. Several risk assessment tools exist. The Braden Scale, created by Barbara Braden, RN, PhD, FAAN, and Nancy Bergstrom, RN, PhD, FAAN in 1987, is the most commonly used pressure ulcer risk scale. The Norton Scale, created by Doreen Norton, was the first scale developed and is commonly used in Europe (Norton et. al., 1975). Risk assessment on

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admission was found to be highly predictive of pressure ulcer development in all settings and most predictive when completed again 48-72 hours after admission; periodic reassessment is therefore appropriate (Bergstrom et. al., 1998). The Braden and Norton scales are valid and reliable tools; it would be prudent for the clinician to review validity and reliability research of any other tools chosen for use. (See - Clinical Tools for Pressure Ulcer Assessment and Monitoring).

Based on the results of either of these scales or a facility-preferred scale, pressure ulcer care plans including preventative measures specific to the areas of risk should be formulated. It is important to create these individualized care plans within 24-48 hours, as many pressure ulcers develop within 24 to 48 hours, and most within 2 to 3 weeks.

### **Wound Staging and Assessment**

A universal staging system for pressure ulcers which was proposed by the National Pressure Ulcer Advisory Council and recommended in the Center for Medicare and Medicaid Services (CMS) RAI Version 2.0 manual, is based on the depth and type of tissue damage:

**Stage I.** Nonblanchable erythema of intact skin, the heralding lesion of skin ulceration. Discoloration of the skin, warmth, edema, induration, or hardness also may be indicators in individuals with darker skin.

**Stage II.** Partial-thickness skin loss involving the epidermis, dermis, or both. The ulcer is superficial and presents clinically as an abrasion, blister or shallow crater.

**Stage III.** Full-thickness skin loss involving damage to or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia. The ulcer presents clinically as a deep crater with or without undermining of adjacent tissue.

**Stage IV.** Full-thickness skin loss with extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures (eg., tendon or joint capsule). Undermining and sinus tracts also may be associated with Stage IV pressure ulcers.

The MDS-2 is frequently used as a source of data in long term care and pressure ulcer incidence is often used as a measure of quality of care. In an effort to clarify some of the questions regarding coding of pressure ulcers in MDS section M, CMS issued several directives, the most recent dated December 2002 (<http://cms.hhs.gov/medicaid/mds20/man-form.asp> ).

A comprehensive wound assessment and documentation of this assessment should be done when the wound is initially identified and at specific intervals thereafter. The AHPCR Treatment Guideline (Bergstrom et. al., 1994) recommends that pressure ulcer assessment be conducted “at least weekly.”

Criteria to be included in this assessment include:

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- Site/location of wound(s).
- Stage of pressure ulcer – see above (other type of wounds are not staged but, may be described as full or partial thickness).
- Size including length, width and depth measured in centimeters.
- Appearance of the wound bed includes a description of the type of tissue present. When there is a combination of tissue types, each type should be identified by the percentage present (i.e., 50% granulation tissue and 50% fibrinous slough).
- Undermining can be assessed by gently probing the wound base with a cotton swab. Measure depth in centimeters and describe location in relation to the face of the clock.
- Drainage/exudate should be described as to the amount, color or type consistency and odor of exudate.
- Periwound tissue should be palpated and described if erythematous, indurated, edematous, fluctuant, macerated, or warm.
- Pain or tenderness should be assessed.

### **Treatment**

The development of a pressure ulcer requires local wound treatment as well as a critical review of the individual pressure ulcer prevention care plan, current processes and systems of care and reassessment of the resident's medical status for possible overlooked risk factors for the development of pressure ulcers or for impaired healing (e.g., under-treated diabetes, hypothyroidism, anemia, use of drugs that impair healing, etc. - 1996 AMDA Pressure Ulcer Clinical Practice Guideline). Also, a preventative regime that had already been initiated should be intensified when a pressure ulcer develops to help insure that the current pressure ulcer has the best environment in which to heal and other pressure ulcers do not develop. A proliferation of wound care products on the market may make the treatment choice confusing. However, if the clinician has a basic understanding of the physiology of wound healing, this knowledge can help to guide treatment choices.

When there is insult or injury to the skin, a cascade of healing events occur (Hess, 1995; Kane and Krasner, 1997). The stages of wound healing include:

#### *Inflammatory Phase*

Begins at the time of injury and may continue for 4 to 6 days. The process of homeostasis controls bleeding and phagocytosis is accomplished by leukocytes. Thus, wound assessment at this phase would reveal edema, erythema, and heat. Pain may also be present.

#### *Proliferative Phase*

This phase may continue from days 4 to 24 and is identified by restoration of vascularization, proliferation of granulation tissue and formation of a protective epithelial barrier.

#### *Maturation phase*

This phase may continue from day 24 to 2 years post injury. Remodeling of collagen fibers and maturation of scar tissue continue until approximately 70% of the original tensile strength is regained.

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Maklebust and Sieggreen (1996), list the three essential components of local pressure ulcer care as cleaning, debridement, and dressings:

### ***Cleaning***

The first principle of cleaning is to avoid further harm. Products such as hydrogen peroxide, acetic acid and povidone iodine have been identified as being cytotoxic (Bergstrom et. al., 1994). Cleaning agents should be gentle to newly proliferating cells, physiologic and safe, such as normal saline.

### ***Debridement***

Necrotic tissue in the wound bed slows healing and increases the bacterial burden as organisms grow and multiply in devitalized tissue. Debridement may be accomplished through several methods (Bergstrom, 1997; Hess, 1995; Kane and Krasner, 1997):

#### ***Sharp debridement***

This requires that a physician or wound care specialist surgically remove necrotic tissue. Sharp debridement may be inappropriate for residents who are on anticoagulants or have bleeding tendencies. It is usually the method of choice for debridement of infected wounds. This is often thought of as a painful procedure, however, residents can be made comfortable by the physician instituting local anesthesia prior to debridement of tissue adjacent to vital tissue.

#### ***Mechanical debridement***

One of the oldest treatments available is mechanical debridement through wet to dry dressings. Gauze dressing moistened with 0.9% normal saline is loosely packed into the wound, allowed to dry and then removed from the wound. Tissue debris and drainage will adhere to the gauze. Because of the nature of this method of debridement there is often viable tissue damaged along with devitalized tissue. It may also be a painful process for the resident which can be minimized by slightly moistening the gauze, if found to be very dry, prior to removal. Some practitioners advocate soaking the dry gauze with normal saline prior to removal; however, this can somewhat decrease the effectiveness of the mechanical debridement. Whirlpool treatments are another type of mechanical debridement.

#### ***Chemical debridement***

Debridement may be accomplished with the use of topical enzymatic preparations. The wound bed should first be gently cleansed with an isotonic solution (normal saline). Chemical debridement agents should only be applied to devitalized tissue. An example of an enzymatic preparation would be papain-urea, or a collagen-specific proteolytic enzyme.

#### ***Autolytic debridement***

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Autolytic debridement uses the body's own ability to liquefy or digest devitalized tissue through autolysis. This method is selective to only necrotic tissue and is usually not painful, but may take longer than other methods. Covering the wound with a transparent film dressing, a hydrocolloid dressing, hydrogel or alginate hastens the process.

It may not be appropriate to debride necrotic heel ulcers if they have no signs of infection. However, daily assessment and palpation of these ulcers for boggy, erythema, warmth or drainage is necessary.

Choice of a debridement method should be based on the resident's individual treatment goals and overall condition.

### ***Dressings***

Dressing choices should be based on the principles of moist wound healing (Field and Kerstan, 1994). A comprehensive wound assessment will guide the clinician's selection of a dressing that is "the safest and most effective, user-friendly and cost-effective dressing possible" (Goode and Thomas, 1997). The goals of wound dressing are to keep the ulcer bed moist, the surrounding tissue dry, and protect the wound from contamination; and dressings should be based on wound characteristics including location near contamination sources, presence and amount of exudates, wound depth and condition of surrounding skin (AMDA Pressure Ulcer Therapy Companion, 1999).

At each stage, dressing chosen should enable the clinician to meet some general treatment goals:

#### *Stage 1*

Protect tissue integrity and prevent further damage.

#### *Stage 2*

Keep wound bed moist and peri-wound tissue dry. Minimize trauma and pain.

#### *Stages 3 and 4*

Keep wound bed moist. Absorb excessive exudate. Debride necrosis / devitalized tissue. Loosely pack dead space. Protect delicate granulation tissue. Keep peri-wound tissue dry. Minimize pain.

There are thousands of wound care products on the market that can be grouped into these five categories:

- 1) Transparent film dressings
- 2) Hydrocolloids
- 3) Hydrogels in sheets, amorphous gel, impregnated gauze and strands
- 4) Foam dressings
- 5) Alginates

### **Healing**

Stotts and Wipke–Tevis (1997) identify multiple concomitant factors that impair healing, such as diabetes, peripheral vascular disease, uremia and immunocompromise. Additionally, the AMDA Pressure Ulcers Clinical Practice Guideline (1996) and the AMDA Pressure Ulcer Therapy

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Companion (1999) lists further comorbid conditions that may affect healing, such as malnutrition and dehydration, end stage renal disease, thyroid disease, congestive heart failure, vasculitis and other collagen vascular disorders, chronic obstructive pulmonary disease, depression and psychosis, pain, systemic infection, malignancies and contractures at major joints. Furthermore, drugs that affect healing such as chemotherapy, radiation, and immunosuppressive therapy may also impede wound healing.

Even though, for the most part, pressure to bony areas can be reduced by the diligent efforts of care givers, there are some inherent characteristics (e.g. co-morbidities, high-risk diagnoses, resident immobility) that cannot be removed, changed or modified which can make the development or progressive worsening of pressure ulcers sometimes unavoidable or even inevitable no matter how diligent the efforts of the treating physicians and care givers. Furthermore, there may be instances where the resident refuses treatment, either because of end-of-life care decisions or simply blatant refusal to be repositioned, receive dressing changes or debridement.

Many wound care experts have expressed concern that the MDS 2.0 requires providers to backstage wounds in order to show healing. Krasner (1997) points out that “in reality, the ulcer heals by granulating, contracting, and re-epithelializing, never returning to a Stage 1... .” CMS’ Revised MDS 2.0 (December 2002) states, “Facilities certainly may adopt the National Pressure Ulcer Advisory Panel (NPUAP) standards in their clinical practice. However, the NPUAP standards cannot be used for coding on the MDS.” It is not clear whether version 3.0 of the MDS (approximate release date November 2004) will require reverse-staging.

The Pressure Ulcer Scale for Healing (PUSH Tool), developed by the National Pressure Ulcer Advisory Panel (NPUAP) allows the clinician to graph changes in a pressure ulcer over time, indicating healing or deterioration of the wound.

### **Prevention**

The AHCPR guidelines provide evidence-based pressure ulcer prevention strategies that should be included in the care plans of residents found to be at risk for development of pressure ulcers. Studies conducted in acute and long term care and reports by Bergstrom (1998) demonstrate that adherence to these pressure ulcer risk reduction strategies can significantly lower the prevalence of pressure ulcers.

Early interventions to address these risks may include:

*Protecting skin against the effects of pressure, friction, and shear:*

- Reduce pressure over bony prominences
- Individualize turning and repositioning plans for residents in bed or chair: every 2 hour turn schedules for residents and every 1 hour repositioning in the chair.
- Position with the head of the bed no higher than 30 degrees.
- Avoid positioning directly on the greater trochanter.
- Provide special attention to floating heels to keep them off the bed
- Manage tissue load:

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- Using pressure-reducing mattresses and overlays – check for “bottoming out” to ensure appropriateness of mattress choice
- Protect skin from mechanical injury via slide board, turn sheet, trapeze and/or lubricant use
- Increase mobility
- Consult PT/OT

*Protecting skin from moisture:*

- Cleanse skin with warm water and mild soap to prevent drying
- Cleanse skin after soiling
- Use non-alcohol based moisturizers
- Use skin protectants or barriers
- Massage is contraindicated over bony prominences.
- Institute bowel or bladder training programs
- Use briefs or absorbent underpads to wick moisture away from skin

*Encouraging optimal nutrition and fluid intake:*

- Evaluate nutritional status
- Consider resident preferences and special needs
- Provide assistance and adequate time
- Offer snacks and fluids between meals
- Consider administration of vitamin and / or protein supplements
- Consider tube feeding / parenteral fluids per resident choice.
- Assess laboratory data that may indicate nutritional status (i.e., CBC, albumin, prealbumin, transferrin levels)

*Also:*

- Educating staff, residents and families and enlisting everyone’s support in reduction of pressure ulcers.
- Front line care givers who are providing direct personal care to residents should be trained to check potential pressure areas and recognize developing pressure ulcers in “at risk” residents.
- An immediate prevention plan should be instituted for those “at risk” when areas of potential pressure areas are identified. This plan should be reassessed and changes made as needed.

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