

Association for the Advancement of Wound Care Guideline of Pressure Ulcer Guidelines

Legend: Bold: Evidence Level A. *Italics* = Level B, Normal = Level C; Underlined if cost analysis was performed.

Each recommendation has Content Validity ≥ 0.75 based on 31 multidisciplinary independent survey respondents.

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I. PATIENT AND PRESSURE ULCER ASSESSMENT

A. PATIENT PRESSURE ULCER (PU) RISK ASSESSMENT FOR ALL SETTINGS

1. **For all settings, a trained professional should assess and document PU risk within 72 h of admission or on change of any PU risk factor, using a valid, reliable scale with good predictive validity for the setting and for patient age and cognition** (Comfort, 2008; Magnan & Makelbust, 2008 ;Makelbust & Magnan, 2009) .
 - a. **Assess environmental/physical/medical/psychosocial factors, patient end-of-life goals** (Brink *et al.* 2006; Baharestani 1994) e.g. **body mass index, skin, friction/shear potential, note surgical procedures** (Compton, 2008; Fowler et al.2009; Schoonhoven et al. 2006)
 - b. **Extremes of age increase PU risk, especially for those over 62 years of age and neonates** (Fowler, McGuire, 2008; Bergstrom, Braden,1992; Bergstrom et al, 2006; Champagne, Ruby 1996; Quigley, Curley 1996)
 - c. Previous or current ulcer increases PU risk (Guihan et al, 2008)
2. **Braden scale has highest inter-rater reliability** (Kottner et al., 2008) **and percent correct predictions** (Ayello, Braden, 2002; Pancorbo-Hidalgo et al,2006; Bolton,2007) **Norton & Warterlow Scales are also valid.**

Table 1. Published Scores for Some Validated Scales Corresponding to Levels of PU Risk

Pressure Risk Assessment Scale	Mild or Low Risk	Moderate Risk	High Risk	Very High
Braden	15-18	13-14	10-12	Less than 9
Braden Q (Pediatric 21 d-8 year)	22-25	17-21	≤ 16	
Norton	Over 18	14-18	10-14	Less than 10

3. **Continue risk assessments routinely according to setting protocols and changes in patient PU risk** (Brandeis, et al. 1995; Berlowitz et al. 1997; Ayello, Braden 2002).
4. **If PU risk assessment is inappropriate for a patient, document why.** (Brandeis et al. 1995; Berlowitz et al. 1997; Ayello, Braden 2002).
5. **Use clinical judgment and institutional protocols to implement patient-appropriate interventions indicated by risk scores.** (Comfort, 2008; Magnan, Makelbust, 2008; Makelbust, Magnan, 2009) and to identify factors affecting PU risk (WOCN, NICE) in each of the following settings:
 - a. **Acute Care: Reassess every 48 h and on transfer to higher care level** (Fowler et al, 2009)
 - b. **Long Term Care: Reassess weekly or on status change** (WOCN Guideline)
 - c. **Home Care: Reassess at each visit, weekly and on resumed care or recertification** (Ayello, Braden 2002)
 - d. **Hospice Care: Reassess weekly for 4 weeks, then monthly** (Hench & Gustaffson, 2003; Seaman, Shively, 2000)

B. PATIENT NUTRITIONAL ASSESSMENT

1. **Properly trained staff should assess nutritional parameters with a validated measure** (Hengstermann et al. 2007—CO Lindgren et al. 2005; Pinchofsky-Devin 1986; Scott et al. 1999; Uzun & Tan 2007) **on admission, at change in condition, and as needed based on medical status or if ulcer is not decreasing in size. Inform appropriate dietary professional of results.** (Guenter et al., 2000; Langer et al 2003; Reed et al 2003; Pinchofsky-Devin 1986)
 - a. **Document adequate protein, calorie & fluid intake as well as feasible, e.g. 3-day calorie count, intake record** (Guenter et al., 2000; Langer et al 2003; Pinchofsky-Devin 1986)
 - b. **Record current and usual weight, height as baseline to set goals or estimate BMI (kg/m^2) as weight (kg) divided by square of height (m^2).** (Guenter, 2000; Kernozek, 2002; Uzun & Tan 2007) See Table 2.

Table 2. Standard Body Mass Index (BMI) Adult Values

Weight Category:	Underweight	Normal	Overweight	Obese
Body Mass Index	< 18.5	18.5 - 24.9	25 - 29.9	≥ 30



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- c. Other factors for nutritional risk may include history of involuntary weight loss; compromised oral, dental, gastrointestinal and/or swallowing status; medical/Surgical history or interventions influencing intake or absorption of nutrients; drug-nutrient interactions e.g. chemotherapy agents causing nausea, agents to correct hyperkalemia causing diarrhea or other related conditions or medications (Pinchofsky-Devin 1986).
2. If feasible, assess nutritional laboratory parameters regularly for patients with documented deficiencies or in those at high PU risk. (Baranoski, Ayello 2004; NPUAP, 2009; WOCN). Example values are presented in Table 3 Laboratory results are not a substitute for documenting individual nutritional intake and status as described in I.B.1.

Table 3. Normal Values for Some Parameters Correlated with PU Development.

Parameter:Normal value	Adult	Child	Infant/Neonate
Pre-albumin	10-40mg/dL	16-28.1 mg/dL	10.4-11.4 mg/dL.
Total protein	6-8g/dL	4.3-7.6 g/dL	6.2-8.0 g/dL
Serum albumin	3.4 -5.0g/dL	3.2-5.1 g/dL	3.2-4.8 mg/dl
Hematocrit (%)	F:35-47% M: 37-51%	31-43%	42-68%
Transferrin	200-400 mg/dL		130-275 mg/dL
Total lymphocyte count	2500/ μ L	350-400/ μ L	1100-1200/ μ L

C. MEDICAL/SURGICAL HISTORY

1. *Document unstable or significant intrinsic risk factors and comorbidities that impede healing or contribute to altered tissue tolerance or integrity* (Fowler et al.2008; Milne et al, 2009) Perform or obtain initial comprehensive systems assessment on individuals with a PU if feasible (Chacon et al., 2010; Konishi et al., 2008)
 - a. Malignancy (IHI 2007) or *severe chronic or terminal disease* (Fowler et al.2008)
 - b. **Diabetes, with Hb A1c ≥ 6.5 to document blood glucose control** (Fowler et al.2008; Amer. Diabetes Assn. 2009)
 - c. **Cardiovascular disease or condition including cardiovascular accident (CVA) leading to altered sensation or ability to move** (Fowler et al.2008; De Laat et al 2007; IHI 2007)
 - d. Gastrointestinal, genitourinary, renal, endocrine or pulmonary disease or condition (IHI 2007)
 - e. **Peripheral vascular disease/condition: assess lower extremity arterial disease or edema as co-morbidity for lower extremity PU.** (Chernecky & Berger, 2004; Fowler et al.2008; IHI 2007) **Tests may include :**
 - i. **Pulses, capillary refill time, edema or mobility**
 - ii. **Ankle/Brachial Systolic Blood Pressure > 0.86 to rule out arterial disease in a heel pressure ulcer**
 - f. Sensory deficits, bowel and bladder habits (Chacon et al., 2010; Konishi et al., 2008)
 - g. *Malnutrition, dehydration, failure to thrive, severe chronic or terminal disease* (Fowler et al.2008; IHI 2007)
 - h. **Neuromuscular system: spasticity, peripheral neuropathy, spinal cord injury, multiple sclerosis, Parkinson’s disease or similar neurologic conditions** (Chacon et al., 2010; Fowler et al.2008; IHI 2007)
 - i. *Conditions such as severe arthritis that prohibit repositioning/pressure redistribution* (Fowler et al.2008; IHI 2007)
2. **Smoking or conditions that affect skin interface pressure, temperature, moisture** (Cackmak et al 2009; Smith et al., 2008; Suriadi et al, 2007) Consider other substance abuse issues that may affect skin PU risk.
3. **Review medications, e.g. sedation, steroid, immunosuppressive, anti-cancer or anti-embolic agent use** (Chacon et al., 2010; Fowler et al.2008; IHI 2007)
4. **Record recent surgical procedures, falls or traumatic injury** (Fowler et al.2008; DeLaat et al 2007; IHI 2007; Manesse et al.1994)
5. **Document details of prior PU. Include treatments or surgical interventions** (Fowler et al.2008; IHI 2007)
6. **Obtain history of restricted mobility related to care, treatment, procedure or falls** (Manesse et al., 1994): **time spent immobile, room temperature, pressure reducing surfaces used and repositioning considerations if appropriate to patient for all settings**
 - a. **Acute care , including Emergency Department** (Schoonhoven et al, 2006; Langemo et al 2006; Linares et al., 1987 Lyder et al 2001)



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- b. **Long term care** (Bergstrom & Braden 1992; Bergstrom, Braden, Kemp et al., 1998)
- c. **Operating room and post-anesthesia care unit** (Schoonhoven et al, 2006; Aronovich 2007)
- d. Procedural lab; e.g. for oncology, radiological or catheter-related procedures such as dialysis (Reed et al., 2003)
- e. Long ambulance or air transfers (Baharestani,1994)

D. PSYCHOSOCIAL and QUALITY OF LIFE ASSESSMENT

1. Assess psychological conditions
 - a. Goals and motivation of patient, family and care provider(s) to participate in care.
 - b. Adherence to health management protocols
 - c. Cognition and ability to comprehend or retain information
 - d. Behavioral disorders that may affect capacity to engage in self care
 - e. **Pay special attention to those with more richly pigmented skin or with little social support** (Saladin et al. 2009; Redeling et al, 2005). Culture or ethnicity can be related to risk of developing a PU (Saladin et al. 2009) or increased likelihood of mortality in patients with a PU (Redeling et al., 2005).
2. Assess social support systems, including family or partner.(Baharestani, 1994)
3. Assess financial resources, access to equipment and related reimbursement limitations, and caregiver availability, skills, knowledge and capacity to provide consistent quality care (Baharestani, 1994)

E. ENVIRONMENTAL ASSESSMENT

1. Assess posturing irregularities/abnormalities: habitual positioning, paralysis, contractures, amputation, rigid or spastic condition (RNAO)
2. Assess for ineffective positioning techniques (RNAO)
 - a. Assess for pressure, shear or friction in all positions, all environments and during lift, turn, repositioning and transfer events (RNAO)
3. Monitor and document adherence to prescribed off-loading regimen and proper use of equipment or adaptive aids (NICE, RNAO, WOCN)
4. Assess for ill-fitting devices, braces, seating and ineffective equipment/assistive devices (JHF, RNAO)
 - a. Evaluate off-loading equipment quality, efficiency, proper use, effectiveness (e.g. feel for "bottoming out" or observe for PU development) (Rithalia, 2001; Brienza et al, 2005)
 - b. Observe seating and brace or other device accommodation to body size and/or contours while assessing skin areas affected for potential breakdown. (RNAO)

F. PHYSICAL EXAM

1. Perform head-to-toe assessment with attention to bony prominences and any skin surfaces in contact with removable devices (RNAO) See Table 4 for areas at risk in common positions.

Table 4. Pressure points to examine if patient has spent time in indicated position (RNAO)

Patient Position	Sites To Examine Including All Other Sites At PU Risk
Supine	Occipital areas, sacrum, scapula(e) and heels
Prone	Chest, anterior superior iliac crests, symphysis, pubis, patella, anterior tibial regions
Sitting	Ischium, coccyx, elbow, trochanter
Side-lying	Trochanter, lateral foot, ankle, knee, ear
All positions: Skeletal deviation areas, e.g. :	Bunion, kyphosis, lordosis, pelvic obliquity

2. **Document alterations in skin sites at risk of developing a PU**
 - a. **Color** (Bates-Jenson 1997; Sprigle et al., 2001)
 - b. **Texture, e.g. unusual hardness (induration), softness or rough surface for this site** (Bates-Jenson 1997)
 - c. **Sensation** (Braden et al 1994; Copeland-Fields & Hoshiko1989)



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- d. **Skin temperature at and around site** (Nakagami et al, 2009;Sae-Sia et al, 2005, 2007;Sprigle et al, 2001)
- 3. **Assess wound**
 - a. **Anatomic location** (Bates-Jenson 1997;Gardner et al 2005)
 - b. **Size (PU length, width, depth) Measure using consistent, reliable method within and across institutions**
 - i. **Lack of area reduction in 2-4 weeks of care is a valid predictor of non-healing for PU** (van Rijswijk & Polansky, 1994) **and other chronic wounds**(Kantor & Margolis, 1998; Sheehan 2003)
 - ii. **Reliable estimates of wound area are (a) longest length x longest perpendicular width.** (Bates-Jensen,1997; Buntix et al, 1996; NICE, 2005; Sanada et al 2004) or **(b) head-toe length and side-side width** (Gunes, 2009; Stotts et al 2001)
 - c. **Exudate type e.g. bloody, serous, purulent, foul) and amount (e.g. none, moist, small, moderate or large amount of exudate) usually based on appearance of dressing)**(Bates-Jenson 1997; Stotts et al 2001)
 - d. **Infection signs (e.g. erythema, edema, odor, purulent or foul-smelling exudate, increase in ulcer pain and exudate, fever, friable or irregular granulation tissue)** (Bates-Jensen, 1997; Gardner et al., 2001)
 - e. **Undermining, sinus tracts and tunneling** (Bates-Jensen, 1997 ; Stotts et al 2001)
 - f. Stage of PU: Deep Tissue Injury, I, II, III, IV, Unstageable (Konishi et al 2008; RNAO; NPUAP)
 - g. **Tissue types & amounts (e.g. epithelium, granulation, yellow/white fibrin/slough, or black, brown or gray necrotic tissue)** (Bates-Jensen, 1997; Stotts et al 2001)
 - i. **Ulcer margin abnormalities e.g. epiboly, exuberant granulation** (Bates-Jensen, 1997; Stotts et al 2001)
 - ii. **Peri-wound skin (e.g. erythema or edema)** (Bates-Jensen, 1997 ; Stotts et al 2001)
 - a. Evaluate for complications as indicated by ulcer severity or chronicity, and if treated, document treatment and its duration. (Bryant et al., 1983; Lewis et al 1988; Milne et al, 2009) e.g. fistulae, abscesses, **osteomyelitis, bacteremia**, cellulitis, cancer, heterotopic bone formation
- 5. For individuals with a PU it is important to perform differential diagnoses (e.g. skin tear, Herpes lesions, incontinence-associated dermatitis, candidiasis, arterial insufficiency ulcer) to improve accuracy of pressure ulcer diagnosis (Konishi et al 2008)
- 6. **Conduct a pain assessment using an age-appropriate validated pain scale** (Chang et al., 1998; Flock, 2003; Gardner et al., 2001; Heyneman et al., 2008)
- 7. Repeat above assessments regularly at same intervals as pressure ulcer risk assessment based on patient risk and institutional guidelines or on any change in patient condition. (Konishi et al 2008)

G. DIAGNOSTIC TESTS

- 1. Use appropriate vascular laboratory consult as needed to assess tissue perfusion if limited vascular perfusion is suspected. Consider appropriate vascular laboratory consult or a bedside Ankle-to-Brachial Index to assist in differential diagnosis. Chercecky et al.,2004; Rennert et al, 2009)

Table 5. Systolic Ankle / Brachial Blood Pressure (ABI) Differential Diagnosis (Arterial calcification may be associated with falsely high ABI ratios)

Arterial Disease Severity	ABI Value
No disease: Normal arterial perfusion	At least 0.86
Mild arterial disease	0.75-0.85
Intermittent claudication (walking capacity limited)	0.50-0.75
Severe arterial disease	0.20-0.50
Gangrene	Less than 0.20

- 2. **Obtain quantitative tissue, swab or bone culture in suspected infection, obvious cellulitis or on non-healing wounds if consistent with treatment goal** (Gardner et al., 2006; Rennert et al, 2009)
- 3. Biopsy chronic non-healing ulcers for suspected malignancy if no healing is observed in response to optimal care during 12 weeks. (Whitney et al., 2006)



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4. Obtain bone Imaging using a patient-compatible method, e.g. MRI / CT scan / Nuclear scan/ PET) in suspected osteomyelitis. (Strobel & Stumpe 2007; Rennert et al 2009; Boutin et al 1998)
5. Obtain corresponding blood analysis as indicated to establish baseline values, assist in the diagnosis of infection and/or reflect the status of co-morbid conditions affecting wound healing: Complete blood count with differential, metabolic profile, coagulation studies (PT, PTT), lipid profile, HbA1c, hepatic function profile, pre-albumin, thyroid function (TSH), C-reactive protein, (CRP) erythrocyte sedimentation rate (ESR), blood cultures (if bacteremia or osteomyelitis is suspected). (Rennert et al 2009)

H. DOCUMENTATION AND COMMUNICATION

1. Document all assessments and findings on approved forms or tools (Milne et al, 2009)
2. Ensure all members of interdisciplinary team have access to all formal assessments (Milne et al, 2009; Powers 1997)

II. PREVENT PRESSURE ULCER OCCURRENCE OR RECURRENCE

A. SKIN INSPECTION AND MAINTENANCE

1. *Perform comprehensive visual and tactile skin inspections during patient care and regularly according to institutional guidelines.* (Schonhoven et al, 2006; Bergstrom & Braden 1992)
 - a. Remove all special garments, protectors and devices, as medically feasible, to assess skin. (AHCPR Prevention Guideline; RNAO; Bergstrom & Braden, 1992)
 - b. Assess splints, casts, tubes and other devices as potential sites for pressure as feasible (RNAO)
2. Manage excess moisture at affected sites, including areas affected by incontinence or perspiration, and skin folds in bariatric patients. (RNAO, Lyder et al., 2002)
 - a. Manage skin temperature elevation at the support surface interface with the patient's skin (RNAO; AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000) using pressure ulcer prevention interventions relevant to patient.
 - b. Select effective under-pads and/or briefs to wick incontinence & moisture away from skin; avoid trapping moisture against skin, use appropriate skin protectants (RNAO)
3. *Clean and dry skin using non-friction bathing standards with a slightly warm, non-irritating, non-sensitizing, pH-balanced no-rinse skin cleanser avoiding saline or soap regularly and after each incontinence episode* (Bergstrom et al., 2005; Hodgkinson 2007; Lyder et al. 2002)
 - a. Maintain skin hydration (RNAO) with non-sensitizing, pH balanced lubricating agents (Lyder et al. 2002)
4. Establish an individualized bowel and bladder program for patients with incontinence (RNAO, WOCN)
 - a. Determine the type of fecal or urinary incontinence based on symptoms and history; consider onset, duration, aggravating and relieving factors (WOCN) Consider referral to a continence specialist if appropriate. (RNAO)
 - b. Use incontinence skin barriers as needed to protect and maintain skin integrity (Lyder et al., 2002; RNAO; WOCN)
 - c. Consider pouching system or collection device to contain urine or stool and protect skin from effluent (RNAO; WOCN) or indwelling catheter for brief periods if urine contributes to skin breakdown (WOCN)
5. *Reduce friction and shear* (Lyder et al., 2002; AHCPR 1992; RNAO; WOCN)
 - a. *Apply lubricants, transparent film or hydrocolloid dressings, or other topical friction or shear reduction agents to bony prominences to reduce mechanical injury from friction or shear* (Flam & Raab 1991; Milne et al., 1999; Ohura 2005; Weng et al. 2008)
 - b. *Avoid vigorous massage over bony prominences* (Ek et al, 1985; Dyson 1978)
6. Document any skin changes. Record and notify patient care team of changes to care plan resulting from the change(s) in the skin condition. (Schoonhoven et al, 2006; Milne et al., 2009)

B. HYDRATION AND NUTRITION PLAN OF CARE

1. **Maintain or restore adequate nutrition to maintain skin integrity as feasible and as compatible with patient and family wishes or condition** (Reed et al. 2003; Sratford et al., 2005; Theilla et al 2007)
 - a. **Restorative dining program if appropriate, providing foods with high nutritive value or nutrition supplements with or between meals if needed** (Sratford et al., 2005; Desneves, et al, 2005)



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- b. **Enteral nutrition only if medically needed to maintain adequate nutrition. This should be consistent with patient and family wishes** (Bergstrom et al 2006; Stratford et al., 2005; Theilla et al, 2007)
- c. Parenteral nutrition only if medically needed to maintain adequate nutrition and enteral nutrition is not an option and if consistent with patient and family wishes (Compton, 2008)
- d. Offer hydrating fluids with repositioning schedule. Offer additional fluids if medically appropriate and patient has dehydration, fever, diaphoresis, diarrhea or heavily draining wounds. Document fluid intake in patients unable to hydrate themselves (RNAO)

C. REHABILITATIVE AND RESTORATIVE PROGRAMS

1. Address immobility and/or inactivity in bed- or chair-bound patients (Allman, 1987; Berlowitz & Wilking 1989; Goode, et al., 1995)
 - a. Begin progressive mobility program as soon as condition allows (RNAO)
 - b. Implement ongoing exercise programs to maintain or restore mobility and activity, increase strength and improve cardiovascular endurance (Rennert et al 2009)
2. Manage muscle spasms appropriately (Whitney et al. 2007)

D. POSITIONING STANDARDS OF CARE TO MANAGE PRESSURE /SHEAR/ FRICTION

1. Vulnerable individuals should be repositioned to reduce pressure, friction and shear. Individual status should determine frequency, not a ritualistic schedule (NICE, NCCNSC)
2. Turn or reposition at least every 2 – 3 hours when on pressure redistributing surface if patient can tolerate this. (Defloor & Grypdonck 2005)
3. Avoid folding and stretching of soft tissues when repositioned (RNAO)
4. Use lift sheets or devices to turn and transfer dependent patients, avoid dragging (NPUAP)
 - a. When using mechanical handling devices remove slings/sleeves from under patient after maneuvering is complete, according to device instructions (NICE, NCCNBC)
5. Use trapeze or side rails to facilitate patient independence with bed mobility (RNAO)
6. Apply pillows and cushions or other appropriate devices such as foot orthoses to prevent bony prominences from contacting each other (i.e., between knees, ankles, feet etc) (RNAO)
7. Maintain head of bed at or below 30 degrees or at the lowest degree of elevation consistent with medical condition (Bergstrom et al., 1992; RNAO)
8. **Relieve pressure under heels by suspension, support surfaces (Reddy et al., 2006) pressure-distributing dressings (Bots & Apotheker, 2004) or other devices (Cheney 1993; Cheneworth 1994; Zernike 1994)**
9. Avoid positioning directly on trochanter; when side-lying, use a 30 degree laterally inclined position (RNAO)
10. Instruct in self-performing pressure relief exercises every 15 minutes in chair-bound persons; if unable, reposition every hour when in chair (RNAO)
 - a. Avoid prolonged sitting intervals (e.g. intervals of more than 4 hours) for at-risk individuals (Defloor et al. 2005; Whitney et al., 2006)
11. Utilize small frequent position changes to redistribute pressure on bony areas (RNAO)
12. When utilizing heating/cooling blankets place on top of an individual. Avoid positioning these devices underneath weight bearing zones (Aronovitch, 2007; Reger et al., 2007)

E. OFF-LOADING EQUIPMENT INCLUDING CHAIRS, INTENSIVE CARE AND OPERATING ROOMS

1. Avoid doughnut-shaped pressure redistribution devices (except on plantar surface of the foot) (AHCPR, NPUAP, Whitney et al., 2005)
2. *Avoid use of sheepskin for pressure reduction without added heel and elbow protection.* (Reddy et al, 2006)
3. **Avoid standard (spring-style) mattresses** (Reddy 2006)
4. **All individuals vulnerable to pressure ulcers require a patient-acceptable support surface, e.g. “high specification foam mattress”, static air mattress, overlay, low air loss or alternating pressure mattress,**



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alternating pressure overlay and regular repositioning at a minimum. Support surface should prevent “bottoming out” (Defloor et al., 2005; McInnes et al. 2008; Nicosia et al. 2007; Nixon et al., 2006; Reddy 2006).

- a. Use holistic assessment to determine supportive devices; risk level, general health status, comfort, skin assess, lifestyle and abilities, critical care needs and acceptability by patient/caregiver (Konishi et al., 2008; NPUAP & EPUAP 2009)
5. **Use devices such as a low-air-loss mattress, high-density air flotation, high specification foam or similar pressure redistribution replacement mattress if patient has pressure ulcer history, elevated risk score, if indicated by clinical condition or when a less effective device has failed to prevent a pressure ulcer** (Pemberton et al 2009; Russell et al, 2003; Sterzi et al. 2003; Vanderwee et al, 2008)
 - a. Assess and review support surfaces regularly; consider clinical outcomes, comfort, abilities, changes in general status (Konishi et al., 2008; NICE)
6. **Use pressure redistribution devices intra-operatively for individuals assessed to be at risk for pressure ulcer development** (Bots & Apotheker, 2004; Reddy et al., 2006)
7. **Use heel/foot /elbow area off-loading devices to augment support surfaces, e.g. pressure-distributing heel dressings** (Reddy 2006; Weng 2008)
8. Ensure regular repositioning according to institutional guidelines and provision of support surfaces or devices, incontinence pads & positioning devices are available in all at-risk environments for all surfaces used by patients (Konishi et al., 2008; NICE;NCCBC)
9. Position all chair-bound patients with attention to anatomy, postural alignment, and distribution of weight, foot support, balance and stability. Educate personnel on assessing proper support surface function. (Bergstrom et al, 1994; Milne et al, 2009; NPUAP/EPUAP 2009)
 - a. *Seating assessments for cushions, supportive aids and equipment should be carried out by trained assessors with specific knowledge and expertise on effective weight redistribution principles and support surface function* (Magnan & Makelbust 2009; Makelbust & Magnan 2009; Milne et al, 2009)
10. Provide an individually prescribed wheelchair and pressure redistribution surface for wheelchair-bound individuals with severe mobility or /positioning deficits (RNAO)
 - a. Prescribe wheelchairs and seating systems according to individualized anthropometric, ergonomic and functional principles (RNAO)
 - b. Measure the effects of posture and deformity on interface pressure distribution if feasible. Use clinical judgment and objective data in determining the compatibility of individuals shape or posture with seating system (RNAO)
 - c. Use power weight shifting wheelchair system for individuals who are unable to independently perform effective weight shift (RNAO)
 - d. Inspect & maintain functionality of a wheelchair support surface at regularly scheduled intervals, including 3-4” high density foam, static air cushions or other therapeutic cushion designed for pressure redistribution (Defloor and Grykdonck 2000; Brienza and Karg, 2005)

F. INTERDISCIPLINARY APPROACH

1. Utilize a multidisciplinary team for development of an individualized plan of care based on intrinsic and extrinsic PU risk factors and risk score data (Bogie & Ho 2007; Konishi et al., 2008; Powers, 1997; Milne et al., 2009)
 - a. Have available a position statement on the benefits of team care with references, such as the *AAWC Statement on Benefits of Team Care* (Milne et al., 2009)
2. **Assign specific healthcare professionals trained in the principles of off-loading to select and implement appropriate pressure redistribution devices for beds, chairs and wheelchairs for all “at-risk” individuals** (Allman et al, 1987;Cullum et al., 2004 ; Makelbust&Magnan 2009; Milne et al. 2009)
3. **Consult a dietitian in cases of malnutrition or suspected malnutrition or for patients assessed at risk for pressure ulcers** (Langer et al 2003; Reed et al 2003; Van Rijswijk & Polansky 1994)
4. Determine need for referral to continence care specialist (Horn et al. 2010; RNAO)
5. Consult Occupational or Physical Therapy seating specialist for wheelchair-bound individuals (RNAO)



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G. EDUCATION

1. *Develop and implement organized, structured and comprehensive training programs for healthcare personnel, patients, families and all care givers for prevention and treatment of pressure ulcers.* (Horn et al. 2010; Magnan & Makelbust 2008; Makelbust & Magnan 2009; Milne et al. 2009; Tippet 2009) Include:
 - a. Written and verbal instruction about negative impact of smoking, alcohol & drug abuse on pressure ulcer outcomes (both prevention & treatment) (Rosen et al., 2006; Milne et al, 2009; Rennert et al 2009)
 - b. Principles of pressure ulcer prevention (Horn et al. 2010; Milne et al, 2009)
 - c. Individualized interventions to reduce pressure shear friction (Horn et al. 2010; Milne et al, 2009)
 - d. Skin inspection methods and maintenance care (Horn et al. 2010; Milne et al, 2009)
 - e. Use and maintenance of pressure redistribution devices(Cheney 1993; Horn et al. 2010; Milne et al, 2009)
 - f. Available resources for assistance and advice (Horn et al. 2010; Milne et al, 2009)
 - g. Signs and symptoms of infection, or other complications (Milne et al, 2009)
 - h. Nutrition and hydration interventions (Horn et al. 2010; Milne et al, 2009)
2. *Develop organized, structured and comprehensive healthcare personnel training programs* (Horn et al. 2010; Magnan & Makelbust 2008; Makelbust & Magnan 2009; Milne et al, 2009) *Include:*
 - a. *Risk assessment factors and patient assessment tool*
 - b. *Pressure ulcer pathophysiology and prevention strategies*
 - c. *Skin and wound assessment parameters*
 - d. *Roles and responsibilities related to assessment and prevention*
 - e. *Development and implementation of individualized plan of care*
 - f. *Selection, use and maintenance of pressure redistribution devices*
 - g. *Patient education and information giving techniques*
 - h. *Accurate documentation of pertinent data*
 - i. *Demonstration of positioning and transferring techniques*

III. PRESSURE ULCER TREATMENT STRATEGIES

A. IMPLEMENT OR CONTINUE ALL MEASURES TO PREVENT NEW PU AND OPTIMIZE WOUND HEALING

1. *Evaluate effectiveness of previous and current preventive or treatment programs* (Horn et al. 2010; Magnan & Makelbust 2008; Makelbust & Magnan 2009; Milne et al, 2009)
2. Set treatment goals consistent with patient's goals, values and lifestyle (RNAO)

B. REMOVE OR ALLEVIATE ALL CAUSES OF PRESSURE ULCER DAMAGE (Milne et al., 2009)

1. Use a pressure redistribution product with verified functionality for individuals with unstageable, deep tissue injury, Stage III, Stage IV, or multiple ulcers over several turning surfaces (NPUAP; NICE)
 - a. *Select a static support surface for individuals who can be positioned without weight bearing on an ulcer and without bottoming out on the support surface* (Cheney, 1993; Cheneworth, 1994; Cullum et al 2004). *There is insufficient evidence for differences in PU outcomes using different types of static devices*(Cullum et al 2004).
 - b. **Select a dynamic air support surface if individual cannot be positioned without pressure on an ulcer, when a static support surface bottoms out, if no evidence of healing or if new ulcers develop** (Cullum et al 2004; Ferrell 1993; Rosenthal et al., 2003)
 - c. **Use support surfaces with verified functionality such as dynamic air flotation, algorithm sensing technology support system, low air loss or air fluidized bed in the treatment of PU or unstageable deep tissue injury on multiple surfaces, compromised skin, or for temperature and moisture control in the presence of large stage III or IV PU, or for surgical graft sites** (Allman et al., 1987; Cullum et al. 2004; Ferrell et al 1993; Economides 1995; Rosenthal et al., 2003)
2. Avoid positioning directly on pressure ulcer when on bed surface (AHCPR 1994; NPUAP 2009)



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Legend: Bold: Evidence Level A. Italics = Level B, Normal = Level C; Underlined if cost analysis was performed.

Each recommendation has Content Validity ≥ 0.75 based on 31 multidisciplinary independent survey respondents.

- a. Use cushions and positioning aids to relieve pressure ulcers or vulnerable skin by elevating the skin or ulcer away from the support surface (AHCPR 1994; NPUAP 2009)
3. Avoid positioning a wheelchair-seated individual directly on a pressure ulcer (AHCPR 1994; NPUAP 2009)
 - a. Allow limited sitting if individual is capable of performing weight shifts every 15 minutes; use power weight-shifting wheelchair system for individuals who are unable to independently perform effective weight shifts (AHCPR 1994; NPUAP 2009)
 - b. Reposition at least every hour; if not possible, return individual to bed. (AHCPR 1994; NPUAP 2009)

C. MANAGE LOCAL AND SYSTEMIC FACTORS : DEBRIDE, CLEANSE AND DRESS WOUND

1. Debride PU areas with eschar and/or devitalized tissue to manage bacterial load (Alvarez et al. 2002; *Burgos et al 2000*; Jones & Fennie 2007; Rennert et al 2009) **Choose a debridement method appropriate to PU status, individual condition and goals of care:**
 - a. **Autolytic debridement** (Barr et al. 1995; Jones & Fennie 2007; Sayag 1988) **is as effective** (Burgos et al. 2000) **or more so** (Konig et al. 2005) **than enzymatic debridement with collagenase**
 - b. **Enzymatic debridement efficacy and safety varies with different enzymes. Collagenase efficacy has been shown better than placebo** (Ramundo & Gray, 2008), similar to some enzymes (Püllen et al. 2002) or autolytic debridement (Burgos et al., 2000) and less effective than papain-urea, with similar healing results (Alvarez et al. 2002;).
 - c. Mechanical debridement (AHCPR; RNAO) using wet-to-dry gauze is considered substandard practice. (Jones & Fennie 2007; Nice 2005)
 - d. Surgical debridement, including conservative sharp debridement, is indicated to achieve rapid removal of necrotic tissue. If debriding large amounts of necrotic tissue use the operating room (Barr et al. 1995; Bluestein & Javaheri, 2008; Chow et al., 1977; Golinko et al., 2009; Gordon 1996; Ramundo & Gray 2008; Rennert et al 2009; Whitney et al., 2006)
 - e. High Flow irrigation (Fujioka et al., 2008; Whitney et al., 2006)
 - f. Biological debridement with maggots (Gray 2008)
 - g. Contraindications for debridement include compromised vascular circulation at ulcer site; Stable heel eschar or gravely palliative or critically unstable patients. (Bluestien, Javaheri, 2008; Langemo et al., 2010; NPUAP 2009)
2. Cleanse all wounds at each dressing change using a cleansing method to optimize removal of debris and prevent trauma (Bergstrom et al. 2006; Rodeheaver & Ratliff 2007)
 - a. *Optimal Irrigation pressure of 4-15 psi may be obtained using a .35 cc syringe with 19 gauge angiocath or a Single-use 100 ml saline squeeze bottle* (Bergstrom et al.1994; Rodeheaver & Ratliff 2007)
 - b. Cleansing may also be performed during hydrotherapy (Burke et al., 1998; Rodeheaver & Ratliff 2007)
 - c. Avoid manual trauma or scrubbing the wound vigorously (Rodeheaver & Ratliff 2007)
 - d. *Wound cleansing solutions may be normal saline, sterile water, Ringer's lactate, or tap water* (Bergstrom et al.1994; Moore & Cowman 2008; Rodeheaver & Ratliff 2007)
 - e. *Use safe wound cleansers with surfactants for heavy exudate or adherent material*(Bergstrom et al.1994; Bolton et al, 2004; Rodeheaver & Ratliff 2007)
 - f. *Avoid topical antiseptic or cytotoxic agents* (Bergstrom et al, 1994; Bluestein, Javaheri 2008; Rodeheaver & Ratliff 2007)
 - g. Cleanse the ulcer and perimeter with enough irrigant for the wound size, depth and condition (usually 100 – 150 ml) warmed to room temperature (Rodeheaver & Ratliff 2007)
3. Manage bacterial colonization and infection (RNAO; Whitney et al., 2006)
 - a. Implement appropriate clean or sterile technique, with standards and universal precautions for wound management: hand washing, protective equipment, dressing disposal appropriate for the patient and isolation as indicated (RNAO).
 - b. Evaluate ulcer for signs and symptoms of clinical infection at each dressing change. (Gardner et al 2006; RNAO)

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- c. If ulcer infection is suspected based on clinical signs of infection and/or if wound regresses or plateaus despite appropriate preventive and treatment measures, determine type and level of microorganisms by validated quantitative swab cultures (Gardner et al 2006; RNAO)
 - i. Irrigate wound with normal saline before obtaining swab culture, swab 1 cm² viable wound area, avoid eschar/slough/surface exudate/edges (Gardner et al 2006; RNAO)
 - d. **If osteomyelitis is suspected obtain a tissue and/or a bone biopsy** (Lewis et al., 1988; Rennert et al 2009; Whitney et al. 2006)
 - i. Conservatively debride bone; excise ulcer necrotic tissue (Chow et al.1977; Rennert et al. 2009)
 - ii. Remove underlying bony prominence and fibrotic bursa cavities if indicated (Rennert et al 2009)
 - e. **Use systemic antibiotics specific to sensitivity report for bacteremia, sepsis, advancing cellulitis, osteomyelitis** (Bergstrom et al, 1994; Chow et al., 1977; Rennert et al 2009; RNAO)
 - f. *Treat distant infections such as urinary tract, pneumonia, cranial sinus or cardiac valves in patients with or at risk of developing a pressure ulcer* (Whitney et al., 2006)
 - g. Use topical antimicrobial cleansing solutions, dressings, gels, ointments, creams and aqueous preparations effective against gram-negative, gram-positive and anaerobic organisms, e.g. with safe, sustained release of ionic silver (Munter et al., 2006), iodine or other agents with evidence of safety on PU (Bluestein, Javaheri 2008; RNAO)
 - i. Initiate on clean ulcers with delayed healing despite 2-4 weeks of optimal care (RNAO)
 - ii. Re-evaluate use after 2 weeks and discontinue use as infection abates, (RNAO)
4. **Select and apply appropriate ulcer dressing(s) to protect PU and surrounding skin from friction, shear, pressure and physical or chemical trauma and to manage exudate and prevent ulcer drying, injury or maceration** (Bots & Apotheker 2004; Bouza et al., 2005; Cullum & Petherick 2008; DeLaat 2005; Heyneman et al. 2008)
- a. *Manage excess ulcer drainage with absorptive dressings* (Barr et al. 1995; Bolton *et al.*, 2004; Payne et al. 2009; Smitten et al, 2005)
 - b. **Maintain moist ulcer environment e.g. with hydrocolloid (Kerstein et al 2001), foam (Munter et al., 2006), hydrogel or similar moisture retentive dressing** (Bouza et al., 2005; Cullum & Petherick 2008; DeLaat 2005; Heyneman et al. 2008)
 - c. **Hydrate dry ulcers e.g. with hydrogel dressings (Heyneman et al. 2008)**, except in case of a stable ischemic heel eschar.
 - d. Fill ulcer cavities to reduce dead space. (Bolton *et al.*, 2004)
 - e. Provide thermal insulation and ulcer temperature stability (RNAO)
 - f. **Choose the most appropriate dressing consistent with principles of ulcer care, patient needs, individual ulcer status, cost/availability and caregiver ability** (Heyneman et al. 2008; Kerstein et al 2001; Payne et al. 2009). [See Table 6 for levels of support for dressing study evidence mainly compared to saline or ointment in gauze. Please see product package inserts for individual claims for specific dressings.
 - i. **Avoid gauze use as a primary PU dressing. It delays healing, increases pain, infection rates(Hutchinson & McGuckin, 1990) and dressing change frequency and is not cost effective (Heyneman et al. 2008; Kerstein et al 2001)**
 - g. Monitor dressing site daily; schedule change frequency based on assessment of patient, ulcer status, dressing condition and package insert instructions. Manage hypergranulation; record wound status at each dressing change and revise dressings according to ulcer outcomes and patient goals (PVA; RNAO)
5. **Manage pressure ulcer-related pain** (de Laat et al. 2005)
- a. **Maintain a moist ulcer environment** (Kerstein et al. 2001; Maume et al 2003)
 - b. **Use topical analgesics, such as EMLA cream** (Evans & Gray 2005) **or anesthetics when appropriate** (de Laat et al. 2005)
 - c. Refer patient to pain specialist and use systemic pain medications when appropriate (Reddy et al. 2003)
 - d. Correct patient posture and use support surfaces to minimize pain (Reddy et al. 2003)
 - e. Use meditation or diversion techniques or refer patient for psycho-social interventions if appropriate. (Ibid)

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- f. Refer patient for massage if needed to manage muscle cramping or lymphatic conditions, (RNAO)
 - i. but avoid massage over reddened bony prominences (RNAO)
- 6. **Implement nutritional interventions** (Langer et al 2003—SR; Lee et al, 2006; Thiella et al. 2007)
 - a. **Ensure adequate nutrient and fluid intake to maximize potential for wound healing** (Langer et al 2003; van Rijswijk & Polansky 1994)
 - i. **Calories (35-40 kcal/kg/day)** (Cereda et al., 2009; Langer et al 2003; Pinchofsky-Devin 1986)
 - ii. **Protein (1.0-1.5 g protein/kg/day)** (Cereda et al., 2009; Langer et al 2003; Lee et al, 2006; Reddy et al, 2009)
 - iii. **Micronutrients; If vitamin or mineral deficiencies are confirmed or suspected, provide appropriate supplements** (Cereda et al., 2009; Desneves et al, 2005; Thiella et al. 2007) e.g. **zinc, amino acids, Vitamin C, A, or E.**
 - iv. Hydration program 30-35 cc/kg of body weight or as medically indicated (RNAO)
 - b. **If underweight or losing weight, enhance intake to place the individual into positive nitrogen balance** (Cereda et al., 2009; Lanter et al., 2003; Pinchofsky-Devin, 1986.)
 - i. Anabolic agents or appetite stimulants may be used. (Spungin 2001)
 - c. Evaluate effectiveness of nutritional interventions regularly (Pinchofsky-Devin 1986; van Rijswijk & Polansky 1994)

Table 6. Pressure Ulcer Studies Supporting Comparative Dressing Outcomes (Bold: A Level; *Italics*: B Level; Normal print: C Level; Underlined contains cost analysis)

Dressing Category	Faster Healing Than Gauze	Less Pain Than Gauze	Fewer Infections Than Gauze	Lower Cost Than Gauze
Alginate Primary Dressing Alone or with Hydrocolloid Secondary Dressing or To Control Minor Bleeding				
Primary alone	Sayag et al. 1996			
Primary under hydrocolloid	Bolton et al. 2004 Thomas et al. 2005			
Before 4-week HCD	Belmin et al. 2002			
With Silver	Maume et al., 2005			
Foam Dressings Including Polyurethane and Silicone Foams				
Primary dressing	<u>Heyneman et al. 2008</u> Maume et al., 2003 Sopata et al. 2002		Hutchinson & McGuckin, 1990 Sopata et al., 2002	<u>Heyneman et al. 2008</u> <u>Payne et al. 2009</u>
Hydrocolloid Primary Dressings				
Primary dressing	Bouza et al., 2005 Gorse & Messner 1987 <u>Heyneman et al. 2008</u> Hollisaz et al., 2004 <u>Kerstein et al., 2001</u> Regan et al., 2009	Chang et al., 1998 Heyneman et al. 2008	Hutchinson & McGuckin, 1990	Colwell et al., 1993 Gorse & Messner 1987 <u>Graumlich et al., 2003</u> <u>Heyneman et al. 2008</u> <u>Kerstein et al., 2001</u> <u>Xakellis et al., 1992</u>
<i>Hydrofiber</i>				
Primary dressing	Ohura et al, 2004 Teot, 1997			<u>Ohura et al, 2004</u>
Hydrogels or Hydrocolloid-based Wound Fillers				
Primary dressing	<u>Heyneman et al. 2008</u> Sopata et al., 2002		Hutchinson & McGuckin, 1990 Sopata et al., 2002	<u>Heyneman et al. 2008</u>
<i>Other Primary Dressings with at least one RCT on Pressure Ulcers</i>				
<i>Chitosan</i>	Kordestani et al 2008			
<i>Silver hydro-alginate</i>	Meaume et al, 2005			
<i>Honey</i>	Gunes & Eser 2007			



D. ADVANCED OR ADJUNCTIVE INTERVENTIONS IF PU IS UNRESPONSIVE TO A-LEVEL MANAGEMENT

Note: Modalities below were not compared in a RCT on PU to any dressing with A-Level evidence in Table 6.

1. **Electrical stimulation** (Gardner et al, 1999; Feedar et al, 1991; Wood et al, 1993; Mulder, 1991)
2. Hyperbaric oxygen therapy (Kranke P et al, 2004--**no studies supported PU effect**, but may be useful if ischemic condition or osteomyelitis is present)
3. *Negative Pressure Wound Therapy*—No consistent effect on PU healing (Gregor et al., 2008; Ubbink et al., 2008). Increased granulation, less fibrin compared to Redon drain (Wild, 2008), earlier use may shorten home care stays (Baharestani et al., 2008) Lower cost than gauze (Mody et al., 2008). The FDA has advised caution in selecting patients for this therapy due to serious, occasionally fatal, complications. Please read the FDA notice at: (<http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/PublicHealthNotifications/ucm190658.htm>).
4. Therapeutic Ultrasound; contact or non-contact -- no PU RCTs supported healing or debridement (Baba-Akbari et al, 2006; Ramundo & Gray 2008)
5. UV Light/ or multi-wavelength phototherapy (Taly AB et al, 2004)
6. Growth factors are not indicated for PU use at this time. They have been compared to gauze primary dressings. (Rees et al, 1999; Robson et al. 1992) which are recognized as substandard practice (deLaat et al. 2005; Kerstein et al 2001;Maume et al 2003). No PU RCT compared a growth factor to dressings with A-Level evidence in Table 6.
7. **Infrared or monochromatic light stimulation** (Dehlin et al. 2007; Durovic et al. 2008; Schubert 2001)
8. Allograft (RNAO)

E. SURGICAL INTERVENTIONS (Brown et al., 2007;Isik et al. 1997; Wong & Ip 2006; Yamamoto et al 1997)

1. Direct closure (Whitney et al 2006) seldom helps unless pressure source is eliminated and PU is small (Brown et al., 2007)
2. *Flaps: Myocutaneous free, fasciocutaneous, cutaneous* (Ichioka et al 2007; Lemaire et al 2008; Wong & Ip 2006; Rennert et al 2009; Yamamoto et al 1997)
3. Skin grafts (Whitney et al., 2006) though they exhibit “poor take” over exposed bone (Brown et al., 2007)
4. Perioperative considerations (Brown et al., 2007; Whitney et al 2006)
 - a. Pre-operative; Smoking cessation, Bowel regulation, Spasms/contractures managed, Medically stable, Nutrition/Hydration adequate, Infection managed
 - b. *Reduce ulcer bacterial burden to $<10^5$ colony forming units per g of sample before surgical closure* (Brown et al., 2007; Murphy et al., 1986; Whitney et al 2006)
5. Post-operative: Use highly effective support surface (e.g. air fluidized bed), increase mobility to sitting over 4-8 weeks. Educate patient and caregiver re: re-injury and recurrence, Conduct daily skin examination and provide intermittent pressure relief techniques and patient-oriented nutrition and hydration (Isik et al. 1997; Milne et al 2009)
 - a. Evaluate for and address surgical complications: such as wound dehiscence, infection, abscess, hematoma/seroma, procedure-related pain (Isik et al. 1997)

F. DOCUMENTATION OF PATIENT RESPONSE TO TREATMENT PROGRAM

1. Measure ulcer and document overall progress weekly, or sooner if there is a significant change in ulcer status, on an approved data collection form; with wound photograph if feasible. Consider validated tools such as the BWAT® (Bates-Jensen Wound Assessment Tool©) DESIGN Tool or PUSH© (Pressure Ulcer Scale for Healing) (Bolton et al., 2004; Milne et al, 2009; Sanada et al., 2004)
2. If no significant reduction in wound area after 2-4 weeks of a treatment regimen, re-evaluate diagnosis and/or care plan (vanRijswijk 1993; vanRijswijk & Polansky 1994) Note: Note: Kurd et al (2009) reported **improved healing outcomes in RCTs for venous leg ulcers and diabetic foot ulcers if wound care providers received feedback of 4-week healing rates**. There is not yet a corresponding RCT for PU. (Level A for chronic wounds pending PU study.)
3. If complications, non-adherence to protocol or nutritional concerns arise, revise plan of care or goals of treatment to address patient issues. (Pinchofsky-Devin 1986; Reed et al 2003)

G. PALLIATIVE CARE FOR THE QUALIFYING INDIVIDUAL

1. Assess skin for signs of “terminal ulcers” in gravely ill individuals (Langemo et al 2006; Kennedy)
2. Establish individualized goals of care as determined by patient wishes and medical condition (Alvarez et al 2007) including the following (McDonald & Lesage, 2006):
 - a. Stabilize and manage all PU and surrounding skin as much as possible while optimizing patient comfort. (Langemo et al., 2010; Letizia et al., 2010; McDonald & Lesage, 2006)
 - b. *Assess individual co-morbid conditions and address PU causes to prevent new PU and surrounding skin breakdown by using methods and materials consistent with patient and family wishes to protect skin, e.g. heel protection and maintain patient hydration, nutrition etc as in Section II of this Guideline.* (Langemo et al., 2010; Letizia et al., 2010; McDonald & Lesage, 2006)
 - c. **Minimize or eliminate odor including wound odor**, (Paul & Peiper 2008) due to infection or incontinence (Langemo et al., 2010; Letizia et al., 2010; McDonald & Lesage, 2006)
 - d. *Assess each PU regularly using reliable, valid scale including PU pain every shift or at dressing change. Manage pain with an effective analgesic (e.g as in Section III C 4 of this Guideline or with topical diamorphine hydrogel) and by keeping wound bed moist while adhering to PU prevention principles in Section II above that are acceptable to the patient* (Langemo et al., 2010; Letizia et al., 2010; McDonald & Lesage, 2006)
 - e. Prevent and manage PU infection to extent acceptable to patient and family (Langemo et al., 2010; Letizia et al., 2010; McDonald & Lesage, 2006)
 - f. *Absorb exudate, e.g. with a foam or hydrocolloid dressing that lengthens dressing wear time. This minimizes dressing change frequency while keeping wound bed moist to reduce pain of dressing removal.* (Langemo et al., 2010; Letizia et al., 2010; McDonald & Lesage, 2006)
 - g. Maintain individual dignity and provide psychosocial support to reduce isolation (Letizia et al., 2010; McDonald & Lesage, 2006)

END OF AAWC PRESSURE ULCER GUIDELINE OF GUIDELINES Summarized in Algorithm form on the final page.

- A Professional Implementation Tool, the *AAWC Pressure Ulcer Care Quick Reference Guide* and brief summaries of the references cited in this Guideline, the *AAWC Pressure Ulcer Guideline Evidence Table* are available at the AAWC website, (www.aawconline.org).
- The *AAWC Pressure Ulcer Guideline of Guidelines*, is summarized below in algorithm form as the *AAWC Algorithm Summary for Managing a Patient With Pressure Ulcer Risk or a Pressure Ulcer*

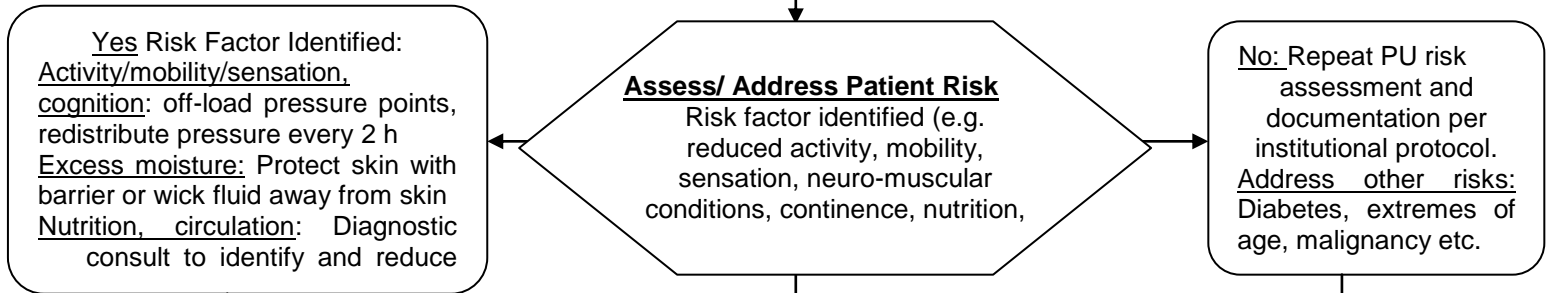
Association for the Advancement of Wound Care Guideline of Pressure Ulcer Guidelines

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AAWC Algorithm Summary for Managing a Patient With Pressure Ulcer Risk or a Pressure Ulcer

Trained multidisciplinary wound care team member evaluate and document patient medical/surgical history, physical, psychosocial condition, environment and quality of life goals. On admission and per setting protocol (usually weekly and on change in patient status) assess PU risk using clinical judgment and reliable, valid scale, (e.g. Braden, Norton,



Use an Interdisciplinary Approach to Prevent Skin Breakdown

- Perform comprehensive visual and tactile skin inspections during patient care and regularly according to institutional guidelines.
- Document and plan care to address all skin changes.
- Assess devices that may cause pressure, e.g. splints, casts, tubes
- Moisturize dry skin to prevent cracking.
- Protect from chemical or physical trauma: e.g. professional incontinence plan; no vigorous massage.
- Use patient-appropriate positioning standards of care per institution protocol.
- Restore, maintain good hydration /nutrition consistent with patient goals, professional nutritionist advice
- Implement professional exercise program to improve mobility/activity
- Instruct patient in self-performing pressure relief exercises when feasible
- Use effective off loading devices selected by trained professionals, meeting patient psychological, social, anatomic and physiologic needs
- Develop, implement organized, structured and comprehensive training programs for healthcare personnel. patients. families and all care givers for prevention and treatment of pressure ulcers.

Pressure Ulcer Treatment

- Implement/continue all above prevention measures to prevent new pressure ulcers/optimize healing
- Use a professionally selected pressure redistribution product with verified functionality for patients with unstageable, deep tissue injury, Stage III, Stage IV or multiple ulcers over several turning surfaces
- Avoid positioning directly on pressure ulcer when on bed or wheel chair surface, e.g. use cushions
- Manage local and systemic factors in a way consistent with patient/family needs and goals
 - Cleanse ulcer at 4-15 psi with water or saline or non-toxic cleanser
 - Debride autolytically or surgically or with an effective enzyme
 - Evaluate ulcer at each dressing change for signs and symptoms of clinical infection
 - Manage local and distant bacterial colonization and infection per institutional protocols
 - Select and apply appropriate ulcer dressings that maintain a moist ulcer environment, protect ulcer and surrounding skin from friction, shear, pressure, trauma, irritation and excess exudate
 - Manage ulcer-related pain according to patient needs
 - Identify and address nutrient and micronutrient deficiencies

Document ulcer progress weekly using reliable valid measures. Re-evaluate plan of care with professional multidisciplinary care team to improve care plan if ulcer has not improved or decreased in size after 4