Guidelines for the prevention of pressure ulcers

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The Wound Healing Society is a professional organization of physicians, nurses, physical therapists, basic scientists, clinical researchers, and industrial researchers dedicated to assuring that every patient receives optimal wound care. Its mission is to advance the science and practice of wound healing. To that end, the following comprehensive, evidence- and consensus-based guidelines were developed to address the Prevention of Pressure Ulcers. The guidelines are presented in generic terms; the details of specific tests, therapies, and procedures are the discretion of an interdisciplinary team of health care professionals who establish, implement, and evaluate policies and procedures directed at the prevention of pressure ulcers.

METHODS

PubMed, EMBASE, and CINAHL and the Cochrane Database of Systematic Reviews were searched and reviewed for evidence on pressure ulcer prevention. In addition, a search of health care databases for current evidence-based guidelines addressing the prevention of pressure ulcers was conducted using electronic and online resources. The panel classified studies based on whether the intervention being evaluated addressed pressure ulcer risk screening (PURS) and assessment (PURA), pressure ulcer prevention plans of care (PUPCP) (including interdisciplinary approaches), selection of support surfaces, friction and shear prevention, management of moisture and incontinence, nutrition, and patient and caregiver education.

Classification of evidence

The strength of evidence supporting a guideline is listed as Level I, Level II, or Level III using the following definitions:

- **Level I**: Meta-analysis of multiple RCTs or at least two RCTs supporting the intervention in the guideline or multiple laboratory or animal experiments with at least two clinical series supporting the laboratory results.
- **Level II**: Less evidence than Level I, but at least one RCT and at least two significant clinical series or expert opinion papers with literature reviews supporting the intervention. Experimental evidence that is quite convincing but without support by adequate human experience.
- **Level III**: Suggestive data of proof-of-principle, but lacking sufficient data such as meta-analysis, RCT, or multiple clinical series.

GUIDELINES

1. Pressure Ulcer Risk Screening (PURS)

Preamble: Pressure ulcer prevention is an important issue in every health care setting. Pressure ulcers are areas of localized tissue destruction caused by unrelieved pressure, shear, and friction to the skin. Contributing risk factors increase the person’s susceptibility to a complex etiology that causes pressure ulcers. Common risk factors have been identified: immobility, friction and shear, moisture, incontinence, poor nutrition, perfusion, age, skin condition, and altered level of consciousness. Individuals at high risk should be screened and assessed and efforts can be focused with interdisciplinary plans of care for preventing pressure ulcers in these patients.

Patients who are at risk should be identified by PURS shortly after admission to a health care setting. While there are limited definitive studies, the best current evidence and expert opinion suggest the following guidelines.

**Guideline #1.1**: All patients admitted to the health care setting shall undergo a PURS by or under the supervision of a registered nurse or health care professional with training.
and expertise in wound care within the time frame specified by organization policy or as required by regulation within 12 hours of admission. In nursing home settings, the window for screening is the MDS, which should be completed in 7 days. (Examples of “training and expertise” in wound care include academic course work, continuing education hours, or contact hours on basic and advanced wound care and wound bed preparation or national certification in wound care through organizations such as the Wound, Ostomy and Continence Nurses Society [WOCN] or the American Academy of Wound Management).

Level of evidence: II

Principle: The best-practice process of pressure ulcer prevention requires a series of steps with feedback loops. These steps include PURS, pressure ulcer risk assessment (PURA), formulation of a pressure ulcer prevention care plan (PUPCP), implementation of the plan, monitoring, reassessment of the care plan, reevaluation of the health care setting, and then either reformulation of the care plan or termination of therapy. Reported time of pressure ulcer development after admission ranged from 1 to 59 days.

Acute care: Pressure ulcers usually develop within the first 2 weeks of hospitalization. ICU patients who developed pressure ulcers did so within the first 72 hours of admission to the ICU. Fifteen percent of elderly patients will develop pressure ulcers within the first week of hospitalization. Long-term care residents usually develop pressure ulcers within the first 4 weeks of admission. Risk assessment screening tools may be helpful to identify patients at risk for pressure ulcer development. Several risk-screening assessment tools are available that consist of subscales for determining risk score. A tool may be used to classify pressure ulcer risk. The Braden scale is the only scale that has been extensively tested in adults across health care settings. Predictive ability of pressure ulcer risk scales is not yet determined; there are not high levels of reliability and validity reported with their use.

PURS recommendations: The Braden scale has been the most extensively studied. The Braden scale consists of six parameters (sensory perception, mobility, activity, moisture, nutrition, and friction and shear) with potential scores from 6 to 23. Lower total scores indicate greater risk of developing pressure ulcers. If other major risk factors are present (e.g., age, fever, poor dietary intake of protein, diastolic pressure < 60, and/or hemodynamic instability), advance to next level of risk. Mild risk = 15–18; moderate risk = 13–14; high risk = 10–12; very high risk = 9 or below.

The Norton scale is a PURA scale that consists of five parameters (general physical condition, mental condition, activity, mobility, and incontinence) each rated on a scale of 1–4, with lower numbers associated with greater impairment and potential total scores ranging from 5 to 20. Mild risk = 14; moderate risk = 13; high risk = 12. The reliability and validity of the tool has not been established.

Braden Q scores: This scale was adapted from the Braden scale for use in the pediatric population. Mild risk = 25; moderate risk = 21; high risk = 16.

Level of evidence: II, III

 Resident Assessment Protocol for nursing homes: This is the only assessment tool recognized by CMS for PURA in nursing homes. The Braden scale does not perform well in settings outside the hospital. Both the Norton Score and the Braden scale have good sensitivity (73–92% and 83–100%, respectively) and specificity (61–94% and 64–77%, respectively), but have poor positive predictive value in nursing home residents (around 37% at a pressure ulcer incidence of 20%). In populations with a lower incidence of pressure ulcers, such as nursing home residents, the same sensitivity and specificity would produce a positive predictive value of 2%. The Norton and Braden scales show a 0.73 kappa statistic agreement among at-risk patients, with the Norton Score tending to classify patients at risk when the Braden scale classified them as not at risk. The net effect of poor positive predictive value means that many patients who will not develop pressure ulcers will receive expensive and unnecessary treatment.

Level of evidence: II, III

Evidence:

27. van Marum RJ, Ooms ME, Ribbe MW, van Eijk JT. The Dutch pressure sore assessment score or the Norton scale for identifying at-risk nursing home patients? Age Ageing 2000; 29: 63–8 [CLIN S].

Guideline #1.2: The result of the PURS shall be documented and appropriate assessment and intervention initiated within 24 hours of admission. In nursing home settings, the window for screening and appropriate assessment and intervention is the MDS, which should be completed in 7 days.

**Level of evidence: II**

**Principle:** A skin risk screening assessment tool may be most helpful when used in combination of strategies including additional skin assessment policies and procedures, skin care teams, and educational programs.

**Evidence:**

Guideline #1.3: A procedure for pressure ulcer rescreening should be implemented within 48 hours or when there is a significant change in the individual’s condition; transfer to ICU, system or organ failure. Septicemia, chronic ICU status with prolonged ventilator support, fever, hemodynamic instability, urinary tract infection in nursing home residents, etc.

**Level of evidence: II**

**Principle:** The best practice process of pressure ulcer prevention requires a series of steps with feedback loops. These steps include PURS, PURA, formulation of a PUP-CP, implementation of the plan, monitoring, reassessment of the care plan, reevaluation of the health care setting, and then either reformulation of the care plan or termination of therapy.

**Evidence:**
1. Allman RM, Goode PS, Patrick MM, Burst N, Bartolucci AA. Pressure ulcer risk factors among
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**Guideline #1.4:** A schedule for reassessing risk should be based on the acuity of the individual and awareness of when pressure ulcers occur in a particular clinical setting.

**Level of evidence: II, III**

**Principle:** Note that there is limited evidence that risk assessment leads to a reduction in frequency of pressure ulcers. The data show that risk assessment did not prevent development of pressure ulcers. In fact, at-risk patients who received proper interventions had a higher incidence of pressure ulcers. Other studies demonstrate similar findings. There are limits of risk factor identification; a number of risk factors are not modifiable, such as fecal incontinence, mobility, level of consciousness, or even nutrition.

**Evidence:**


2. Pressure Ulcer Risk Assessment (PURA): It plays a significant role in the prevention of pressure ulcers. Patients who are at risk should be identified by PURA shortly after admission to a health care setting. While there are limited definitive studies, the best current evidence and expert opinion suggest the following guidelines.

**Guideline #2.1:** The PURA shall be performed by or under the supervision of a registered nurse or health care professional with training and expertise in wound care within the time frame specified by organization policy or as required by regulation. (Examples of “training and expertise” in wound care include academic course work, continuing education hours, or contact hours on basic and advanced wound care and wound bed preparation or national certification in wound care through Wound Ostomy and Continence Nurses Society.)

**Level of evidence: II**

**Principle:** Each patient shall undergo a thorough PURA by or under the supervision of a registered nurse or health care professional with training and expertise in wound care to determine and assess the risk factors and care needs and the type of preventive care to be provided.

**Evidence:**


Guideline #2.2: The PURA shall include identification of subjective, objective, and psychosocial factors to determine and assess the risk factors and care needs and the type of preventative care to be provided. The following key points are recommended for documentation and shall be addressed when appropriate:

- The subjective/objective assessment of skin status and bony prominences and risk for pressure ulcers should include information from the patient and his/her medical record. Elements that should be documented as part of the subjective assessment of skin status and bony prominences include:
  - Description of skin changes as well as any actions taken, recent trauma, friction, shear, or immobility.
  - Use of special garments, shoes, heel, and elbow protectors, orthotic or orthopedic devices.
  - History of pressure ulcers and presence of current ulcer.
  - Previous treatments or surgical interventions that increase risk for pressure ulcers.
  - Factors that impede healing status, such as comorbid conditions or medications.
  - Medical history (history of stroke).
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- Reported usual body weight; desirable body weight, recent change in body weight (quantified) and a decrease in subcutaneous tissue, appetite, dental health, oral and gastrointestinal history, including chewing and swallowing difficulties and a person’s ability to feed himself or herself, drug/nutrient interactions, medical/surgical history or interventions that influence nutritional intake or absorption of nutrients; recent changes in dietary intake (quantitative and qualitative).
- Alcohol and substance abuse, use of tobacco.
- Gastrointestinal and elimination symptoms (including normal bowel/bladder habits, incontinence, and diarrhea; describe onset, duration, and aggravating and relieving factors of incontinence).
- Recent changes in functional capacities (e.g., activities of daily living, immobility, ability to move, reposition and turn, level of consciousness, ability and willingness to follow instruction, employment, recreation).

Level of evidence: II, III

Elements that should be documented as part of the objective assessment for risk of pressure ulcers include:

- Advanced age (> 75 years of age having an odds ratio of > 12.6).
- African-American race.
- Female gender.
- Disorders of skin integrity. Daily inspection of skin (dryness and/moisture/shear and friction) and bony prominences and specific vulnerable pressure points for bed- or chair-bound individuals in acute care settings (supine position: occiput, sacrum, heels, spine, elbows, ankles; sitting position: ischial tuberosities, coccyx; side-lying position: trochanters); in long-term care and nursing home settings, inspection may be less frequent—occurring when bathing or providing skin care, yet should still be assessed head to toe and documented on a regular basis as determined by initial risk assessment, changes in risk status, and facility protocol.
- Assessment for immobility (confined to bed, chairs, wheelchairs, recliners, and couches); individuals who have contractures; who have limited range of motion and limited function; or those who may require assistance in ambulating, moving, turning, repositioning, or getting out of bed or chairs should be carefully monitored for pressure ulcer development; assessment for friction and shearing (individuals who cannot lift themselves during repositioning and transferring at risk for friction injuries; shear injuries commonly occur when the head of the bed is elevated and the individual slides downward).
- Assessment for incontinence.
- Admitting diagnosis that may affect skin integrity (gangrene, burns, osteomyelitis, edema, and infections) and wound healing (including immune status and diabetes).
- Concurrent medical and surgical problems that may affect skin integrity (burns, edema, organ system failure, septicemia, ICU length of stay, ventilator days, advanced cancer, terminal illness, and diabetes) and wound healing (including infections, e.g., urinary tract infections, bacterial infections, pneumonia, anemia, and immune status).
- Assessment of nutrition status data obtained from the physical examination includes weight, BMI, and anthropometric and laboratory evaluations. Other elements of an objective assessment of nutrition status that may be helpful include lab values listed below such as serum transferrin, prealbumin, and resting energy expenditure. Nutritional requirements and nutrition support options should be determined as an integral part of the initial risk assessment for each individual.
- Laboratory data as available which may include but are not limited to complete blood count with red cell indices, total lymphocyte count, serum electrolytes, blood urea nitrogen, creatinine, serum glucose, serum albumin, prealbumin, C-reactive protein, transferrin, serum cholesterol, serum triglycerides, and liver function studies.

Level of evidence: II

Principle: Each patient shall undergo thorough PURA to assess the risk factors and care needs and the type of preventative care to be provided. Additional considerations, which impact pressure ulcer prevention measures, and should be addressed on an individual basis include:

- Age differences: Seniors and children are at high risk. Individuals over 65 years of age are at high risk for developing pressure ulcers, neonates and children younger than 5 years old are at high risk, with the head (occiput) being the most common site of pressure ulcer occurrence.

Level of evidence: II

- Gender and racial differences: Female gender, African-American race, and advanced age are identified as risk factors for pressure ulcer diagnosis in acute care hospitals.
- Spinal cord injury (SCI): Patients with SCI are at high risk of developing pressure ulcers with high rates of recurrence.

Level of evidence: II

The following are associated with increased risk: history of ulcers, younger age at onset and duration of SCI, greater disability and difficulty with practicing good skin care, and extent of paralysis. Pressure ulcers are least likely to occur among individuals with SCI who maintain a normal weight, return to work and family roles, do not have a history of tobacco use, suicidal behaviors, incarcerations, or alcohol or drug abuse.

Level of evidence: II

- Potential sites for pressure ulcers: The most common anatomic sites at risk for pressure ulcers are the sacrum or coccyx and heels. Other areas identified as common sites for pressure ulcers are the ankle, buttocks, and occipital areas.
Level of evidence: II

- **Critically ill patients:** Among burn patients with increased moisture as determined by the Braden scale, developed pressure ulcers; wound drainage and incontinence were also identified as contributing factors. Pressure ulcers are four times more likely in ICU patients exposed to moisture and two times more likely in patients with sensory perception or perfusion problems.

Level of evidence: II

- Other significant factors related to the development of pressure ulcers in critically ill patients include nor-epinephrine administration, APACHE II score > 13, length of stay, anemia, and fecal incontinence.

Level of evidence: I, II

- **Immobilized low weight patients:** Patients with a lower BMI developed pressure ulcers.

Level of evidence: I, II

- Postoperative patients with a longer duration of surgery and length of time in a hypotensive state have an increased risk of developing pressure ulcers.

Level of evidence: II

- Acute care hospitalized patients diagnosed with pressure ulcers have three categories of risk factors including skin integrity (presence of gangrene, nutritional deficiencies, diabetes, and anemia), system failure (paralysis, senility, respiratory failure, acute renal failure, CVA and congestive heart failure [nonhypertensive]), and infections (sepsis, osteomyelitis, pneumonia, bacterial infections, and urinary tract infections).

Level of evidence: I, II, III

- **Inadequate nutritional intake:** According to the US Department of Health and Human Service’s clinical practice guidelines for the prevention of pressure ulcers, assessment of the adequacy of nutritional intake (serum albumin, total lymphocyte count, nitrogen balance, hydration status, and micronutrients) is correlated with skin integrity and should be frequently addressed. Note that although poor nutrition is part of total patient care and should be addressed in each patient, no nutritional intervention has shown effectiveness in prevention of pressure ulcers in published studies.

**Evidence:**

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Guideline #2.3: The subjective and objective assessments of pressure ulcer risk shall be summarized and documented in the patient’s medical record.

Guideline #2.3a: The patient’s skin status and bony prominence assessment shall be summarized based on the findings of the subjective and objective PURA and should include prevention measures (turning-positioning program, bed surface pressure relief therapy, minimizing friction and shear, managing incontinence) for optimal skin integrity requirements.

Guideline #2.3b: The patient’s nutritional requirements shall be summarized based on the findings of the subjective and objective nutrition assessments and should include protein, calorie, fluid, electrolyte, and micronutrient requirements.

Guideline #2.3c: The patient and caregiver educational requirements shall be summarized based on the findings of the subjective and objective nutrition assessments and should include causes and risk factors for pressure ulcer development, and ways to minimize risk.

Level of evidence: II, III

Principle: The PURA shall be documented and be available to all health care providers.

Evidence:


3. Development of Pressure Ulcer Prevention Care Plan (PUPCP)

Preamble: Development of a PUPCP plays a significant role in the prevention of pressure ulcers. Clinical settings and patients who are at risk should have a prevention plan to target prevention efforts to minimize risk. While there are limited definitive studies, the best current evidence and expert opinion suggest the following guidelines.

Guideline #3.1: The policy and procedure for the prevention plan for pressure ulcers shall be formalized and documented. The pressure ulcer prevention plan shall include identification of high-risk settings and groups to target prevention efforts to minimize risk.

Level of evidence: II, III

Principle: The policy and procedure for the prevention of pressure ulcers should ensure that the objective of care is to identify etiologic factors contributing to pressure ulcer occurrence, conduct regular risk screening and assessments using valid and reliable tools, develop, implement, and evaluate evidence-based programs for prevention of pressure ulcers (including identification of risk factors, skin and bony prominence assessment and care, demonstration of proper body positioning, selection and use of support surfaces and skin protection devices), and treatments and use of appropriate nutritional interventions.

Evidence:


Guideline #3.2: An interdisciplinary team of health care professionals shall review and evaluate the quality of preventative pressure ulcer care provided at the health care setting at least quarterly. This team ideally will function as an entity or may each contribute independently to the PUPCP. The disciplines responsible for carrying out each planned approach will be designated on the PUPCP. The PUPCP should be developed with an interdisciplinary approach involving the physician, registered nurse, registered dietitian, physical therapist, and other health care personnel as appropriate, and with the involvement of the patient and/or family whenever possible and is based on information from the risk tool and the PURA. The PUPCP information should be completed within 48 hours after the completion of the PURA and incorporated into the overall plan of care in acute care settings. In long-term care settings, an LPN may be assigned to a team and completion of PUPCP information and overall plan of care will be consistent with the policies and guidelines of long-term care settings.

Level of evidence: II, III

Principle: Having an interdisciplinary team of health care providers is the optimal approach to prevention of pressure ulcers. Using a team approach, the objective should be to identify etiologic factors contributing to pressure ulcer occurrence, conduct regular risk screening and assessments using valid and reliable tools, develop, implement, and evaluate evidence-based programs for prevention of pressure ulcers (including identification of risk factors, skin and bony prominence assessment and care, demonstration of proper body positioning, selection and use of support surfaces and skin protection devices, and treatments and use of appropriate nutritional interventions).

- Although the development of a pressure ulcer may reflect a breakdown in quality of care, it cannot reflect...
Evidence:


4. Selection of prevention interventions

Preamble: There are many pressure ulcer prevention interventions to consider. Selection of pressure prevention interventions should be appropriate to the patient’s individualized needs. Guidelines assist the health care provider in making decisions regarding the best cost-effective practice.

Guideline #4.1: The interventions selected to prevent pressure ulcers shall be appropriate to the patient’s quality of care if the pressure ulcer develops despite consistent application of known interventions. The link to quality care assumes that consistent application of effective interventions will prevent all pressure ulcers. This has not been demonstrated in the literature. This is a profoundly important issue from a regulatory and medico legal standpoint. Furthermore, Abel RL, Warren K, Bean G, Gabbard B, Lyder CH, Bing M, McCauley C (Quality improvement in nursing homes in Texas: results from a pressure ulcer prevention project. J Am Med Dir Assoc 2005; 6: 181–8) showed a failure of an intense educational intervention to reduce the incidence of pressure ulcers. This dilemma is also cited by Meehan M (Beyond the pressure ulcer blame game: reflections for the future. Ostomy Wound Manage 2000; 46: 46–52). In a survey of 35 nursing homes administered by the Department of Veterans Affairs, the extent of compliance with quality indicators ranged from 2.98 to 4.08 on a 1–5 scale. No significant association was found for compliance with quality indicators and the rate of pressure ulcer development or in adherence to guideline recommendations. No relationship was found between a pressure ulcer quality indicator score and the mean number of pressure ulcer prevention or treatment strategies used in 321 Missouri long-term care facilities. The overall quality indicator score did not differ among homes by type of risk assessment instrument used, the wound care protocol used, or whether a wound care specialist nurse was responsible for care. In a national random sample of 2,425 hospitalized Medicare beneficiaries, the overall documentation of compliance with quality indicators was also poor. However, there was no link between documentation of a quality indicator and incidence of pressure ulcers. In fact, older adults who had documentation of being at risk and/or who received a pressure-reducing device and/or were turned every 2 hours had a higher incidence of pressure ulcer development. Although the chart documentation of prevention interventions was poor, these data suggest that the actual application of selected interventions described as quality indicators was not effective in reducing the incidence of pressure ulcers. However, the NPUAP recommends that the incidence of pressure ulcers be an indicator of quality in health care settings. Prevalence and incidence outcome studies can be useful in determining the effectiveness of prevention and treatment strategies in health care settings and establish benchmarking measures. Education of the interdisciplinary team, nursing staff, and other health care professionals is an integral part of reducing the incidence of pressure ulcers. The NPUAP has developed competency-based curricula for pressure ulcer prevention.
risk factors, skin status and assessment of bony prominences, nutritional status, mobility, risk of incontinence, pressure, friction and shear, medical condition, and goals expressed by the patient and/or family. If the resident is not competent, the designated individual with durable power of attorney/health care shall be an active participant.

Level of evidence: I, II, III

**Principle:** Prevention intervention selections should be tailored to the individual's needs and should be evidence based. Consideration of the least invasive, most cost-effective therapy is preferred.

**Evidence:**


**Guideline #5.1:** Provide frequent position changes using pillows and wedges to reduce pressure on bony prominences (Bergstrom & Braden, 1992; Knox, Anderson, & Anderson, 1994).

Level of evidence: II

**Principle:** Pressure ulcers are thought to be caused by unrelieved pressure and compression of soft tissues against bony prominences. Relieving pressure over bony prominences can be achieved. Pillows under calves decrease heel interface pressures (Tymec, Pieper & Bollman, 1997). No specific support surface or heel product has been proven superior in decreasing pressure at the heel (Whittemore, 1998; De Keyster, Dejaeger, De Meyst & Evers, 1994; Flemister, 1991; Guin, Hudson & Gallo, 1991; Pinzur et al., 1991).

**Evidence:**


**Guideline #5.2:** Avoid foam rings or donuts for pressure reduction; they concentrate the pressure to surrounding tissue (AHCPR, 1992). Foam wheelchair cushions are recommended (Conine et al., 1994).

Level of evidence: I, II, III

**Principle:** Seat cushions reduce pressure in the sitting position. Ring cushions or donut devices have been shown to increase edema and venous congestion.
Evidence:


Guideline #5.3: Pressure prevention interventions shall be provided through use of pressure-reducing or relieving devices to relieve pressure.

Level of evidence: I, II, III

Principle: Pressure-reducing or relieving devices work by redistributing pressure over the bony prominences. Static support surfaces are mattresses or mattress overlays that are applied to a mattress and are filled with air, water, gel, foam or a combination of these. Alternating support surfaces or dynamic support surface mattresses have been associated with lower incidence of pressure ulcers compared with standard hospital mattresses. High-specification foam bed surface has been effective in decreasing the incidence of pressure ulcers in high-risk patients. (A variety of pressure-reducing mattresses or devices lower the incidence of pressure ulcers when compared with a standard hospital mattress. At-risk patients should not be placed on an ordinary, guideline hospital foam mattress. Turning every 4 hours in combination with the use of a pressure-reducing mattress was shown to decrease the occurrence of pressure ulcers compared with turning every 6 hours on a pressure-reducing mattress or turning every 2–4 hours on a nonpressure-reducing mattress. Bed surfaces that provide pressure reduction include nonpowered surface mattress replacements, powered single-zone surfaces, low-air-loss multizone customized beds and mattresses; pressure relieving surfaces include air-fluidized beds and lateral rotation dynamic air therapy beds. There is insufficient evidence to support the choice of one specific bed surface/device over another for prevention of pressure ulcers. Efficacy of these devices is inconclusive; most support surface studies rely only on interface pressure measurements as an outcome.

Evidence:


12. Dunlop V. Preliminary results of a randomized controlled study of a pressure ulcer preventative system. Adv Wound Care 1998; 11 (Suppl. 3): 14 [RCT].


31. Santy JE, Butler MK, Whyman JD. A comparison study of 6 types of hospital mattresses to determine which most effectively reduces the incidence of pressure sores in elderly patients with hip fractures in a District General Hospital. Report to Northern & Yorkshire Regional Health Authority 1994 [RCT].


**Guideline #5.4:** Avoid ordinary sheepskin for pressure reduction; it provides comfort but does not relieve pressure to tissue (Pieper, 1998). Dense specialized sheepskin is recommended (Jolly, Wright McGowan, 2004).

**Level of evidence:** I, II

**Principle:** There is limited evidence that dense specialized sheepskin will reduce the incidence of pressure ulcers.

**Evidence:**


3. Jolley DJ, Wright R, McGowan S, Hickey MB, Campbell DA, Sinclair RD, Montgomery KC. Preventing pressure ulcers with the Australian Medical Sheepskin:
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Guideline #5.5: Limit the amount of time the head of the bed is elevated: lower head of bed 1 hour after meals to prevent pressure over bony prominences; assess the sacral area more frequently if this is not possible (WOCN Clinical Guidelines, 2003).

Level of evidence: II, III

Principle: Elevation of the head of the bed may result in shear and friction forces between the skin and the bed surface; this may predispose to the development of pressure ulcers.

Evidence:

2. Young T. The 30 degree tilt position vs. the 90 degree lateral and supine positions in reducing the incidence of non-blanching erythema in a hospital inpatient population: a randomized controlled trial. J Tissue Viability 2004; 14: 88–96 [RCT].

Guideline #5.6: Pressure prevention interventions shall be provided through regular and frequent turning and repositioning for bed and chair bound patients (Kosiak, 1961; Gordon et al., 2004). Reposition at least every hour to reduce pressure for chair-bound patients with attention to the patient’s anatomy, postural alignment, and distribution of weight and support of feet (WOCN Clinical Guidelines, 2003; AHCPR, 1992).

Level of evidence: II

Principle: Pressure ulcers are thought to be caused by unrelieved pressure and compression of soft tissues against bony prominences. Relieving pressure over bony prominences can be achieved. Reductions in pressure incidence have been achieved by repositioning every 4 hours for bed-bound patients. For the chair-bound patient, tissue pressure between the sitting surface and bony prominence should be relieved. Reposition the sitting individual to relieve pressure at least every hour. For those who can reposition themselves, pressure relief should be encouraged every 15 minutes such as chair push-ups. Constant low-pressure devices and seat cushions have not been proven efficacious in reducing the incidence of pressure ulcers for chair-bound individuals. Gel or air-pressure reducing chair cushions are more effective than foam in preventing ischial pressure ulcers. The Roho cushion was demonstrated to be more effective in relieving pressure at the seating surface when compared with the Jay and Pindot cushions.

Evidence:


Guideline #5.7: Pressure reduction using specialized foam overlays should be used as a preventative measure in the operating room for patients assessed to be at high risk for pressure ulcer development.

Level of evidence: I, II

Principle: Convoluted foam, cubed foam, and specialized thicker, denser sheepskin overlays are the only overlay surfaces shown to reduce the incidence of pressure ulcers in these settings.
Evidence:
3. Dunlop V. Preliminary results of a randomized controlled study of a pressure ulcer prevention system. Adv Wound Care 1998; 11 (Suppl. 3): 14 [RCT].

Guideline #6.1: Avoid vigorous massage over bony prominences.

Guideline #6.2: Use overhead trapeze bars, when possible, to facilitate the patient to assist with mobility.

Guideline #6.3: Clean and dry the skin after each incontinence occurrence.

Evidence:

Guideline #6.4: The use of cornstarch to decrease skin resistance, protective application of hydrocolloids, hexachlorophene lotion, hyperoxygenated fatty acid preparations, or sheet hydrogel dressings may protect vulnerable skin surfaces (Gordon et al., 2004; Green et al., 1974; Torra I Bou et al., 2005).

Guideline #6.5: Friction combined with pressure and moisture results in damage more readily. Friction injuries occur more frequently on elbows or where skin is fragile or macerated.

Evidence:

Guideline #6.5: Use lift sheets or devices to turn or transfer patients to avoid dragging or pulling that can result in friction injuries (WOCN Clinical Guidelines, 2003).

Level of evidence: III

Principle: Friction combined with pressure and moisture results in damage more readily. Friction injuries occur more frequently on elbows or where skin is fragile or macerated.

Evidence:

Guideline #6.6: Maintain head of bed at, or below, 30' or at the lowest degree of elevation consistent with the patient’s medical condition to prevent sliding and shear-related injury.

Level of evidence: III

Principle: Elevation of the head of the bed may result in shear and friction forces between the skin and the bed surface; this may predispose to the development of pressure ulcers.

Evidence:

Guideline #8.1: The nutrition management plan to prevent pressure ulcers should provide adequate daily calories, protein, carbohydrates, fat, vitamins, and minerals to meet individual energy needs. Provide nutrition (parenteral or enteral) appropriate to individual needs, goals of care, and patient preferences.

Level of evidence: I, II, III

Principle: Nutrition is essential in maintaining skin integrity; if nutritional risk or malnutrition occurs, the patient is at risk for the development of pressure ulcers. The impact of nutrition in the prevention of pressure ulcers remains controversial.

Evidence:


Guideline #8.2: Provide ongoing weekly nutrition assessment and reassessment to ensure adequacy of dietary intake in acutely ill patients; nutrition assessment in nursing home residents shall be compatible with guidelines for nursing homes.

Level of evidence: II, III

Principle: Nutrition is essential in maintaining skin integrity; if nutritional risk or malnutrition occurs the patient is at risk for the development of pressure ulcers. Long-term care residents are at particularly high risk for developing pressure ulcers. Risk assessment tools such as the Braden scale include nutrition assessment as an integral part of overall assessment of risk for pressure ulcer development.

Evidence:


9. Health care provider, patient and/or caregiver education

Preamble: Despite many of the advances in wound care, the challenge of preventing pressure ulcers remains due to the complexity of predisposing factors. This is compounded by the need to educate health care providers, patients, family, and/or caregivers about pressure ulcer prevention.

Guideline #9.1: The health care provider, patient, and/or caregiver should understand the importance of the following in preventing pressure ulcers in at-risk adults: regularly inspecting skin and bony prominences; following recommended skin-care regimens, avoiding vigorous massage of reddened areas and bony prominences; preventing friction and shearing forces, including frequent turning, repositioning, and the use of pressure-reducing devices if patient is confined to bed and/or chair; avoiding donut-type devices; maintaining adequate hydration and nutrition; monitoring weight loss, poor appetite, or gastrointestinal changes that interfere with eating; and promptly reporting changes in medical status and nutritional problems.

Level of evidence: II, III

Principle: Health care providers, patients, families, and caregivers need to be educated about pressure ulcer risk prevention.
Evidence:


10. Interdisciplinary approach

Preamble: Preventing pressure ulcers is less costly than treating pressure ulcers. The economic significance of pressure ulcers necessitates the importance of an interdisciplinary approach for their prevention.

Guideline #10.1: An interdisciplinary team of appropriate health care professionals, including a physician, advanced practice nurse and/or registered nurse/LPN for nursing homes, registered dietitian, physical therapist, occupational therapist, social worker, and other health care professionals as appropriate shall be identified to establish, develop, and implement policies and procedures for the prevention of pressure ulcers.

Level of evidence: II, III

Principle: Efforts to implement pressure ulcer prevention protocols through development of policies and procedures demonstrates a reduction in the prevalence of pressure ulcers. Note that this reference, and a number of others, has not demonstrated an effect in reducing the incidence of pressure ulcers that was sustained in time. No change in pressure ulcer prevalence has been observed since implementation of the Omnibus Budget Reconciliation Act of 1987 in a nationally derived sample of long-term nursing home residents. The relative odds of having a pressure ulcer increased by 6% from 1992–1994 to 1997–1998 for all pressure ulcer stages and increased 21% for stages 2 and greater. The risk-adjusted incidence rate of developing a pressure ulcer in Department of Veterans Affairs nursing facilities in 1997 was similar to the rate in 1990. However, the severity of new pressure ulcers was higher in 1997. Arguably, this represents either a complete failure to implement recommended interventions or a complete failure of the nature of the quality improvement interventions.

Evidence:


