# Guideline Summary NGC-8962

## Guideline Title

**Pressure ulcer prevention and treatment protocol. Health care protocol.**

## Bibliographic Source(s)

Institute for Clinical Systems Improvement (ICSI). Pressure ulcer prevention and treatment protocol. Health care protocol. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2012 Jan. 88 p. [112 references]

## Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Institute for Clinical Systems Improvement (ICSI). Pressure ulcer prevention and treatment. Health care protocol. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2010 Apr. 69 p. [102 references]

# Scope

## Disease/Condition(s)

Pressure ulcers

## Guideline Category

Counseling

Evaluation

Management

Prevention

Risk Assessment

Treatment

## Clinical Specialty

Dermatology

Family Practice

Geriatrics

Internal Medicine

Nursing

Nutrition

Pediatrics

Physical Medicine and Rehabilitation

Preventive Medicine

Surgery

## Intended Users

Advanced Practice Nurses

Allied Health Personnel

Dietitians

Health Care Providers

Health Plans

Hospitals

Managed Care Organizations

Nurses

Occupational Therapists

Physical Therapists

Physician Assistants

Physicians

### Guideline Objective(s)

- To eliminate the incidence of pressure ulcer development
- To accurately identify patients at risk of developing a pressure ulcer in the inpatient and outpatient care setting
- To improve the frequency of skin inspections and re-inspections in hospitalized patients and outpatient care patients with identified pressure ulcer(s)
- To increase the use and implementation of pressure ulcer prevention plans
- To improve the completion of a comprehensive patient assessment, including wound evaluation, in patients with an identified pressure ulcer
- To increase the use and implementation of pressure ulcer treatment plans
- To improve education in the prevention and progression of pressure ulcers to patients, families, and caregivers
- To improve the coordination and communication between care providers/care institutions regarding the transfer/discharge plan for patients with identified pressure ulcer(s)

### Target Population

All patients within an acute health care facility and ambulatory settings with or at risk for pressure ulcers

**Note**: While this protocol does not specifically address other settings, its use by them is not limited.

### Interventions and Practices Considered

**Evaluation/Prevention/Risk Assessment**

1. Assessment and daily reevaluation of all patients for the risk of pressure ulcer development (use of Braden Scale or Braden Q scale)
2. Documentation of the risk assessment
3. Prevention plan and documentation
   - Initiation of pressure ulcer prevention plan (minimizing/eliminating friction, minimizing pressure, support surfaces, managing moisture, maintaining adequate nutrition/hydration)
   - Educating patients and caregivers
4. Skin inspection and documentation

**Management/Treatment**

1. Comprehensive assessment including wound evaluation and documentation
   - Review of history and physical, with emphasis on pressure ulcer
   - Wound description/staging
   - Review of etiology of pressure
   - Assessment of nutritional status
   - Monitoring the wound for signs of infection
   - Assessment of psychosocial needs
2. Pressure ulcer treatment
   - Establishing the treatment goal
   - Moist wound healing
   - Cleansing the wound
   - Choosing appropriate topical wound care products
   - Wound debridement
   - Consideration of adjunct therapy (including negative pressure wound therapy, electrical stimulation)
3. Pain management
4. Management of nutrition (specific nutrient goals, vitamin and mineral supplement)

5. Surgical consultation
6. Patient and staff education
7. Discharge plan or transfer of care
8. Documentation of all items in patient's medical record

### Major Outcomes Considered

- Prevalence of pressure ulcers in health care facilities
- Effectiveness of treatment

## Methodology

### Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

### Description of Methods Used to Collect/Select the Evidence

A literature search of clinical trials, meta-analyses, systematic reviews, or regulatory statements and other professional order sets and protocols is performed.

A consistent and defined process is used for literature search and review for the development and revision of Institute for Clinical Systems Improvement (ICSI) Protocols. Literature search terms for the current revision of this document include device-related pressure ulcers in pediatric patients, occipital pressure ulcers in pediatric patients, pressure ulcer prevention, pressure ulcer prevention with devices, biofilm, hyperglycemia and pressure ulcers, deep tissue injury and stageable pressure ulcers from January 2010 through July 2011.

### Number of Source Documents

Not stated

### Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

### Rating Scheme for the Strength of the Evidence

#### Classes of Research Reports

| Class | Description |
|---|---|
| **Primary Reports of New Data Collections** | |
| **A** | Randomized, controlled trial |
| **B** | Cohort-study |
| **C** | Non-randomized trial with concurrent or historical controls<br>• Case-control study<br>• Study of sensitivity and specificity of a diagnostic test<br>• Population-based descriptive study |
| **D** | Cross-sectional study<br>• Case series<br>• Case report |
| **Reports that Synthesize or Reflect upon Collections of Primary Reports** | |
| **M** | Meta-analysis<br>• Systematic review<br>• Decision analysis<br>• Cost-effectiveness analysis |
| **R** | Consensus statement<br>• Consensus report<br>• Narrative review |
| **X** | Medical opinion |

### Methods Used to Analyze the Evidence

Systematic Review

### Description of the Methods Used to Analyze the Evidence

Not stated

### Methods Used to Formulate the Recommendations

Expert Consensus

### Description of Methods Used to Formulate the Recommendations

#### Document Development

A workgroup consisting of 6 to 12 members that includes physicians, nurses, pharmacists, and other healthcare professionals relevant to the topic, along with an Institute for Clinical Systems Improvement (ICSI) staff facilitator develops each document. Ordinarily, one of the physicians will be the leader. Most work group members are recruited from ICSI member organizations, but if there is expertise not represented by ICSI members, 1 or 2 members may be recruited from medical groups, hospitals, or other organizations that are not members of ICSI.

The work group will meet for 3 to 4 three-hour meetings to develop the protocol. Under the coordination of the ICSI staff facilitator, the work group develops the algorithm and writes the annotations and literature citations. The literature is graded in the document based on the ICSI Evidence Grading System.

Once the final draft copy of the protocol is developed, the document is sent to the ICSI members for review and comment.

### Rating Scheme for the Strength of the Recommendations

Not applicable

### Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

### Method of Guideline Validation

Internal Peer Review

### Description of Method of Guideline Validation

#### Review and Comment

The purpose of the review and comment process is to provide an opportunity for the clinicians in the member organizations to review the science behind the recommendations and focus on the content of the protocol. Review and comment also provide an opportunity for clinicians in each organization to come to consensus on feedback they wish to give the work group and to consider changes needed across systems in their organization to implement the protocol.

All member organizations are encouraged to provide feedback on protocols; however, responding to review and comment is not a criterion for continued membership within the Institute for Clinical Systems Improvement (ICSI).

#### Document Approval

Each protocol is approved by the appropriate steering committee. There is a steering committee for Respiratory, Cardiovascular, Women's Health, and Preventive Services. The Committee for Evidence-based Practice approves guidelines, order sets, and protocols not associated with a particular category. The steering committees review and approve each protocol based on:

- Member comments have been addressed reasonably.
- There is sufficient reason to expect that members will use the protocol with minor modifications or adaptations.
- Within the knowledge of the reviewer, the recommendations in the protocol are consistent with other protocols, regulatory and safety requirements, or recognized authorities.
- When evidence for a particular step in the protocol has not been established, the work group identifies consensus statements that were developed based on community standard of practice and work group expert opinion.
- Either a review and comment by members has been carried out, or within the knowledge of the reviewer, the changes proposed are sufficiently familiar and sufficiently agreed upon by the users that a new round of review is not needed.

Once the final draft copy of the protocol is developed, the document is sent to the ICSI members for review and comment.

## Recommendations

### Major Recommendations

**Note from the National Guideline Clearinghouse (NGC) and the Institute for Clinical Systems Improvement (ICSI)**: For a description of what has changed since the previous version of this guidance, refer to Summary of Changes Report--January 2012.

The recommendations for treatment of pressure ulcers are presented in the form of a protocol and two algorithms with 11 components each accompanied by detailed annotations. Algorithms are provided in the original guideline document for Pressure Ulcer Prevention and Treatment (inpatient algorithm) and Pressure Ulcer Prevention and Treatment (outpatient algorithm). Clinical highlights and the annotations follow.

Class of evidence (A-D, M, R, X) ratings are defined at the end of the "Major Recommendations" field.

**Clinical Highlights**

- **Risk assessment** should be performed in both the outpatient and inpatient settings. For outpatient, a set of questions answering yes or no should be used. For inpatient, use of a standardized risk assessment tool is

recommended. The work group recommends the Braden or Braden Q Scale. *(Annotation #1; Aim #2)*

- A **skin inspection** should be done on every patient within 6 hours of admission, and re-inspection should occur every 8 to 24 hours, depending on the status of the patient. *(Annotation #4; Aim #3)*
- The **pressure ulcer prevention plan** should include interventions that minimize or eliminate friction and shear, minimize pressure with off-loading, manage moisture, and maintain adequate nutrition and hydration. *(Annotation #3; Aim #1)*
- **Pressure ulcer treatment** should be evidence-based and include a patient assessment and wound evaluation, including the following elements: history and physical, wound description/staging, etiology of pressure, psychosocial needs, nutritional status, and bacterial colonization/infection. *(Annotation #8; Aim #5)*
- **Document** all risk assessments, skin inspection findings, pressure ulcer prevention interventions and treatments. Utilize a consistent documentation format. *(Annotations #1, 3, 4, 8; Aim #1)*
- **Education** is provided to the patient, family, caregivers and health care team members regarding prevention and treatment of pressure ulcers. *(Annotation #10; Aim #7)*
- **Communication** of pressure ulcer development, risk assessment, skin inspection results, and treatments should be consistent. Any change in skin condition is communicated to direct and indirect care providers as soon as observed. *(Annotations #1, 3, 4, 8, 10, 11; Aim #8)*

**Special Considerations**

Pressure ulcer prevention should be provided for all patients at risk of pressure ulcer development and those individuals who have a pressure ulcer *[M]*. There may be some patient conditions that may impede interventions in this protocol being implemented. Individualize the interventions as appropriate for these patients.

Risk assessment should be provided for all inpatients and outpatients. The frequency and extent of this assessment varies based on the patient's risk factors.

For inpatients, the risk assessment and skin inspection must be documented in the patient record, and "Not Assessed" should be written if not completed. The pressure ulcer prevention plan must be documented in the patient record and "Not Applicable" written if patient is at minimal risk (e.g., Braden score >18). The other communication and education steps of the protocol still apply.

All personnel involved in the process must take an active role in this protocol. If at any time a particular section of the protocol cannot be performed (e.g., maintain nutrition), the other assessment, verifications and subsequent steps still apply.

Persons undergoing palliative or hospice care may need an alteration in their goals of care. The goals of care can shift from prevention and treatment to palliation and management of ulcer pain and odor *[R]*. Refer to Annotation # 9, "Identify Treatment Goals," for further discussion.

Special consideration should be given to the use of compression stockings as they can impair lower extremity arterial function *[D]*. Lower extremity arterial disease should be ruled out before compression is applied. Stockings must be fitted based on measurements of ankle, calf and lower leg length. If the patient's legs are likely to become edematous, they should be measured over several days to be sure initial size of stockings is still appropriate. If the patient complains of pain or tightness of stockings, the legs should be remeasured. Stockings must be removed to inspect the skin for signs of pressure or perfusion problems.

Thigh-high elastic stockings have not proven to be more effective in prevention than knee-high ones and should be avoided because of the tendency to roll and cause a tourniquet effect. Elastic stockings are being used less by hospitals because of sequential compression device use and prophylactic anticoagulation therapy in deep vein thromboembolism prevention.

There are many potential providers involved in pressure ulcer prevention and treatment. This includes but is not limited to physicians, nurses, dietitians and rehabilitation services professionals. It is important to consider timely and appropriate referrals.

**Annotations for Pressure Ulcer Treatment**

1. **Risk Assessment and Documentation**

**Inpatient**

Pressure ulcer assessment includes determining a person's risk for pressure ulcer development and inspection of skin condition, particularly over bony prominences, beneath clothing and under devices.

For all inpatients, assess risk for pressure ulcer development at time of admission using a validated risk assessment tool. The literature and work group recommend the Braden Scale for Predicting Pressure Sore Risk© (Braden Scale) and the Braden Q Scale©, although there are several tools available to assess pressure ulcer risk. Other tools available include the Norton Scale and Waterlow Scale *[M]*.

The Braden Scale for Predicting Pressure Sore Risk (Braden Scale) is the most commonly used validated tool for predicting patients at risk for pressure ulcer development. Although the sensitivity and specificity for predicting pressure ulcer risk are high for the Braden Scale, it serves as an adjunct to clinical judgment regarding each individual. It is important for the health care team to use the Braden score as a guideline in planning interventions aimed at prevention *[R]*.

The Braden Scale was developed and tested for the adult population. The Braden Q is a modified Braden Scale for use in pediatric patients up to age 18 years. The Braden Q consists of seven subscales: mobility, activity, sensory perception, skin moisture, friction and shear, nutrition and tissue perfusion/oxygenation *[R]*. The Braden Q was tested for validity in a cohort study with children ages 21 days to 8 years in three sites *[C]*.

Reevaluate the risk for pressure ulcer development daily and with any change in level of care or condition such as surgery, transfer to or from intensive care unit, change in nutritional status or level of mobility, or as indicated for your care setting.

See Appendix A, "Braden Scale for Predicting Pressure Sore Risk© (Braden Scale)," Appendix B, "Braden Q Scale©," and Appendix C, "Outpatient Risk Assessment Plan," in the original guideline document.

**Outpatient**

Assess risk for pressure ulcer development in all patients receiving care in areas such as outpatient, ambulatory care, same-day surgery, emergency room, interventional cardiology or radiology areas, or similar settings.

Increases in population age, severity of illness and comorbidities have resulted in outpatient areas providing care for more patients at risk for pressure ulcer development. Health care services and triage processes may immobilize patients for two or more hours and place the patient at higher risk for pressure ulcer development.

In the absence of a validated outpatient risk assessment tool, the work group recommends assessing the patient using the following questions:

- Is the patient bed- or wheelchair-bound, or does he/she require assistance to transfer? *[M]*
- Will the patient be immobile or sedated for more than two hours?
- Is the patient incontinent of urine and/or stool?
- Does the patient have existing pressure ulcers, history of pressure ulcers?
- Does the patient appear visibly malnourished?

In addition, for young children, is the child demonstrating inadequate tissue perfusion with evidence of skin breakdown?

For a "Yes" response to any question above, initiate a pressure ulcer prevention plan. See Annotation #3, "Pressure Ulcer Prevention Plan, Documentation and Education of Patient and Caregivers." See also Appendix D, "Pressure Ulcer Prevention Plan," in the original guideline document.

Research has identified age as a risk factor for developing pressure ulcers in correlation with factors such as low blood pressure, temperature, and poor protein intake *[B]*. Advancing age, along with other risk factors, increases the risk for pressure ulcer development. The existence of comorbid conditions such as cardiovascular and endocrine diseases may contribute to increased vulnerability for the development of pressure ulcers. Patients 75 years of age or greater and/or patients with multiple high-risk diagnoses should be advanced to the next level of risk *[R]*. See Appendix C, " Outpatient Risk Assessment Plan," in the original guideline document.

2. **Is Patient at Risk?**

**Inpatient and Outpatient**

It is important for members of the health care team to become familiar with patient populations at increased risk for pressure ulcer development *[C]*, *[R]*. High-risk diagnoses may include but are not limited to:

- Peripheral vascular disease
- Myocardial infarction
- Stroke
- Multiple trauma
- Musculoskeletal disorders/fractures/contractures
- Gastrointestinal bleed
- Spinal cord injury (e.g., decreased sensory perception, muscle spasms)
- Neurological disorders (e.g., Guillain-Barré, multiple sclerosis)
- Unstable and/or chronic medical conditions (e.g., diabetes, renal disease, cancer, chronic obstructive pulmonary disease, congestive heart failure)
- History of previous pressure ulcer
- Preterm neonates
- Dementia
- Recent surgical patient. Individuals who undergo operative procedures may be at increased risk for pressure ulcers. This risk may be related to length of time on the operating room/procedure table, hypotension or to the type of procedure *[D]*, *[R]*.

The effectiveness and success of treatment of pressure ulcers is greatly influenced by pre-existing comorbidities and chronic conditions. Knowledge of comorbidities and chronic conditions and how they impact the healing process by reducing the amount of oxygen, amino acids, vitamins and minerals available at the wound site thereby determine the appropriate interventions for optimum pressure ulcer healing.

**Documentation**

Utilize a consistent documentation format to support risk assessment findings, care provision, communication and measurement.

"Not assessed" is written if the risk assessment is delayed or not completed.

3. **Pressure Ulcer Prevention Plan, Documentation and Education of Patient and Caregivers**

The prevention of pressure ulcers incorporates the interventions below:

- Minimize or eliminate friction and shear *[M]*
- Minimize pressure (off-loading) *[M]*
- Support surfaces
- Manage moisture
- Maintain adequate nutrition/hydration *[M]*

The interventions and information presented are to be utilized for prevention of pressure ulcer development. See Appendix D, "Pressure Ulcer Prevention Plan," in the original guideline document.

**Minimize/Eliminate Friction and Shear**

*Actions*:

- Lift the body off the bed/chair rather than dragging as the patient is moved up in bed/chair.
- Avoid elevating head of the bed more than 30 degrees unless contraindicated. Sitting at a 90-degree angle when in the chair decreases shear/friction.
- Use transfer devices such as mechanical lifts, surgical mattress and surgical slip sheets.
- Pad between skin-to-skin contact, or skin-to-equipment contact that may rub together.
- Frequently use hypoallergenic lubricating oils, creams or lotions which lower the surface tension on the skin and reduce friction *[M]*.
- Use transparent film, hydrocolloid dressings or skin sealants on bony prominences (such as elbows) to decrease friction.
- Keep skin well hydrated and moisturized.
- Lubricate or powder bedpans prior to placing under the patient. Roll patients to place the bedpan rather than pushing and pulling it in and out.
- Protect skin from moisture. Excessive moisture weakens dermal integrity and destroys the outer lipid layer. Therefore, less mechanical force is needed to wound the skin and cause a physical opening *[R]*.

**Minimize Pressure (Off-loading)**

Immobility is the most significant risk factor for pressure ulcer development. Consider passive range of motion for prevention and treatment of joint contractures and referral to physical therapy/rehabilitation services for additional treatment. Patients who have any degree of immobility should be closely monitored for pressure ulcer development *[R]*.

Patients have greater intensity of pressure over the bony prominences when sitting in a chair, because there is less distribution of weight. Along with increased weight over the bony prominences, there is a tendency for the body to slide in a downward motion, causing shearing and destruction of the soft tissue over the bony prominences. A sitting position includes sitting in bed with head elevation greater than 30 degrees, a cardiac chair, recliner or wheelchair. When in this position, it is important for the patient to shift weight every 15 minutes if he/she is able to do so independently. This includes "small shifts of weight" such as pushing up on their arms, raising or lowering their head slightly to redistribute the weight, or lifting from side to side. If the patient is unable to shift weight independently, his/her position should be changed by care providers on an hourly basis. Remember to utilize chair cushions and consult Physical Therapy/Occupational Therapy for assistance with seating and positioning *[R]*.

**Support Surfaces**

The work group recommends that hospitals, transitional care units, and nursing homes convert their standard bed mattresses to group I or II prevention mattresses to reduce the incidence of hospital-acquired pressure ulcers.

The work group also recommends consulting a wound specialist or educated skin care team member for the proper and most cost-effective selection of support surfaces.

*Actions*:

- Use pressure support surfaces to redistribute pressure as indicated for beds and chairs *[M]*.
- Consider patient's weight in bed selection. For patients over 300 pounds, evaluate need for bariatric bed/appropriate size support surface.
- Consider patient's height in bed selection. Assess tall patients who might exceed standard bed length.
- Minimize/eliminate pressure from medical devices such as oxygen masks and tubing, catheters, halo/cervical collars, casts, nasogastric tubes, external stabilizers on percutaneous endoscopic gastrostomy tubes, orthopedic splints/immobilizers and restraints.
- Limit the number of linen layers between the treatment support surface and patient.
- Maintain or enhance patient's level of activity.
- Use pressure support surfaces as indicated. Free-float heels by elevating calves on pillows and keeping heels free of all surfaces. Refer to the picture in the original guideline document.

Patients in Bed:

- Encourage patients to make frequent, small position changes.
- Use pillows or wedges to reduce pressure on bony prominences.
- At a minimum, nursing should turn patient every two hours *[M]*.
- When the patient is lying on one side, do not position directly on trochanter (hip).
- Use pressure redistribution mattresses/surfaces *[M]*.
- If the patient's condition limits repositioning, still attempt to off-load pressure.

Patients in Sitting Position:

- Encourage patients to weight shift every 15 minutes (e.g., chair push-ups, if able to reposition self; have patient stand and reseat self if able; make small shift changes such as elevating legs).
- Reposition every hour if the patient is unable to reposition self.
- Utilize chair cushions for pressure redistribution. Avoid use of "donuts."

**Manage Moisture**

There is an increased attention to the effects of microclimate in pressure ulcer formation and healing. Microclimate is defined as the tissue temperature and relative humidity at the body/support surface junction. Increased body temperature results in a higher metabolic rate in tissue and alters cell growth towards fibroblasts and scarring. The inpatient population with elevated skin temperatures and perspiration is at increased risk for pressure ulcer formation. Microclimate management is important in prevention and healing of pressure ulcers *[R]*.

*Actions*:

- Evaluate type of incontinence – urinary/fecal or both, and contributing factors. Eliminate if possible.
- Implement toileting schedule or bowel/bladder program as appropriate.
- Check for incontinence a minimum of every two hours, and as needed.
- Cleanse skin gently after each incontinent episode with water or pH-balanced cleanser. Avoid excessive friction and scrubbing, which can further traumatize the skin. Cleansers with nonionic surfactants are gentler to the skin than anionic surfactants in typical soaps *[R]*.
- Use moisture barrier protectant on skin (e.g., creams, ointments, film-forming skin protectants) as needed to protect and maintain intact skin, or to treat non-intact skin.
- Select absorbent underpads and briefs to wick incontinence moisture away from the skin versus trapping moisture against the skin, causing maceration.
- Consider use of stool containment devices (e.g., rectal pouch, U.S. Food and Drug Administration [FDA]-approved rectal tube). Assess the stool consistency, frequency and the effectiveness of the above actions before initiation of devices, but initiate devices before skin breakdown occurs. A rectal pouch may be the initial treatment: if ineffective, begin use of an FDA-approved rectal tube. These products require training prior to use due to risk of injury or perforation.
- Some tube feeding solutions and antibiotics may exacerbate the incidence of diarrhea. Communicate the issue of diarrhea to the physician and/or dietitian to evaluate options for minimizing the diarrhea.
- Assess for candidiasis, and treat as appropriate *[R]*.
- Contain wound drainage.
- Separate skin folds, use a skin sealant and change dressings frequently *[R]*.
- Change linen frequently for excessive perspiration. Airflow specialty beds may minimize perspiration.

**Maintain Adequate Nutrition / Hydration**

Each individual who is at risk for inadequate nutrition should be screened for nutritional status at admission to a health care facility or with a significant change in condition. A valid and reliable tool, such as the Malnutrition Screening Tool (MST) or the Short Nutritional Assessment Questionnaire (SNAQ), may be used to complete a nutrition screen.

Referral to a Registered Dietitian should take place to thoroughly assess a patient who is at risk for the development of, or presents with, a pressure ulcer *[R]*.

Referral to other health care team members, such as a physician, dentist, speech or occupational therapist, may be needed to evaluate factors contributing to poor nutrition.

*Actions*:

Complete an assessment for the prevention or treatment of pressure ulcers, which includes:

- Assessment of nutritional needs, protein, calories, fluids, vitamins and minerals *[R]*
- Adequacy of oral intake, both in recent history and current *[R]*
- Barriers to achieving optimal nutrition, including swallowing, chewing and social implications *[R]*
- Cognitive function, including ability to eat independently *[R]*
- Review of patient's medical condition and chronic disease states, including diabetes control and renal disease *[R]*
- Anthropometrical and biochemical indicators, including body mass index, weight changes and Braden Scale *[R]*
- Recording weight history and weight loss from usual body weight
  - Weight loss of greater than or equal to 5% change in 30 days or greater than or equal to 10% in 180 days should be flagged as increased nutritional risk.
  - Body mass index of 19 or less may be indicative of possible nutrition depletion *[R]*
- Activity level
- Goals and wishes of the patient

The nutrition care plan is built based on the results of the assessment. This care plan would be used for both those patients identified at risk and in need of nutrition prevention, and those patients requiring nutrition intervention of pressure ulcers.

- Monitor weight and weight changes. Address as indicated with modifications of patient's caloric intake *[R]*.
- Develop a time frame for review of the treatment plan. More frequent evaluations are needed when condition changes or when progress toward pressure ulcer closure is not occurring *[R]*.
- Allow flexibility and creativity in accommodating patient's food preferences *[M]*, *[R]*.
- Ensure adequate fluid intake to keep well hydrated and prevent dehydration *[R]*.
- Assure nutrition/hydration needs are adequately met when procedures may delay nourishment/intake.

- Consider the need for enteral or parenteral supplementation.
- Provide nutritional supplements and food fortifiers as indicated *[R]*.
- Provide multivitamin and mineral supplement if intake is poor or nutritional deficiency is suspected or indicated by lab values *[R]*.
- Monitor laboratory values. Serum prealbumin levels in malnutrition can be interpreted as follows:
  - Less than 5 mg/dL predicts a poor prognosis.
  - Less than 11 mg/dL predicts high risk and requires aggressive nutritional supplementation.
  - Less than 15 mg/dL predicts an increased risk of malnutrition *[R]*.
- Refer to other medical disciplines for recommendations on cognitive issues.

Laboratory values, such as albumin, prealbumin and transferrin may not reflect the current nutritional state, especially in the critically ill patient. Other assessment factors such as weight loss, illness severity, comorbid conditions and gastrointestinal function should be considered for a nutrition plan of care *[R]*.

**Educate Patient/Caregivers**

Patient education is an important piece of pressure ulcer prevention and treatment. The patient, family and caregivers are key to prevention, management and treatment of pressure ulcers. Teaching materials should be given to the patient and family on admission or at the time risk is identified. Possible content of education includes:

- Causes of pressure ulcers
- Ways to prevent them
- Dietary needs
- Positioning

Education should be in an appropriate reading level, organized, appealing and with easy-to-understand instructions in multiple languages and/or family and caregivers should be brought into the hospital to have hands-on teaching on dressing changes to assess their ability to provide the care at home. Detailed written instructions should also be given to them to refer to at home. If the patient, family or caregiver is unable to do the actual treatment, the education still needs to be provided. Education should also be provided to the person or agency that will be doing the care, if the patient, family or caregiver is not able. Document response to education.

**Documentation**

Document the pressure ulcer prevention plan in the patient record. Utilize a consistent documentation format to communicate the assessment and care plan. A paper checklist or process within an electronic medical record system could be a tool to support documentation of the pressure ulcer prevention plan.

"Not applicable" is written for the pressure ulcer prevention plan if the patient is not at risk.

All personnel involved in the process must take an active role in the prevention plan. If at any time, a particular section of the plan cannot be implemented (e.g., maintain nutrition), the other interventions still apply.

Refer to the original guideline document for more information about pressure ulcer prevention plan, documentation, and patient/caregiver education.

4. **Skin Inspection and Documentation**

For all inpatients, complete a skin inspection on every inpatient within six hours of admission, and palpate particularly over bony prominences *[R]*.

For all patients inspect and palpate for:

- Alteration in skin moisture
- Change in texture, turgor
- Change in temperature compared to surrounding skin (warmer or cooler)
- Color changes
  - Non-blanchable erythema in patients with lightly pigmented skin
  - Purplish/bluish discoloration in patients with darkly pigmented skin
- Consistency, such as bogginess (soft) or induration (hard)
- Edema
- Open areas, blisters, rash, drainage
- Pain or itching

*[R]*

Caregivers who are not of the same ethnic background as the patient may be less sensitive to slight changes in skin color. This is an important factor to consider in the assessment of patients with darkly pigmented skin *[R]*.

Observe skin in good lighting, and any areas of discoloration or redness should be palpated for change in temperature compared to surrounding skin, or feeling of bogginess (soft) or induration (hard). Pay particular attention to areas over bony prominences. Blanching erythema is an early indicator of the need to redistribute pressure; non-blanching erythema is suggestive that tissue damage has already occurred or is imminent; indurated or boggy skin is a sign that deep tissue damage has likely occurred. Medical devices can cause pressure damage; therefore, close observation around and under medical devices is highly recommended *[R]*.

Re-inspect and palpate skin for inpatients every 8 to 24 hours, depending on status of patient. Frequency of skin inspection under equipment may be different from head-to-toe skin inspection. Depending on the device, an increase

frequency may be necessary.

Patients at high risk of breakdown, as determined by either Braden or Braden Q Scale score, may need to be assessed more frequently as condition changes.

The skin inspection can be performed at the same time as other assessments. Start at the top and work downward. A full-body skin inspection doesn't have to be visualizing all aspects of the patient in the same time period.

Refer to the original guideline document for additional information about skin inspection.

**Documentation**

Document skin inspection in the patient record. Utilize a consistent documentation format to support care provision, communication and measurement.

"Not assessed" is written if the skin inspection is delayed or not completed. Define a procedure for documentation of a patient refusal of skin inspection. The communication and education steps of the protocol apply even if skin inspection is refused by the patient.

A paper checklist or process within an electronic medical record system could be a tool to support documentation of skin inspection.

7. **Document When Wound Is Outside of Scope: Differential Diagnosis**

The scope of this guideline is limited to the evaluation and treatment of pressure ulcers defined as localized injury to the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure or pressure in combination with shear and/or friction. Wound types outside of scope, though they share pressure and shear as a portion of their etiology, include:

- Incontinence-associated dermatitis
- Venous insufficiency ulcers
- Arterial insufficiency ulcers
- Diabetic foot ulcers
- Skin tears

8. **Comprehensive Patient Assessment Including Wound Evaluation and Documentation**

Pressure ulcer treatment includes an assessment of the following elements: history and physical, etiology of pressure, psychosocial needs, nutritional status, wound and surrounding skin appearance, and bacterial colonization/infection.

**History and Physical**

Review a current health history and physical including medication list to identify factors potentially contributing to the pressure ulcer or impairing the healing of the pressure ulcer. For example, patients with atherosclerotic cardiovascular disease or low blood pressure may not perfuse tissue at normal levels and therefore would be at higher risk of developing pressure ulcers. Also, patients who use tobacco or have low hemoglobin would have reduced oxygen transported to cells, thus increasing the risk of cell death. Diabetes can cause microvascular disease and loss of protective sensation of the lower extremities, both contributing factors in the development of pressure ulcers. Neurological injuries from stroke and spinal cord injury or deficits in mobility or level of consciousness could interfere with the patient's ability to reposition or sense/indicate discomfort. The subscales of validated risk assessment tools guide practitioners to the areas of risk and need for intervention *[C]*.

**Wound Description/Staging**

Pressure ulcer assessment consists of an assessment of the wound and surrounding (periwound) skin.

Thorough assessment of the wound should occur when the wound is initially identified, routinely and prior to any transition from one health care setting to another. This transition assessment is essential to communicate clearly to the next level of care regarding the state of the wound.

Clean the wound and surrounding skin prior to assessment. With each dressing change, assess the wound bed appearance, surrounding skin, and drainage. Document the assessment findings.

Refer to the Resources Table in the original guideline document for National Database of Nursing Quality Indicators (NDNQI)-related resources.

**Etiology of Pressure**

Identifying the source of pressure is essential as a preventive measure or when an injury is suspected. Although the most common locations of pressure ulcers are bony prominences, equipment-related pressure ulcers are increasing. Devices that may contribute to pressure ulcers include respiratory therapy equipment, compression therapy devices, and immobilizing equipment.

When the patient's overall health status supports healing, yet no improvement in the wound has been noted, the source of pressure may not have been correctly identified, and therefore the interventions may not be effective.

**Nutritional Status**

Nutritional needs are based on the patient's age, sex, height, weight, presence of inadequate nutrition or obesity, current disease state, severity of illness, and presence and severity of wounds. The work group recommends collecting a baseline nutritional assessment. Refer to Annotation #3, "Pressure Ulcer Prevention Plan, Documentation and Education of Patient and Caregivers," for more specific information on nutritional assessment.

**Bacterial Colonization/Infection**

It is important to differentiate between wound contamination, colonization, and infection. Contamination is the presence of bacteria on the wound surface without proliferation. Colonization is characterized by the presence and proliferation of microorganisms in a wound without a host response. This occurs frequently, particularly in chronic wounds such as stasis ulcers, and pressure ulcers *[R]*. Critical colonization is an elevated or "critical" level of surface colonization that can delay wound healing without eliciting a host immune response, as infection would *[R]*.

A wound infection occurs when the bacteria invade healthy viable tissue to proliferate to the point of overwhelming the host's immune response. The infection may be acute or chronic depending on the host's defense mechanisms *[R]*.

In acute wounds, the classic signs of inflammation (redness, edema, pain, increased exudate, and periwound surface warmth) persist beyond the normal time frame of three to four days. In patients who are immunosuppressed, the signs of inflammation often are diminished or masked because these patients are unable to mount an effective immune response. Often the only clue to a wound infection is complaint of pain.

All chronic wounds, including pressure ulcers, have bacteria. The clinician needs to determine if the bacterial load in the wound is balanced or has critical colonization or infection. Since bacteria resides in non-viable tissue, debridement of this tissue and wound cleansing are important to reduce bacteria and avoid adverse outcomes such as sepsis.

The first sign of **critical colonization** or local infection may be a delay in healing and an increase in exudates. Critical colonization potentially can be treated with antimicrobial dressings such as silver preparations.

Diagnosis of wound **infections** is based on patient history and clinical findings. Although the gold standard for determining infection is tissue biopsy, many wounds are swab cultured for confirmation of infection. All wounds should be cleansed with a non-antiseptic solution prior to culture *[R]*. The swab culture should be placed on healthy granulation tissue, pressed down and turned 360 degrees to extract fluid. Do not culture pus, slough or necrotic tissue *[R]*. Infection is indicated when bacteria counts reach $10^5$ organism per gram of tissue. Infection must be treated with systemic antibiotics based on wound culture results. The signs and symptoms of wound infection depend on whether the wound is acute or chronic *[R]*.

In a chronic wound, the signs of infection may be more subtle. Signs may be:

- Increase in amount or change in characteristics of exudate
- Decolorization and friability of granulation tissue
- Undermining
- Abnormal odor
- Epithelial bridging (a bridge of epithelial tissue across a wound bed) at the base of the wound
- Sudden pain *[R]*

Clinicians may find the mnemonics NERDS and STONES helpful. See Appendix E, "Mnemonics for Critical Colonization," in the original guideline document.

See the original guideline document for information on biofilm.

**Psychosocial Needs**

Psychosocial issues may affect pressure ulcer development and treatment. One study reported that increased isolation from friends and family, financial problems, pain, lack of privacy, changes in body image and loss of control and independence have significant impact on the patient and their recovery *[D]*. Lower levels of well-being and activity in spinal cord injury and pressure ulcer development have been reported *[D]*. There is some evidence to support that psychological factors may influence the development of pressure ulcers, and an individual's style of coping may have an effect on outcomes *[D]*.

Providing holistic care through empathy, knowledge, and tailoring the plan of care to the patient's individual needs will facilitate physical healing as well as the spiritual healing *[D]*. Interventions to enhance socialization such as encouraging involvement in current relationships, in developing relationships, and positive feedback when the patient reaches out to others might be beneficial *[R]*. Interventions to enhance body image would include assisting patients to discuss changes caused by the pressure ulcer and assisting patient to separate physical appearance from feelings of personal worth *[R]*. Pain management, financial assistance and providing privacy may also help to enhance the patient's psychosocial adjustment to the pressure ulcer.

Determine if the patient is able to manage the wound treatment independently or if he/she has adequate support at home. Consider referral for additional resources/services as necessary.

**Documentation**

For inpatients, a thorough wound assessment (as described above) is documented on admission or initial identification of a hospital-acquired pressure ulcer, and prior to any transition from one health care setting to another. Partial wound assessment is documented with each dressing change. Dressing status is documented every shift. If advanced wound dressings are in place on day of discharge, the previous dressing change assessment is also noted.

Documentation is recorded in the outpatient medical record according to organizational policy.

A consistent documentation format is utilized to support care provision, communication and measurement.

A paper checklist or process within an electronic medical record system could be a tool to support documentation of the assessment.

Document turning and repositioning, as well as lack of them due to patient refusal, contraindications or inability to comply.

9. **Identify Treatment Goals**

Wound healing or restorative care is the optimal goal that is evidenced by granulation tissue or re-epithelialization of the wound *[R]*. This goal is obtained by evidenced-based interventions that support the principles of wound healing. For palliative care, the individual's wishes are followed, and the goals promote comfort.

The treatment goal directs the plan of care, including, but not limited to:

- Debride the wound and prepare for surgical intervention
- Complete wound closure
- Manage pain, drainage and odor

Wound palliation or symptom management is the goal for those wounds that have become chronic and do not respond to standard interventions or when the demands of the treatment are beyond the patient's tolerance or stamina, such

as in the end-of-life issues. The following mnemonics identify the components of a treatment plan for symptom management *[R]*:

**S-P-E-C-I-A-L**

**S** = Stabilize the wound

**P** = Prevent new wounds

**E** = Eliminate odor

**C** = Control pain

**I** = Infection prophylaxis

**A** = Advanced absorbent wound dressing

**L** = Lessen dressing changes as palliation care occurs

Many of the interventions of a treatment plan to heal a wound are not possible with a patient who is receiving palliative care. The focus is to manage pain, drainage and odor, as well as prevention of complications/deterioration of wound. If the patient is receiving comfort care, advanced wound care may be used in these situations and may include:

- Charcoal over the wound bed
- Topical antimicrobial dressings, e.g., silver, cadexomer iodine
- Topical metronidazole
- Topical anesthesia
- Premedicating the patient
- A four-hour turning on a low air surface, if a two-hour turning schedule may not be possible due to pain.

Individualize turning and repositioning per the patient's preferences, goals and as the medical patient's condition allows. Utilize pressure redistribution, padding and positioning devices.

10. **Implement and Document Interventions**

**Moist Wound Healing**

A moist wound surface promotes cell migration and prevents cell death. The clinician must select agents that maintain or donate moisture at the wound surface. The cardinal rule of healing is to keep the wound tissue moist and the surrounding skin dry. Use a dressing that will keep the wound bed continuously moist. A wet-to-dry dressing is not typically considered continuously moist and therefore not recommended *[B]*, *[R]*, *[NA]*.

The work group recommends the following tips:

- If it is dirty, clean it.
- If it is deep, fill it.
- If it is open, cover it.
- If it is dry, moisten it.
- If it is wet, absorb it.

**Wound Cleansing**

Wound healing is optimized and risk of infection is reduced when surface bacteria, necrotic tissue, exudates, metabolic wastes, and residue of wound care products are removed from the wound. Routine wound cleansing is used for both necrotic and clean wounds. Routine wound cleansing should be accomplished with minimal chemical or mechanical trauma to the tissue *[M]*. Traumatized wounds have a greater risk of infection and slower healing rate. The process of cleansing a wound involves selection of both a wound cleansing solution and a mechanical means of delivering that solution to the wound.

*Goals of Cleansing*

- Remove non-viable tissue, bacteria, bacterial toxins from the wound surface
- Protect healing wound
- Facilitate wound assessment by optimizing visualization of wound

*General Points of Cleansing*

- Cleanse the wound initially and at each dressing change
- Use universal precautions to minimize risk of cross-contamination
- Minimize mechanical force when cleansing ulcer with gauze, cloth, or sponges

*Mechanical Cleansing Procedure*

Work in a circular pattern, starting at the center of the wound to gently cleanse the wound with the moistened gauze. Work toward the edge of the wound and surrounding skin. Remove loose tissue with the gauze pad. Do not press hard or scrub a clean wound because this will damage the tissue and slow healing. Do not return to the wound center after cleansing, to avoid recontamination of the wound.

*Antimicrobials and Cleansers*

Normal saline is a safe and effective cleanser for all wounds. Normal saline is physiologic and will not harm tissue. It will adequately cleanse most wounds if a sufficient amount is used to thoroughly flush the wound. Although normal saline is the cleanser of choice in the hospital, it does not contain a preservative, so bacteria starts to colonize once the sealed bottle is open. Therefore, hospital protocols often advise discarding any unused saline after 24 hours.

Drinkable tap water is as effective as saline to cleanse a wound. Cleansing can be done under running water in a sink or preferably in the shower. Immunosuppressed patients should not use tap water *[M]*.

For the clean granulating wound, cytotoxic cleaning agents are not indicated. However, when a wound is suspected to have critical colonization or infection, topical antimicrobials are indicated (e.g., povidone-iodine, sodium hypochlorite solution, hydrogen peroxide or acetic acid) for a time-limited period (usually two weeks) *[R]*. For wounds with evidence of a heavy bioburden, use agents and dilutions that minimize any adverse effects. Discontinue the antimicrobial as soon as the bacterial balance has been restored, as evidenced by a clean wound bed and a reduced volume of exudate. If the wound has heavy exudates or adherent material, a commercial wound cleanser may be used. Commercial wound cleansers contain surfactants that help remove wound contaminants *[R]*.

*Irrigation*

High-pressure irrigation may be needed in the presence of slough and necrotic tissue *[R]*.

- The cleansing method should provide enough pressure to remove debris yet not cause trauma to the wound bed. The optimal pressure to cleanse is between 4 and 15 psi.
- A 35 mL syringe with 19-gauge angiocath creates an 8-psi irrigation pressure stream, which may be used to remove adherent material in the wound bed *[R]*.

*Periwound Skin Cleansing*

Periwound skin must be protected throughout the healing process. Trauma, excoriation, erythema, maceration, and dermatitis of intact skin delay epithelial activity and increase pain. Periwound maceration and continuous contact with wound moisture can enlarge the wound and impede healing *[R]*. Special attention to the periwound skin should be part of all dressing changes. Barrier ointments or films, absorptive dressings, and hydrocolloids can be used to protect the periwound skin. Cleaning the periwound skin with a pH balanced skin cleanser rather than saline promotes the healing of pressure ulcers *[D]*. Intact skin should be moisturized regularly to prevent cracking of the skin.

**Topical Treatments**

Dressing selection should be based on the tissue in the wound bed, the periwound skin condition and the treatment goals. The type of dressing may change over time as the wound heals or deteriorates *[R]*.

- Calcium alginates or other fiber gelling dressings
- Composites
- Contact layers
- Foam
- Gauze
- Impregnated gauze
- Hydrocolloid
- Hydrogel
- Transparent film
- Wound fillers
- Wound pouches
- Antimicrobials
- Collagen

Refer to the original guideline document for more information on these products.

**Debridement**

Debridement is the removal of necrotic tissue or contaminated foreign matter. Necrotic tissue is non-viable, devitalized tissue called slough or eschar and varies in color, consistency and adherence to the wound bed. The words "slough" and "eschar" refer to different levels of necrosis and are described according to color and consistency. Slough is described as yellow (or tan) and thin, mucinous or stringy; eschar is described as brown or black and soft or hard, and represents full-thickness destruction *[D]*, *[R]*. Slough tends to have more moisture and less adherence to the wound bed than eschar, having little to no moisture and much adherence *[R]*.

Necrotic tissue impedes wound healing for two main reasons: 1) it is a medium for bacterial growth, and 2) is a physical obstruction or barrier to granulation, contraction and epithelialization in the wound bed *[D]*, *[R]*, *[NA]*.

*Goals of Debridement*

1. Remove obstructive tissue
2. Decrease risk of infection
3. Accelerate wound healing
4. Prevent further complications by reducing tissue destruction

*Selective Debridement*

1. Autolytic debridement
2. Chemical/enzymatic debridement
3. Conservative sharp debridement
4. Biosurgical debridement or larval debridement therapy
5. Ultrasonic mist

Refer to the original guideline document for more information on selective types of debridement.

*Non-selective Debridement*

**Surgical sharp debridement** is preferred for larger or deeper pressure ulcers to quickly shift the state of the wound from burdened, infected or chronic healing to free to proliferate in a normal or acute healing process. This, of course, depends on the status of the patient and the surgeon's clinical judgment. **Prior to performing any type of debridement of the extremities, especially below the knee, the patient must be assessed for adequate blood supply by palpation of pulses, Doppler, ankle/brachial index, non-invasive arterial studies and a review of the patient's past and present medical history for risk factors for arterial insufficiency.** Surgical debridement is the excision of necrotic material up to and including viable tissue margins *[R]*. International guidelines recommend performing debridement in the operating room for the following situations: presence of advancing cellulitis, wound-related sepsis, extensive necrotic tissue, inability to establish degree of undermining/tunneling, and if there is infected bone or hardware that may require removal *[R]*.

**Mechanical debridement** is the removal of necrotic tissue using an outside force. The most common types of mechanical debridement are wet-to-dry gauze dressings (distinct from wet-to-moist gauze dressings where the wound bed and primary layer of the dressing remain completely moist and do not adhere to each other), wound irrigation (using a blunt needle and syringe or pulsed lavage with suction), and whirlpool.

Refer to the original guideline document for additional information on debridement.

**Adjunct Therapies**

Adjunct therapies can augment the healing process for pressure ulcers in any phase of wound healing, as long as the standard of care is implemented concomitantly. For example, using electrical stimulation on a pressure ulcer in the absence of off-loading will do little for creating a positive outcome for the patient. The original guideline document provides a description of adjunct therapies for the reader to explore and to make the appropriate referral to a clinician trained in their use, but does not necessarily constitute a "recommendation" by the work group. Note: there is little data comparing the use of one adjunct therapy to another.

*Biophysical Agents*

Biophysical agents or modalities such as electrical stimulation; induced electrical stimulation; photo therapy, i.e., infrared and ultraviolet; negative pressure wound therapy; hyperbaric oxygen; and non-contact, non-thermal ultrasound all add some form of energy to the wound bed to help drive the healing process forward, especially in the compromised tissues of patients who tend to get pressure ulcers.

**Electrical stimulation** for wound healing is defined as the use of a capacitative coupled electrical current to transfer energy to a wound. A physical therapist will have the knowledge required to set the polarity, amplitude and voltage, amperage, wave forms, frequency and duty cycle appropriate for the state of each wound and patient. There is a significant body of research that demonstrates that polarity influences healing in different ways at different phases *[R]*. Electrical stimulation also improves local blood flow and oxygen delivery, has antibacterial effects, helps with debridement and thrombolysis, and decreases pain. Contraindications are malignancy, an electronic implant or metal implant. Consider the use of direct contact (capacitative) electrical stimulation in the management of recalcitrant category/stage II, as well as category/stage III and IV pressure ulcers to facilitate wound healing.

**Induced electrical stimulation** is technology that induces the flow of electrons in the tissue rather than directly applying electricity. These technologies are pulsed radio frequency stimulation, pulsed electromagnetic fields, and pulsed short-wave diathermy. All of these are forms of diathermy, but for wound healing are set up, and applied, to be non-thermal. All class III diathermy non-thermal medical devices licensed by the Federal Drug Administration induce electrical current in the tissues, and as such, will have the same clinical effects, indications and contraindications as direct electrical stimulation *[R]*.

**Hyperbaric oxygen therapy** is the application of oxygen to the host's tissues above atmospheric pressure. Systemic hyperbaric oxygen is administered by a Certified Hyperbaric Registered Nurse (CHRN) or a Certified Hyperbaric Technologist (CHT). Hyperbaric oxygen is generally not the first adjunct therapy considered since wound ischemia is due to pressure that should be eliminated through support surfaces, splinting and positioning. If off-loading measures are adequate, the wound should get enough perfusion, as long as no arterial insufficiency is present. If a pressure ulcer is present distal to the knee, check for adequate blood flow *[R]*.

**Negative pressure wound therapy** devices apply negative pressure, or suction, to the wound bed. This technology should be applied by a clinician (registered nurse, physical therapist, physician, podiatrist, etc.) trained in its indications, contraindications, precautions and different methods of application. It is a skilled application, with risk if not done properly, and it should also be monitored by clinician for any adverse outcomes or events, specifically frank bleeding from a named vessel or organ.

Refer to the original guideline document for additional information on the mechanism of action of different types of biophysical modalities.

**Biological Applications**

These are products that donate physiological constituents in wound healing to the wound bed. They can donate extra cellular matrices, cells of repair, cellular communicators, and growth factors. They take the form of gels and sheets placed in the wound bed that is prepared: free of necrosis and bacterial bioburden. These products are an attempt to modulate chronic wound physiology, moving it forward into a more normal rate of repair by providing the wound with resources it otherwise did not have or is slow to recruit. Categories are platelet gels, platelet-derived growth factor therapy, biological skin substitutes, and extracellular matrix sheets. For these products, it is recommended that clinicians refer the patient to a wound-focused physician or clinician, who will be able to help select the appropriate product.

**Pain Management**

Pressure ulcers can be extremely painful, and it is important to assess every patient with a pressure ulcer for pain *[D]*. Wound pain may be decreased by maintaining a moist wound bed or by using non-adherent dressings. Some dressings, such as hydrogels or foams, may cause less pain and require less frequent dressing changes. Assessment of the pain component of a wound should occur at regular intervals, such as on admission, with reassessments, with routine vital signs, with changes in activity level, with dressing changes, and after painful interventions *[D]*. Pharmacological and non-pharmacological pain relief measures should be considered to treat the pain associated with a pressure ulcer or with the interventions needed to treat the ulcer. Consider premedication for effective pain management prior to implementing any wound care, especially with debridement. Use of analgesics and adjunctive

therapies are important interventions to consider in alleviating the painful experience. Two small studies indicate topical opioids may be a consideration for reducing pressure ulcer pain *[A]*, *[D]*. Non-pharmacologic interventions could include repositioning, positioning off the pressure ulcer, using effective safe-handling devices such as lift devices or transfer sheets, use of pressure redistribution devices, relaxation techniques, guided imagery, music therapy, and distraction *[D]*.

**Nutrition**

*Specific Nutrient Goals for Treatment of Pressure Ulcer*

Treatment plans for the nutritional needs of persons with pressure ulcers include:

1. Fluid needs are calculated, taking into account the patient's overall hydration status. General Formula, 1 mL per kcal of calories consumed or 30 mL/kg of body weight with 1500 mL minimum unless medically indicated diseases present, such as renal or congestive heart failure *[R]*.

2. Protein recommendations vary from 1 to 2 g/kg/day. Clinical judgment will be needed to estimate protein needs, which may vary depending on the patient's medical condition. Consideration should be given to include use of evening protein supplement *[R].* Protein requirements may vary by stage of pressure ulcer, from 1.25 to 1.5 g/kg/day for stages I-IV and 1.5 to 2 g/kg/day with those patients with larger stage III or IV or for those with multiple pressure ulcers *[R]*. The amount of wound exudate, which contains significant amounts of protein, may also affect the amount of protein needed *[R]*.

3. Caloric requirements are based on the patient's individual nutritional goal. The various methods to determine include Harris Benedict and use of 30 to 35 kcals/kg of body weight. Caloric needs may need to be decreased or increased based on individual needs and should be reevaluated based on patient's weight history, as well as current weights *[R]*.

4. Vitamin C requirements should be met with addition of daily citrus fruits. If found to be deficient or suspected of being deficient based on dietary history, short-term daily supplementation of 50 to 100 mg of Vitamin C is recommended *[R]*.

5. Zinc supplementation recommendations are variable. When possible, lab assay should be taken to evaluate zinc deficiency. Zinc deficiency may be the result of draining wounds, increase in gastrointestinal losses or poor dietary intake. When deficiency is indicated through lab assays, recommendations are for 40 mg of elemental zinc (220 mg of zinc sulfate) daily for two to four weeks and labs redrawn *[R]*.

*Therapeutic Vitamin and Mineral Supplement*

Daily administration may be considered if poor oral intake or deficiencies are suspected based on patient history or lab assays. This supplementation may contain recommended vitamin C dosage *[R]*.

*Biochemical Data*

Serum albumin and prealbumin may be useful to establish overall health. However the results are also reflective of other disease states such as liver disease hydration or renal disease. This needs to be taken into account as the levels may not correlate to nutritional status *[R]*.

*Arginine and Glutamine*

Supplemental use of arginine and glutamine is controversial and more studies need to be undertaken; at this time supplementations are not recommended *[R]*.

*Vitamin A*

Excessive vitamin A supplementation can lead to an exacerbated inflammatory response. Also, in patients with chronic renal failure, vitamin A supplementation is frequently contraindicated as vitamin A levels are typically high in this population, and there is an increased risk of hypercalcemia. Patients with fat malabsorption may require a water-miscible form of vitamin A. Discuss supplementation of vitamin A with a registered dietitian or physician to address correct dosage *[R]*. Therapeutic vitamin and mineral supplement may provide vitamin A at daily requirement needs.

**Surgical Repair**

Pressure ulcers may be closed using surgical intervention in certain circumstances. When there is significant tissue loss, a flap procedure by a plastic surgeon is typically performed. Surgical repair of stage III or IV pressure ulcers is considered when other therapies have been implemented and patient healing is optimal. Recommendation is to consult a surgeon who is experienced in surgical repair of pressure ulcers.

**Education**

*Patient Education*

Patient education is an important piece of pressure ulcer prevention and treatment. The patient, family and caregivers are key to prevention, management and treatment of pressure ulcers. Teaching materials should be given to the patient and family on admission or at the time risk is identified. Possible content of education includes:

- Causes of pressure ulcers
- Ways to prevent them
- Dietary needs
- Positioning
- Signs of infection
- Types of tissue
- Normal and abnormal colors of tissue
- Infection control
- Dressing change technique, goal and purpose

Education should be in an appropriate reading level, organized, appealing and with easy-to-understand instructions.

Family and caregivers should be brought into the hospital to have hands-on teaching on dressing changes to assess their ability to provide the care at home. Detailed written instructions should also be given to them to refer to at home. If the patient, family or caregiver is unable to do the actual treatment, the education still needs to be provided. Education should also be provided to the person or agency that will be doing the care, if the patient, family or caregiver is not able. Document response to education.

11. **Interdisciplinary and Interfacility Communication and Documentation**

All health care team members need to be aware of patients who are at risk for pressure ulcers and those with active safety plans. Communicate skin status and prevention plan interventions when transferring care to another provider such as change of shifts, transporting between departments, and patient transfer to another facility or unit. Develop a method to communicate skin care concerns to all members of the health care team. Use consistent methods for communication, such as identifying the Braden score or Braden Q score and skin inspection results.

**Discharge Plan or Transfer of Care**

At discharge or transfer of care to another department or facility, the patient's plan of care – including a thorough description, goal of treatment, stage of ulcer and follow-up should be communicated. Location, size, type, stage, description of wound bed and surrounding skin along with past and current treatments should be communicated to ensure continuity of care and to decrease chance of further injury and delay of healing. If the patient is at risk, special needs and interventions used should be communicated. The needs of the patient at home or place of discharge need to be assessed to ensure the patient has equipment and resources available. This includes specialty surfaces in bed and chair, wound supplies, nutritional needs, and transfer equipment.

**Definitions**:

**Classes of Research Reports**

| Class | Description |
|---|---|
| **Primary Reports of New Data Collections** | |
| **A** | Randomized, controlled trial |
| **B** | Cohort-study |
| **C** | Non-randomized trial with concurrent or historical controls<br>• Case-control study<br>• Study of sensitivity and specificity of a diagnostic test<br>• Population-based descriptive study |
| **D** | Cross-sectional study<br>• Case series<br>• Case report |
| **Reports that Synthesize or Reflect upon Collections of Primary Reports** | |
| **M** | Meta-analysis<br>• Systematic review<br>• Decision analysis<br>• Cost-effectiveness analysis |
| **R** | Consensus statement<br>• Consensus report<br>• Narrative review |
| **X** | Medical opinion |

### Clinical Algorithm(s)

The following detailed and annotated clinical algorithms are provided in the original guideline document:

- Pressure Ulcer Prevention and Treatment (inpatient)
- Pressure Ulcer Prevention and Treatment (outpatient)

## Evidence Supporting the Recommendations

### Type of Evidence Supporting the Recommendations

The type of supporting evidence is classified for selected recommendations (see the "Major Recommendations" field).

## Benefits/Harms of Implementing the Guideline Recommendations

### Potential Benefits

Appropriate prevention and treatment of pressure ulcers in an acute healthcare facility and ambulatory settings

### Potential Harms

- The U.S. Federal Drug Administration (FDA) has received reports of serious complications, including death, associated with the use of *negative pressure wound therapy systems*. The FDA advises health care professionals to carefully select patients for negative pressure wound therapy after reviewing the most recent device labeling and

instructions. Patients should be monitored frequently in an appropriate care setting by a trained practitioner. Practitioners should be vigilant for potentially life-threatening complications, such as bleeding, and be prepared to take prompt action if they occur. In addition, on February 28, 2011, the Food and Drug Administration issued a statement indicating the safety and effectiveness of negative pressure wound therapy systems in newborns, infants and children has not been established.

- When using whirlpool therapy, avoid using whirlpool with granulating wounds or pressure ulcers in the presence of venous insufficiency as the limb will be further congested with this intervention. The Centers for Disease Control provides a table of infections reported due to whirlpools, both in open wounds and intact skin. Whirlpool therapy leads to vasodilatation and increased circulation, but these may be undesired outcomes in some clinical situations; use cautiously in the care of the patients with diabetes and with vascular ulcers. More specific information can be obtained at http://www.cdc.gov.
- Rectal pouch and rectal tube require training prior to use due to risk of injury or perforation.

## Contraindications

**Contraindications**

- Contraindications to electrical stimulation include malignancy, an electronic implant, or metal implant.
- In patients with chronic renal failure, vitamin A supplementation is frequently contraindicated as vitamin A levels are typically high in this population, and there is an increased risk of hypercalcemia.

## Qualifying Statements

**Qualifying Statements**

- This health care protocol is designed to assist clinicians by providing an analytical framework for the evaluation and treatment of patients, and is not intended either to replace a clinician's judgment or to establish a protocol for all patients with a particular condition. A health care protocol will rarely establish the only approach to a problem.
- This health care protocol should not be construed as medical advice or medical opinion related to any specific facts or circumstances. Patients are urged to consult a health care professional regarding their own situation and any specific medical questions they may have.

## Implementation of the Guideline

**Description of Implementation Strategy**

Once a guideline is approved for release, a member group can choose to concentrate on the implementation of that guideline. When four or more groups choose the same guideline to implement and they wish to collaborate with others, they may form an action group.

In the action group, each medical group sets specific goals they plan to achieve in improving patient care based on the particular guideline(s). Each medical group shares its experiences and supporting measurement results within the action group. This sharing facilitates a collaborative learning environment. Action group learnings are also documented and shared with interested medical groups within the collaborative.

Currently, action groups may focus on one guideline or a set of guidelines such as hypertension, lipid treatment, and tobacco cessation.

Detailed measurement strategies are presented in the original guideline document to help close the gap between clinical practice and the guideline recommendations. Summaries of the measures are provided in the National Quality Measures Clearinghouse (NQMC).

**Implementation Recommendations**

Prior to implementation, it is important to consider current organizational infrastructure that address the following:

- System and process design
- Training and education
- Culture and the need to shift values, beliefs and behaviors of the organization

The following system changes were identified by the work group as key strategies for health care systems to incorporate in support of the implementation of this protocol.

1. Develop a process of communicating to all health care team members (who need to be aware) of patients at high risk for pressure ulcers, previous history of pressure ulcers, and those with active prevention plans.
2. Develop a process for educating staff, patients and caregivers about risk assessment and skin inspection techniques, along with skin safety strategies.
3. Develop a process and/or visual/electronic medical record cue on each admission documentation record for the completion of a skin inspection and risk assessment.
4. Establish system-wide mechanisms and wound treatment, support and education for the successful implementation of pressure ulcer prevention and wound treatment plans.
5. Address barriers to implementing pressure ulcer prevention plans.
6. Form a skin care/pressure ulcer treatment team with defined roles.
7. Develop a process to ensure consistent assessment of the patients with pressure ulcers, using the following components:

- History and physical
- Wound description/staging
- Etiology of pressure
- Nutritional status
- Bacterial colonization/infection
- Psychosocial needs

8. Develop a process for consistent treatment of all patients with pressure ulcer(s).
9. Develop a process for education and training of health care team members regarding treatment of pressure ulcers.
10. Develop a process that will provide patient, family, and caregivers education in the treatment of pressure ulcers.

The Institute for Clinical Systems Improvement (ICSI) Pressure Ulcer work group identified barriers to implementing pressure ulcer prevention and treatment plans. The work group agreed on the universality of the issues and on the need to address them. The issues and recommendations for addressing them are stated below.

**Communication**

Gaps in communication exist in varying degrees throughout systems.

Possible activities to address barriers:

- Obtain support from key stakeholders.
- Develop standard protocols for communication between units and facilities, and among all caregivers.
- Develop education materials for patients and families.
- Institute standard process for identifying patients at risk or with pressure ulcer(s).

**Patient Complexity**

The ability to prevent pressure ulcer development is affected by the complexity and acuity of patient disease states, physical condition, aging population, obesity and malnutrition, and necessary supporting equipment that may vary during hospitalization.

Possible activities to address barriers:

- Develop processes and tools to identify at-risk patients.
- Consider creation of teams or other mechanisms to develop staff expertise for treating pressure ulcer(s).
- Utilize pressure ulcer prevention guidelines/protocols/orders for at-risk patients.
- Implement support surface/bed decision-making algorithms.

**Patient Physical and Behavioral Compliance**

The ability of patients to participate in pressure ulcer prevention strategies may be affected by physical and behavioral factors. Noncompliance may be related to inability to participate, lifestyle issues, cultural differences, medical condition, physical condition, lack of trust or knowledge gaps.

Possible activities to address barriers:

- Provide education that increases patient/family knowledge of pressure ulcer risk and appropriate interventions.
- Identify barriers to patient participation and develop strategies to address those barriers.

**Technical Components**

Equipment and supplies needed for pressure ulcer prevention and treatment may not be readily available.

Possible activities to address barriers:

- Clarify responsibility and accountability for equipment and supplies needed for pressure ulcer prevention and treatment.
- Provide support surface/bed decision-making algorithms.
- Consider the business case for the purchase of pressure redistributing equipment versus equipment rentals.

**Staffing**

Implementing consistent processes for pressure ulcer assessment and prevention may be viewed as additional work.

Possible activities to address barriers:

- Educate staff on the impact and costs of pressure ulcers to the patient and the health care system.
- Incorporate strategies and resources to support staff ability to achieve pressure ulcer prevention.

**Knowledge Deficit**

Pressure ulcer prevention is complex. Conflicting procedures and protocols may exist. Multiple health care team members may be involved in caring for the patient, and limited knowledge may result in misunderstanding of equipment or procedures. Consistent risk assessment and initiation of prevention strategies are challenges.

Possible activities to address barriers:

- Initiate staff education during orientation and as ongoing staff training. Education and training for staff on identifying pressure ulcer risk, prevention and treatment needs to be done routinely to keep staff competent and current with evidence-based practice. Education should be based on the needs of the staff and should be appropriate to the patient population. Use of products, prevention and treatment methods needs to be offered in orientation with ongoing education regarding skin and wound care. Methods of education should be varied and include written, interactive,

multidisciplinary, hands-on and visual. These methods should also be easy to access. For additional information, refer to the Resources Table section of the original guideline document.

- Incorporate pressure ulcer prevention into staff competencies.
- Consider creation of skin care teams or other mechanisms to develop staff expertise.
- Develop pressure ulcer prevention standing orders for patients at risk.
- Employ staff with expertise in pressure ulcer treatment.

Refer to the original guideline document for information on continuous quality improvement strategies.

### Implementation Tools

Chart Documentation/Checklists/Forms

Clinical Algorithm

Quality Measures

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

## Institute of Medicine (IOM) National Healthcare Quality Report Categories

### IOM Care Need

End of Life Care

Getting Better

Living with Illness

Staying Healthy

### IOM Domain

Effectiveness

Patient-centeredness

## Identifying Information and Availability

### Bibliographic Source(s)

Institute for Clinical Systems Improvement (ICSI). Pressure ulcer prevention and treatment protocol. Health care protocol. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2012 Jan. 88 p. [112 references]

### Adaptation

Not applicable: The guideline was not adapted from another source.

### Date Released

2008 Jan (revised 2012 Jan)

### Guideline Developer(s)

Institute for Clinical Systems Improvement - Nonprofit Organization

### Guideline Developer Comment

Organizations participating in the Institute for Clinical Systems Improvement (ICSI): Organizations participating in the Institute for Clinical Systems Improvement (ICSI): Affiliated Community Medical Centers; Allina Medical Clinic; Aspen Medical Group; Baldwin Area Medical Center; Brown Clinic; Center for Diagnostic Imaging/Medical Scanning Consultants; CentraCare; Central Lakes Medical Clinic; Chippewa County – Montevideo Hospital & Clinic; Cuyuna Regional Medical Center; Essentia Health; Fairview Health Services; Family HealthServices Minnesota; Family Practice Medical Center; Fergus Falls Medical Clinic; Gillette Children's Specialty Healthcare; Grand Itasca Clinic and Hospital; Hamm Clinic; HealthEast Care System; HealthPartners Central Minnesota Clinics; HealthPartners Medical Group & Regions Hospital; Hennepin County Medical Center; Hennepin Faculty Associates; Howard Young Medical Center; Hudson Physicians; Hutchinson Area Health Care; Hutchinson Medical Center; Integrity Health Network; Lake Region Healthcare Corporation; Lakeview Clinic; Mankato Clinic; MAPS Medical Pain Clinics; Marshfield Clinic; Mayo Clinic; Mercy Hospital and Health Care Center; Midwest Spine Institute; Minnesota Association of Community Health Centers; Minnesota Gastroenterology; Multicare Associates; New Richmond Clinic; North Central Heart Institute; North Clinic; North Memorial Health Care; Northwest Family Physicians; Obstetrics and Gynecology Specialists; Olmsted Medical Center; Park Nicollet Health Services; Planned Parenthood Minnesota, North Dakota, South Dakota; Quello Clinic; Raiter Clinic; Rice Memorial Hospital; Ridgeview Medical Center; River Falls Medical Clinic; Riverwood Healthcare Center; South Lake Pediatrics; Southside Community Health Services; Stillwater Medical Group; University of Minnesota Physicians; Winona Health

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### Source(s) of Funding

The following Minnesota health plans provide direct financial support: Blue Cross and Blue Shield of Minnesota, HealthPartners, Medica, Security Health Plan of Wisconsin, and UCare. In-kind support is provided by the Institute for Clinical Systems Improvement's (ICSI) members.

### Guideline Committee

Patient Safety & Reliability Steering Committee

### Composition of Group That Authored the Guideline

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### Financial Disclosures/Conflicts of Interest

In the interest of full disclosure, Institute for Clinical Systems Improvement (ICSI) has adopted a policy of revealing relationships work group members have with companies that sell products or services that are relevant to this protocol topic. It is not assumed that these financial interests will have an adverse impact on content. They are simply noted here to fully inform users of the protocol.

Kathy Borchert, MS, RN, CWOCN, ACNS-BC, reviews documentation and provides expert testimony related to pressure ulcer cases.

No other work group members have potential conflicts of interest to disclose.

### Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Institute for Clinical Systems Improvement (ICSI). Pressure ulcer prevention and treatment. Health care protocol. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2010 Apr. 69 p. [102 references]

### Guideline Availability

Electronic copies: Available from the Institute for Clinical Systems Improvement (ICSI) Web site.

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; telephone, (952) 814-7060; fax, (952) 858-9675; Web site: www.icsi.org; e-mail: icsi.info@icsi.org.

### Availability of Companion Documents

The following is available:

- Development and revision process for guidelines, order sets, and protocols. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2007 Jun. 5 p. Electronic copies: Available from the Institute for Clinical Systems Improvement (ICSI) Web site.

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; telephone, (952) 814-7060; fax, (952) 858-9675; Web site: www.icsi.org; e-mail: icsi.info@icsi.org.

In addition, the Braden Scale for Predicting Pressure Sore Risk, the Braden Q Scale tools, an outpatient risk assessment plan, a pressure ulcer prevention plan, and mnemonics for critical colonization are available in the appendices of the original guideline document.

### Patient Resources

None available

### NGC Status

This NGC summary was completed by ECRI Institute on July 28, 2009. This NGC summary was updated by ECRI Institute on October 20, 2010. This summary was updated by ECRI Institute on March 16, 2011 following the U.S. Food and Drug Administration advisory on negative pressure wound therapy (NPWT) systems. This NGC summary was updated by ECRI Institute on May 25, 2012.

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