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INSTITUTE FOR CLINICAL SYSTEMS IMPROVEMENT

Health Care Protocol :

Pressure Ulcer Prevention and Treatment Protocol

Third Edition
January 2012

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- health care teaching institutions;
- health care information service departments;
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- health care information technology departments;
- medical specialty and professional societies;
- researchers;
- federal, state and local government health care policy makers and specialists; and
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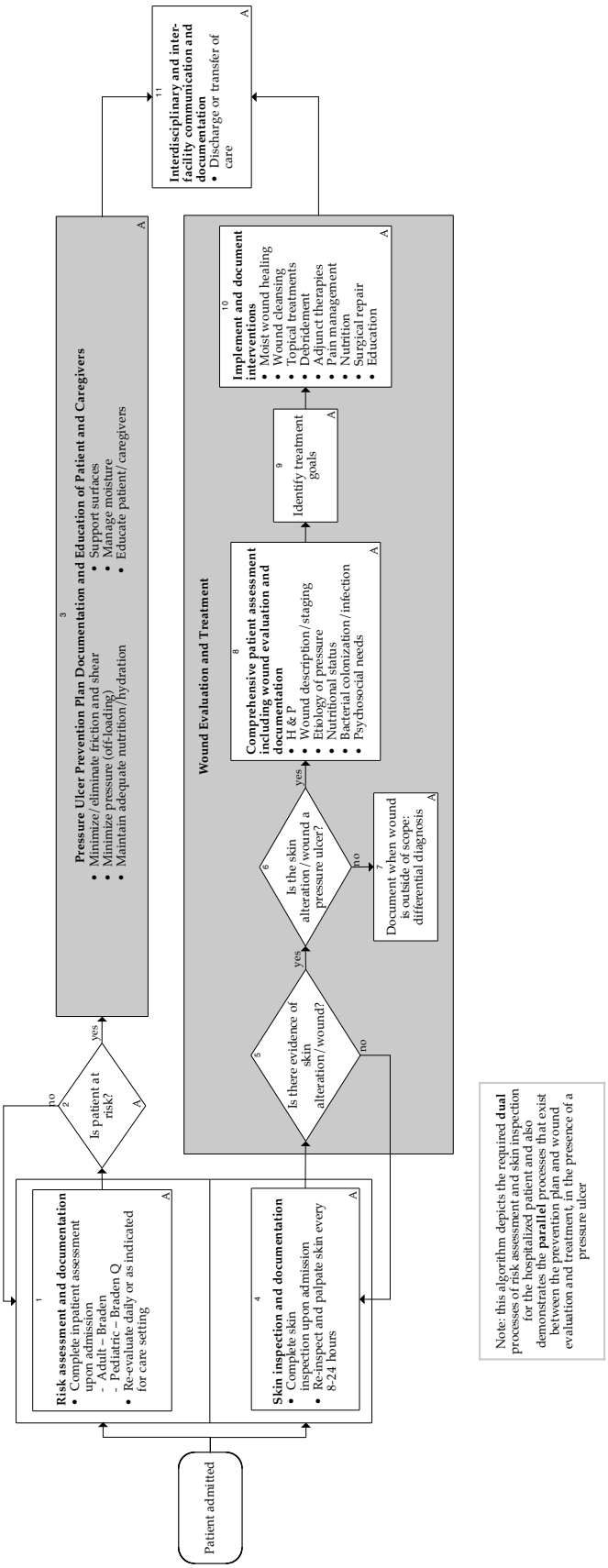
All algorithm boxes with an "A" and those that refer to other algorithm boxes link to annotation content.

Text in blue throughout the document also provides links.

A = Annotation

Inpatient Algorithm



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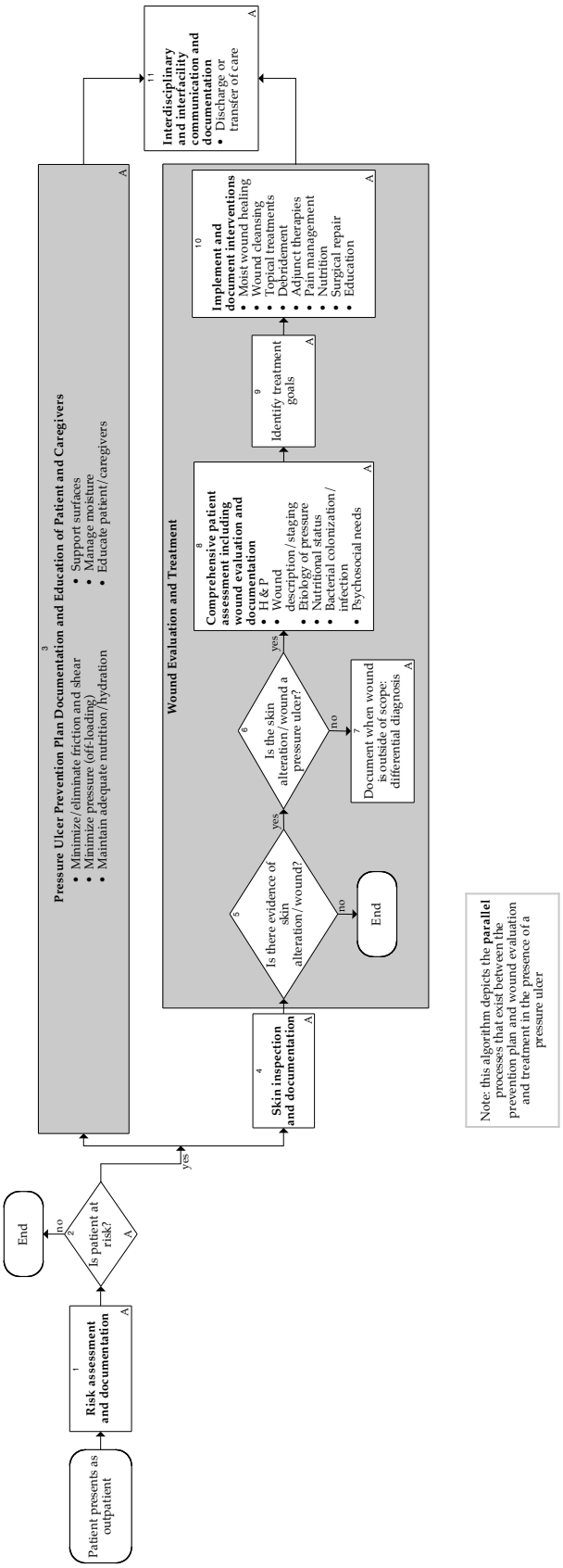
Outpatient Algorithm



Note: this algorithm depicts the **parallel** processes that exist between the prevention plan and wound evaluation and treatment in the presence of a pressure ulcer

All algorithm boxes with an "A" and those that refer to other algorithm boxes link to annotation content.

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A = Annotation

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Disclosure of Potential Conflict of Interest

In the interest of full disclosure, 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.

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Description of Evidence Grading

A consistent and defined process is used for literature search and review for the development and revision of 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.

Individual research reports are assigned a letter indicating the class of report based on design type: A, B, C, D, M, R, X.

Evidence citations are listed in the document utilizing this format: *(Author, YYYY [report class]; Author, YYYY [report class] – in chronological order, most recent date first)*. A full explanation of ICSI's Evidence Grading System can be found on the ICSI Web site at http://www.icsi.org.

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

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Foreword

Introduction

Pressure ulcers have been associated with an extended length of hospitalization, sepsis and mortality. In fact, nearly 60,000 United States hospital patients are estimated to die each year from complications due to hospital-acquired pressure ulcers. The estimated cost of managing a single full-thickness pressure ulcer is as high as $70,000, and the total cost for treatment of pressure ulcers in the United States is estimated at $11 billion per year *(Reddy, 2006 [M]; Redelings, 2005 [C])*.

The prevalence of pressure ulcers in health care facilities is increasing. Pressure ulcer incidence rates vary considerably by clinical setting, ranging from 0.4% to 38% in acute care, from 2.2% to 23.9% in long-term care, and from 0% to 17% in home care *(Lyder, 2003 [R])*.

It is estimated that pressure ulcer prevalence (the percentage of patients with pressure ulcers at any one point in time) in acute care is 15%, while incidence (the rate at which new cases occur in a population over a given time period) in acute care is 7% *(Wound, Ostomy, and Continence Nurses Society, 2004 [R]; National Pressure Ulcer Advisory Panel, 2001 [R])*.

The Centers for Medicare and Medicaid Services, as of October 1, 2008, announced a transformational change in hospital payments. This change involved the implementation of a new payment system that rewards hospitals for quality care and avoids payments for unnecessary and preventable costs. Therefore, by screening patients entering the hospital for pressure ulcers, the ulcers will be discovered upon admission and improve treatment of this frequently preventable condition.

Present on Admission is defined as present at the time the order for inpatient admission occurs – conditions that develop during an outpatient encounter, including emergency department, observation or outpatient surgery are considered as Present on Admission. Medical record documentation from any provider involved in the care and treatment of the patient may be used to support the determination of whether a condition was Present on Admission. More specific information can be obtained at http://www.cms.hhs.gov/HospitalAcqCond/.

In February 2007, the Minnesota Hospital Association kicked off a Safe Skin campaign in an effort to prevent pressure ulcers. Over 90 hospitals are participating in this effort, and many have received Safe Skin Excellence awards for implementing at least 90% of the campaign roadmap. A set of expectations or activities are required for the hospitals participating. The Minnesota Hospital Association also provides a set of project tools and conference call presentations, as well as access to best-practice recommendations on various topics related to pressure ulcer prevention.

The Minnesota Health Department's Adverse Health Events report from 2003-10 showed 249 patients developed hospital-acquired stage III or IV unstageable pressure ulcers (reportable events). In reporting year 2010, 30% of Stage III, IV and unstageable pressure ulcers reported under Minnesota's Adverse Health Care Event Reporting Law were classified as device-related pressure ulcers. The majority of the devices involved were cervical collars *(Minnesota Department of Health, 2011 [NA])*.

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Scope and Target Population

All patients within an acute health care facility and outpatient settings are covered under the scope of this protocol. Current evidence does not identify any population exempt from this protocol. While this protocol does not specifically address other settings, its use by them is not limited.

The intent of this protocol is to offer recommendations for assessment, prevention and treatment of pressure ulcer(s), providing continuity of care for all patients. Involvement of patients, family, caregivers and all health care team members is integral to this protocol.

Specifically, the goals of the protocol are that pressure ulcer risk assessment, skin inspections and prevention plan will occur consistently for patients receiving care at both acute health care facilities and outpatient settings. Furthermore, it is a goal that pressure ulcer risk assessment will become a patient care vital sign *(Reddy, 2006 [M])*. Lastly, a goal of this protocol is to offer recommendations for treatment of pressure ulcer(s), providing continuity of care for all patients.

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Aims

1. Eliminate the incidence of pressure ulcer development. *(Annotation #3)*
2. Accurately identify patients at risk of developing a pressure ulcer in the inpatient and outpatient care setting. *(Annotations #1, 2)*
3. Improve the frequency of skin inspections and re-inspections in hospitalized patients and outpatient care patients with identified pressure ulcer(s). *(Annotation #4)*
4. Increase the use and implementation of pressure ulcer prevention plans. *(Annotation #3)*
5. Improve the completion of a comprehensive patient assessment, including wound evaluation, in patients with an identified pressure ulcer. *(Annotation #8)*
6. Increase the use and implementation of pressure ulcer treatment plans. *(Annotation #10)*
7. Improve education in the prevention and progression of pressure ulcers to patients, families and caregivers. *(Annotation #10)*
8. Improve the coordination and communication between care providers/care institutions regarding the transfer/discharge plan for patients with identified pressure ulcer(s). *(Annotation #11)*

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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 six hours of admission, and re-inspection should occur every 8-24 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)*

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- **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)*

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Implementation Recommendation Highlights

The following system changes were identified by the protocol 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 systemwide 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.

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The 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.

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- 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 this protocol.
- 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.

Measurement

Continuous quality improvement strategies may be used to measure the degree to which implementation of the protocol reduces pressure ulcers incidence.

Measurement activities may include:

- prevalence and incidence studies,
- concurrent audits,
- comparing admission skin inspection to discharge skin inspection,
- review of assessment and prevention documentation, and/or
- ensuring that pressure ulcer risk assessment and skin inspection are completed for all patients.

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Overall improvement strategies may include consideration of the following:

- Establish/improve processes to ensure that risk assessment is conducted within six hours of admission for all patients.
- Agree on the use of a standard risk assessment tool, e.g., Braden or Braden Q Scale.
- Develop and utilize multiple methods to visually cue staff as to which patients are at risk. For example, consider using stickers in the patient's chart or on the patient's door so that all who enter will realize the patient is at risk for pressure ulcer development.
- Build shared pride in progress. Post "Days since Last Pressure Ulcer" data. Refer to Resources Table, Institute for Healthcare Improvement.

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

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

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

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

What changes can we make to ensure effective management of moisture?

- Look for opportunities to design a process for periodic activities such as repositioning, assessing for wet skin, applying barrier agents, offering toilet opportunities and even offering oral fluids (water). For example: By combining routine activities in a protocol such as a "pressure ulcer prevention protocol" (a care efficiency), staff can complete multiple tasks while in the room every two hours and document them all at once.
- Keep supplies at the bedside for patients who are incontinent. This provides the staff with the supplies they need to immediately clean, dry and protect the patient's skin after each episode of incontinence.
- Provide underpads that pull the moisture away from the skin, and limit the use of disposable briefs or containment garments if at all possible.
- Provide pre-moistened, disposable barrier wipes to help cleanse, moisturize, deodorize and protect patients from perineal dermatitis due to incontinence.

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What changes can we make to optimize nutrition and hydration?

- Assist patient with meals, snacks and hydration. Every effort should be made to allow patient preferences when medically appropriate.
- Document the amount of nutritional intake.
- Consult a dietician.

What changes can we make to minimize pressure?

- See Annotation #3, "Pressure Ulcer Prevention Plan, Documentation and Education of Patient and Caregivers."

What changes can we make to minimize or eliminate friction and sheer?

- See Annotation #3, "Pressure Ulcer Prevention Plan, Documentation and Education of Patient and Caregivers."

Ensure consistent assessment of the patients with pressures ulcers using the following components:

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

What processes can be put in place to ensure appropriate treatment of all patients with pressure ulcers?

- See Annotation #10, "Implement and Document Interventions."

What processes can be put in place to ensure appropriate education for patients and families related to the prevention and treatment of all pressure ulcers?

- See Annotation #11, "Interdisciplinary and Interfacility Communication and Documentation."

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Related ICSI Scientific Documents

Guideline

- Palliative Care

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Definitions

Braden Scale for Predicting Pressure Sore Risk© (Braden Scale) – a standardized tool for determining level of risk for pressure ulcer development in adult patients. The following are the risk levels based on score: Mild risk 15-18, Moderate risk 13-14, High risk 10-12, Very High risk 9 or below.

Braden Q Scale© – a modified version of the Braden Scale for use with pediatric patients. The scale has been validated for identifying pressure ulcer risk in children 8 years old and under. Mild risk 22-25, Moderate risk 17-21, High risk 16 or below.

Capillary closure pressure – the amount of pressure required to collapse a capillary. To prevent pressure ulcer development, the goal of 32 mmHg or below is the "standard" value.

Interface pressure – a method used to measure capillary closure pressure; a perpendicular force measured between the body and a support surface.

Pressure redistribution – pressure redistribution and reduction are interventions, not a support surface capability; therefore, this new term is being used to define the ability of a support surface to redistribute tissue load over contact areas of the body.

Pressure ulcer – 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. A number of contributing or confounding factors are also associated with pressure ulcers; the significance of these factors is yet to be elucidated.

Pressure ulcer staging:

Stage I: Intact skin with non-blanchable redness of a localized area, usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area. Further description: The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. Stage I may be difficult to detect in individuals with dark skin tones. May indicate "at risk" persons (a heralding sign of risk).

Stage II: Partial thickness loss of dermis presenting as a shallow, open ulcer with a red-pink wound bed, without slough. May also present as an intact or open/ruptured serum filled blister. Further description: presents as a shiny or dry shallow ulcer without slough or bruising*. This stage should not be used to describe skin tears, tape burns, perineal dermatitis, maceration or excoriation.

*Bruising indicates suspected deep tissue injury.

Stage III: Full thickness tissue loss. Subcutaneous fat may be visible, but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling. Further description: The depth of a stage III pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue, and stage III ulcers can be shallow. In contrast, areas of significant adiposity can develop extremely deep stage III pressure ulcers. Bone/tendon is not visible or directly palpable.

Stage IV: Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling. Further description: The depth of stage IV pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue, and these ulcers can be shallow. Stage IV ulcers can extend into muscle and/or supporting structures (e.g., fascia, tendon or joint capsule), making osteomyelitis possible. Exposed bone/tendon is visible or directly palpable.

Unstageable: Full-thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed. Further description: Until

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enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore stage, cannot be determined. Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as "the body's natural (biological) cover" and should not be removed.

Suspected deep tissue injury: Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue. Further description: Deep tissue injury may be difficult to detect in individuals with dark skin tones. Evolution may include a thin blister over a dark wound bed. The wound may further evolve and become covered by thin eschar. Evolution may be rapid, exposing additional layers of tissue even with optimal treatment.

Used with permission. National Pressure Ulcer Advisory Panel: 2007 Definitions, http://www.npuap.org/resources.htm.

Skin inspections – Comprehensive skin inspection including head-to-toe and front-to-back evaluation.

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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 *(Reddy, 2006 [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 *(Langemo, 2006 [R]; Hughes, 2005 [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 *(Chicano, 2009 [D]; Merrett, 1993 [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.

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Protocol

Risk Assessment and Documentation (Outpatient and Inpatient) *(Annotations #1, 2)*

- Assess all patients for risk of pressure ulcer development. This includes areas such as outpatient, less-than-24-hour stay, same-day surgery, emergency room, catheter lab and similar settings.
- At time of admission, assess all inpatients for risk of pressure ulcer development with a validated risk assessment tool.
- Reevaluate risk for pressure ulcer development daily, change in level of care or with change in condition.

Prevention Plan and Documentation

Initiate Pressure Ulcer Prevention Plan *(Annotation #3)*

- Minimize or eliminate friction and shear
- Minimize pressure (off-loading)
- Manage moisture
- Support surfaces
- Maintain adequate nutrition/hydration
- Educate patient/caregivers

Skin Inspection and Documentation *(Annotation #4)*

- Upon admission to the hospital, inspect the skin of every patient head to toe and front to back; palpate when indicated.
- Reassess skin every 8-24 hours, with change in condition, or level of care.
- Frequency of skin inspection under equipment may be different from head-to-toe skin inspection. Depending on the device, an increase in frequency may be necessary.
- Look for alteration in skin moisture, texture, tugor, temperature, color or consistency.
- For darkly pigmented skin, look for purplish/bluish localized areas and/or localized warm areas that become cool.

Comprehensive Patient Assessment Including Wound Evaluation and Documentation *(Annotation #8)*

- Review history and physical, with emphasis on pressure ulcer.
- Wound description/staging when wound is identified, with dressing changes and prior to any transition to another health care facility.
- Review etiology of pressure including equipment-related etiology.
- Assess nutritional status.
- Monitor the wound for signs of infection.
- Assess psychosocial needs.

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	Assessment Factor	Considerations
A	Anatomic location	Describe location using precise anatomic terms, as much as possible Consider using a body diagram to clearly communicate location of the pressure ulcer
S	Size, shape	Use disposable measuring guide Measure length, width, depth in centimeters at the longest or widest portion of the pressure ulcer Depth is measured into deepest portion of wound May use gloved finger or a carefully placed cotton-tipped applicator to measure depth and compare to measuring guide Describe measurements utilizing face of clock 12-6 direction for length 3-9 direction for width
S	Stage	Use National Pressure Ulcer Advisory Panel definitions and descriptions A pressure ulcer that is covered with eschar or necrotic tissue cannot be staged until the majority of the base is clearly identified Pressure ulcers are never "backstaged" as the ulcer heals; the ulcer is described as a healing pressure ulcer with a notation of the highest stage
E	Exudate	Describe amount using terms such as none, light/scant, moderate or large Describe characteristics using terms such as serous, serosanguinous, sanguinous/bloody, or purulent
S	Surrounding skin	Assess and describe color, texture, temperature, presence of induration, maceration, or integrity of periwound skin
S	Sinus tract, tunneling	Measure length/depth using gloved finger or carefully placed cotton-tipped applicator Describe location utilizing the face of a clock, as above
M	Margins	Note presence of undermining Note presence of erythema or maceration Undermining – tissue destruction around the perimeter of the wound under the intact surface/skin
E	Edges	Describe wound edges using terms such as indistinct, distinct attached, not attached, defined, undefined or rolled under
N	Nose (odor)	Some dressings or topical solutions can affect the odor
T	Tissue	Note characteristics of tissue in wound base, such as epithelial, granulation, slough, or necrotic tissue Necrotic tissue can be further described as white/gray, yellow, soft black/brown, or hard black eschar May describe percentage of tissue type present

(Gardner 2005 [C]; Mullins, 2005 [R]; Woodbury, 1999 [R]; Bates-Jensen, 1997 [C]; Bates-Jensen, 1992 [C])

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Implement and Document Interventions *(Annotation #10)*

Pressure ulcer treatment

- Treatment goal should direct the plan of care. The goal may be healing, symptom control or maintenance e.g;, prevention of infection.
- Cleanse the wound:
  - prior to assessment,
  - before dressing application, and
  - using a wound cleansing solution and method that will adequately clean.
- Topical treatments
  - Choose a product that is appropriate to the Pressure Ulcer Prevention and Treatment Protocol goal.
- Debride the wound of any necrotic tissue, which is non-viable devitalized or contaminated foreign matter in the wound. Methods of debridement include surgical sharp, chemical, mechanical, conservative, biosurgical, ultrasonic mist and autolytic.
- Consider adjunct therapy.

Pain management

- Assess every patient with a pressure ulcer for pain and treat as needed. Consider premedication prior to wound care when indicated.

Nutrition

- Consider nutritional needs and implement recommendations as appropriate.

Surgical consultation

- Consult with surgeon who has experience in pressure ulcer debridement and surgical repair when necessary.

Education

- Educate the patient, family and care provider on the prevention, management and treatment of pressure ulcers.

Interdisciplinary and Interfacility Communication and Documentation *(Annotation #11)*

Discharge Plan or Transfer of Care

- Notify care setting in advance of transfer, and include thorough description, goal of treatment, stage of pressure ulcer and follow-up care.
- Document all items in the patient's medical record.

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Annotations

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 *(Pancorbo-Hidalgo, 2006 [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 *(Baranoski, 2008 [R]; Ayello, 2002 [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 sheer, nutrition and tissue perfusion/oxygenation *(Butler, 2007 [R]; Quigley, 1996 [R])*. The Braden Q was tested for validity in a cohort study with children ages 21 days to 8 years in three sites *(Curley, 2003 [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."

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? *(Reddy, 2006 [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?

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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," and Appendix D, "Pressure Ulcer Prevention Plan."

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 *(Bergstrom, 1992 [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 *(Stechmiller, 2008 [R])*.

See Appendix C, " Outpatient Risk Assessment Plan."

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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 *(Price, 2005 [R]; Wolverton, 2005 [C]; Whittington, 2004 [C])*. 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-Barre', 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 *(Walton-Geer, 2009 [R]; Price, 2005 [R]; Aronovitch, 1998 [D])*.

(Wound, Ostomy, and Continence Nurses Society, 2003 [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

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the healing process by reducing the amount of oxygen, amino acids, vitamins and minerals available at the wound site thereby determines 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.

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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 *(Reddy, 2006 [M])*
- Minimize pressure (off-loading) *(Reddy, 2006 [M])*
- Support surfaces
- Manage moisture
- Maintain adequate nutrition/hydration *(Reddy, 2006 [M])*

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

Minimize/Eliminate Friction and Shear

The effect of pressure on underlying structures and tissue is magnified when shear forces are added. Shear forces occur when patients are positioned in such a way that they tend to slide, for example, when the head of the bed is elevated without elevating the feet, as well. Shear forces plus pressure cause stretching and kinking of capillaries and tissue, resulting in more tissue ischemia than would have occurred with pressure alone.

Friction affects only the outermost skin layers by movement of the epidermis against an external surface. Clinically, friction presents as a superficial abrasion or blister (e.g., heel rubbing on sheets). A patient with muscle spasms has an increased risk for friction injury. Shear and friction often go hand in hand.

Actions:

- Lift the body off the bed/chair rather than dragging as the patient is moved up in the 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 that lower the surface tension on the skin and reduce friction *(Reddy, 2006 [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.

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- 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 *(Baronoski, 2004 [R])*.

Minimize Pressure (Off-Loading)

Tissue tolerance is the ability of both the skin and its supporting structures to endure the effects of pressure without adverse sequela *(Braden, 1987 [R])*. Soft tissues, such as skin, muscle, and fascia, that are over bony prominences may be exposed to varying pressure and ischemia as a result of compressing surfaces, other external devices, or shearing force. DeFloor describes a conceptual schema that includes tissue tolerance for pressure and tissue tolerance for oxygen. He further discusses determinants of tissue tolerance as tissue mass, age, dehydration, protein and vitamin C deficiency, corticosteroid use, stress, temperature, medications, smoking and specific diseases affecting oxygen supply and blood pressure *(DeFloor, 1999 [R])*.

Each individual may have different tissue tolerance. Factors that affect the individual's tolerance include shear, friction, moisture exposure, nutrition, age, blood flow or oxygen perfusion *(Braden, 1987 [R])*. Bryant and Nix report that the literature is inconclusive regarding the effects of moisture, especially incontinence on tissue tolerance and more research is needed to understand its role. Each type of body tissue may also have varying tolerance. Body tissue, such as muscle, is less tolerant to pressure than skin tissue *(Bryant, 2012 [NA])*. This variance may result in deep tissue injury prior to any noticeable skin injury.

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 *(Wound, Ostomy, and Continence Nurses Society, 2003 [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 *(Baranoski, 2004 [R])*.

Support Surfaces

The support surface industry can be complex and ever changing. Despite that, support surfaces are critical for decreasing pressure ulcer incidence and prevalence. Whether the goal is pressure ulcer prevention in identified "at-risk" patients, or treatment of patients with pressure ulcers, an appropriate pressure redistribution surface will need to be selected.

Use of specialty support surfaces does prevent pressure ulcers. The Cochrane Collaboration published a 2011 update to their paper entitled "Support Surfaces for Pressure Ulcer Prevention (Review)." Twelve additional randomized, controlled trials were added to the systematic review. It was "found that people lying on ordinary foam mattresses are more likely to get pressure ulcers than those on higher specification foam mattresses." They concluded, "In people at high risk of pressure ulcer development, higher specification foam mattresses rather than standard hospital foam mattresses should be used" *(McInnes, 2011 [R])*.

Given the list of conditions for patients who are at risk listed in this document, 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 Cochrane Review, as well as many other studies, reports that further research is needed to determine if one support surface product is superior to another, and the work group agrees.

There is a clinical and financial difference between surfaces that prevent pressure ulcers and surfaces that off-load and distribute pressure well enough to treat present pressure ulcers. There are many factors that go into clinical selection and insurance qualification of such surfaces, including patient mobility, continence, stage of the pressure ulcer(s) and number of ulcers. For example, treatment redistribution surfaces tend to cost more but are clinically necessary in most situations for stage III and stage IV ulcers. Therefore, the work group 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 *(Reddy, 2006 [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 that follows.

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 *(Reddy, 2006 [M])*.
- When the patient is lying on one side, do not position directly on trochanter (hip).
- Use pressure redistribution mattresses/surfaces *(Reddy, 2006 [M])*.
- If the patient's condition limits repositioning, still attempt to off-load pressure.

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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

Management of moisture from perspiration, wound drainage and incontinence are important factors in pressure ulcer prevention. Moisture from incontinence may be a precursor to pressure ulcer development by macerating the skin and increasing friction *(Ratliff, 1999 [R])*. Fecal incontinence is a greater risk factor for pressure ulcer development than urinary incontinence because the stool contains bacteria and enzymes that are caustic to the skin. In the presence of both urinary and fecal incontinence, fecal enzymes convert urea to ammonia, raising the skin pH. With a more alkaline skin pH, the skin becomes more permeable to other irritants *(Ratliff, 2005 [R])*. Wet skin shows significantly larger decreases in temperature and blood flow during pressure load *(Mayrovitz, 2001 [D])*. Some absorbent pads can cause an increase in interface pressure *(Fader, 2004 [NA])*.

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 *(European Pressure Ulcer Advisory Panel, 2009 [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 *(Jeter, 1996 [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, Federal Drug Administration-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 a Federal Drug Administration-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 *(Evans, 2003 [R])*.

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- Contain wound drainage.
- Separate skin folds, use a skin sealant and change dressings frequently *(Wound, Ostomy, and Continence Nurses Society, 2003 [R])*.
- Change linen frequently for excessive perspiration. Airflow specialty beds may minimize perspiration.

Maintain Adequate Nutrition/Hydration

Nutrition intervention and development of a nutrition care plan can identify and address underlying nutritional issues.

Inadequate nutrition may be a reversible risk factor for pressure ulcers.

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 *(Evans 2005 [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 *(Keast, 2007 [R])*;
- adequacy of oral intake, both in recent history and current *(Dorner, 2004 [R])*;
- barriers to achieving optimal nutrition, including swallowing, chewing and social implications *(Dorner, 2004 [R])*;
- cognitive function, including ability to eat independently *(Dorner, 2004 [R])*;
- review of patient's medical condition and chronic disease states, including diabetes control and renal disease *(European Pressure Ulcer Advisory Panel, 2009 [R])*;
- anthropometrical and biochemical indicators, including body mass index, weight changes and Braden Scale *(European Pressure Ulcer Advisory Panel, 2009 [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% of 180 days should be flagged as increased nutritional risk
  - Body mass index of 19 or less may be indicative of possible nutrition depletion *(Dorner, 2004 [R])*
- activity level; and
- goals and wishes of the patient.

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Nutrition for prevention and treatment of pressure ulcers should be individualized and developed with patient participation. Nutrition intervention should consider:

- assessed needs,
- adequacy of current nutrition intake and extent of nutrient and fluid losses,
- existing barriers to achievement of optimal nutrition,
- consideration related to coexisting conditions,
- disease states,
- anthropometrics,
- biochemical and clinical indicators of nutritional status, and
- goals and wishes of the patient *(Keast, 2007 [R])*.

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 adequate nutrition and those patients requiring nutrition intervention for pressure ulcers.

- Monitor weight and weight changes. Address as indicated with modifications of patient's caloric intake *(Keast, 2007 [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 *(Dorner, 2004 [R])*.
- Allow flexibility and creativity in accommodating patient's food preferences *(ASPEN, 2007 [R]; Reddy, 2006 [M])*.
- Ensure adequate fluid intake to keep well hydrated and prevent dehydration *(Amerian Dietetic Association Nutrition Care Manual, 2009 [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 *(Dorner, 2009 [R])*.
- Provide multivitamin and mineral supplement if intake is poor or nutritional deficiency is suspected or indicated by lab values *(Dorner, 2004 [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 increase risk of malnutrition *(Evans, 2005 [R])*.
- Refer to other medical disciplines for recommendations on cognitive issues.

Laboratory values, such as albumin, prealbumin and transferin 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 gastrointestional function should be considered for a nutrition plan of care *(Doley, 2010 [R]; Evans, 2005 [R])*.

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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, and
- 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.

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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 *(National Institute for Clinical Excellence, 2001 [R]; National Institute for Clinical Excellence, 2003 [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; and
- pain or itching.

(Scanlon, 2004 [R])

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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 *(Lyder, 1991 [R])*. The basis of the blanch test is that gentle pressure on the skin temporarily forces blood from the area, causing the skin to appear white in a Caucasian individual. With healthy tissue, blood refills dermal capillaries, resulting in a swift color return. The presence of melanin, with darkly pigmented skin, ensures the clinician is unable to visualize the evacuation of blood followed by the refill (*Bennett, 1995 [R])*. Therefore, a one-dimensional assessment parameter, skin color change, is inadequate for patients with darkly pigmented skin. Meehan and Barczak found that African-Americans had a higher incidence of full-thickness versus partial-thickness pressure ulcers, demonstrating the challenge of identifying a stage I pressure ulcer in a person with darkly pigmented skin so as to intervene with prevention initiatives early and prevent full-thickness tissue damage *(Barczak, 1997 [R]; Meehan, 1994 [D])*.

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 *(European Pressure Ulcer Advisory Panel, 2009 [R])*.

Ask the patient about:

- areas with lack of sensation;
- areas of pain;
- location of current or previous ulcers;
- fragile skin, easy bruising; and
- medications or medical condition putting at higher risk for breakdown.

Re-inspect and palpate skin for inpatients every 8-24 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 include visualizing all aspects of the patient in the same time period.

- When applying oxygen, check the ears for pressure areas from the tubing.
- If on bed rest, look at the back of the head during repositioning.
- When auscultating lung sounds or turning the patient, inspect the shoulders, back and sacral/coccyx region.
- When checking bowel sounds, look into skin folds.
- When positioning pillows under calves, check the heels and feet (using a hand held mirror makes this easy).
- When checking intravenous sites, check the arms and elbows.

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- Examine the skin under equipment with routine removal (e.g., compression stockings, restraints, splints).
- Each time you get a patient up or provide care, look at the exposed skin, especially on bony prominences.
- Pay special attention to areas where the patient lacks sensation to feel pain and/or has had a breakdown in the past.

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.

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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

Erythema to the sacral/perianal region requires accurate assessment so as to differentiate whether it is non-blanchable, due to pressure, or blanchable, due to incontinence-associated dermatitis. Interventions implemented will be dictated by this assessment (e.g., off-loading pressure versus urine/stool containment or toileting/bowel management plan). Determination of the type of damage can be challenging for a partial thickness wound in a patient with both incontinence and immobility *(Gray, 2007 [R])*.

Venous insufficiency ulcers

Wounds that occur due to improper functioning of valves in the veins, usually of the legs, are termed venous ulcers. They are a major cause of chronic wounds. Venous ulcers develop generally along the medial distal leg. Those that occur on pressure-bearing regions can be mistaken for pressure ulcers, but treatment differs in the need for reduction in edema, and use of compression.

Arterial insufficiency ulcers

Arterial insufficiency ulcers are caused by arteriosclerosis leading to insufficient oxygenation of the skin and underlying tissues, generally located on the lateral surface of the ankle or the distal digit. Revascularization is the mainstay of treatment.

Diabetic foot ulcers

Underlying etiologies of diabetic foot ulcers include neuropathy, trauma, deformity, high plantar pressures, and peripheral arterial disease. Rest, elevation of the affected foot, and relief of pressure are essential components of treatment and should be initiated at first presentation.

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Skin tears

Acute traumatic wounds resulting from separation of the epidermis from the dermis are skin tears. They are usually related to friction and/or shear force. Treatment depends on careful assessment and classification.

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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 *(Bergstrom, 1998 [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 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 occur on bony prominences, the prevalence of equipment-related pressure ulcers is 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

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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 proloferation of microorganisms in a wound without a host response. This occurs frequently, particularly in chronic wounds such as stasis ulcers and pressure ulcers *(Branom, 2002 [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 *(Sussman, 2007 [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 *(Branom, 2002 [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 *(Bryant, 2012 [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 *(Bonham, 2009 [R])*. Infection is indicated when bacteria counts reach 10^5 organisms 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 *(Branom, 2002 [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,
- discolorization 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, or
- sudden pain *(Branom, 2002 [R])*.

Clinicians may find the mnemonics, NERDS and STONES helpful *(Sibbald, 2006 [R])*. Refer to Appendix E, "Mnemonics for Critical Colonization."

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Biofilm forms when bacteria adheres to surfaces in moist environments. A slimy, glue like substance is excreted by the bacteria and results in the bacteria being anchored to the tissue beneath. Although a biofilm can be formed by a single bacteria, more often biofilms consist of many species of bacteria. The plaque that forms on your teeth and causes tooth decay is a type of bacterial biofilm. More information regarding biofilm can be found at http://www.biofilm.montana.edu.

Once anchored to the surface, biofilm organisms carry out either detrimental or beneficial reactions depending upon the surrounding environmental conditions. The elevation of proteases, from inflammatory cells, impairs wound healing by destroying essential growth factors, receptors and extracellular matrix (ECM) proteins. Ladwig et al. demonstrated that the healing of pressure ulcers could be predicted by protease activity in wound fluid *(Ladwig, 2002 [B])*. Chronic wounds often have bacterial biofilms that cause elevated levels of pro-inflammatory cytokines, leading to chronic inflammation. James et al. identified biofilms in 60% of chronic wounds biopsied, but in only 6% of acute wounds *(James, 2008 [D])*.

Inflammatory cells kill microorganisms and release matrix metalloproteases and elastase. These proteases remove denatured ECM components and permit wound healing to proceed. Matrix metalloproteases (MMPs) are necessary for several key processes in wound healing: debridement, angiogenesis, contraction, epithelial migration, and remodeling of scar tissue. Bacteria in biofilms are difficult to kill with topical or systemic antibiotics, antimicrobials or antiseptics. Therefore, effective debridement of biofilms, and prevention of re-formation, by applying effective dressings, antibiotics, antimicrobials or antiseptics is essential for the treatment plan of a chronic wound. Chin et al. demonstrated topical doxycycline inhibits matrix metalloprotease activity and tumor necrosis factor alpha (TNFα) release, promoting healing *(Chin, 2003 [A])*. Another study showed that cadexomer iodine destroyed Pseudomona biofilms after 24 hours of exposure to an in vitro bofilm model of skin wounds *(Thorn, 2009 [D])*.

Psychosocial Needs

Psychosocial issues may affect pressure ulcer development and treatment. Langemo et al. 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 (*Langemo, 2000 [D])*. Lower levels of well-being and activity in spinal cord injury and pressure ulcer development have been reported *(Krause, 1998 [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 affect on outcomes *(Jones, 2003 [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 spiritual healing *(Langemo, 2000 [D])*. Interventions to enhance socialization such as encouraging involvement in current relationships, in developing relationships, and positive feedback when patient reaches out to others might be beneficial *(Dochterman, 2004 [R])*. Interventions to enhance body image could include assisting patients to discuss changes caused by the pressure ulcer and assisting patient to separate physical appearance from feelings of personal worth *(Dochterman, 2004 [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.

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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.

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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 *(Bryant, 2012 [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, and
- 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 *(Alvarez, 2007 [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 include:

- charcoal over the wound bed;
- topical antimicrobial dressings, e.g., silver, cadexomer iodine;
- topical metronidazole;
- topical anaesthesia;
- premedicating the patient; and

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

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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 *(Bergstrom, 2005 [B]; Sibbald, 2000 [R]; Winter, 1962 [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, exudate, 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 *(Fernandez, 2007 [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 the healing wound.
- Facilitate wound assessment by optimizing visualization of the 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.

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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.

The 2011 Cochrane Collaboration updated evidence review states there is "no good evidence to support use of any particular wound cleansing solution or technique for pressure ulcers" *(Moore, 2011 [M])*.

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 *(Moore, 2011 [M]; Fernandez, 2007 [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) *(European Wound Management Association, 2005 [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 *(White, 2006 [R]; European Wound Management Association, 2005 [R])*.

Irrigation

High-pressure irrigation may be needed in the presence of slough and necrotic tissue *(Wound, Ostomy, and Continence Nursing Society, 2012 [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 *(Watret, 2002 [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 *(Whitney, 2006 [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 *(Konya, 2005 [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 *(Whitney, 2006 [R])*.

Calcium alginates or other fiber gelling dressings: Used for packing if moderate to heavily exudative wound. Absorbs drainage and turns to a gel to maintain a moist wound bed. Consider lengthening dressing change interval or discontinuing if dressing still dry at scheduled dressing change.

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Composites: Use on partial and shallow full-thickness wounds. Components of different dressing categories combined into a single dressing. Absorption depends on dressing components.

Contact layers: Protect the wound base, conforming to wound shape. Allows passage of exudate from the wound to a secondary dressing. Use on full-thickness wounds with minimal to heavy exudate. Can be used in combination with negative pressure wound therapy. Can stay in place up to seven days.

Foam: Contains a hydrophilic polyurethane film-coat layer. Absorptive, non-adherent to a moist wound bed, comfortable. Available in adhesive and non-adhesive form.

Gauze: Absorptive, packing. Unless kept moist, will adhere to the wound for non-selective debridement; wound may dry out. Polyester gauze remains moist longer; cotton weave wicks drainage more effectively yet sticks more to the wound base when it dries out.

Impregnated gauze: Used for packing, can deliver antimicrobial, medications and moisture, for partial or full-thickness wounds.

Hydrocolloid: Contains gel-forming agents. Adhesive, absorptive, impermeable barrier, variety of shapes. For partial and full thickness, may use in combination with other dressings. Comfortable, may be left in place up to several days.

Hydrogel: Donates fluid to the wound, little or no absorption. Available in pad and amorphous forms, non-adherent.

Transparent film: Permeable to oxygen and water vapor but protects from environmental contaminants. Promotes autolysis, may be used as a secondary dressing, can stay on up to seven days. Not recommended for an infected wound. If used as the primary dressing apply to partial-thickness minimally draining or closed wounds. Can be used to decrease friction.

Wound fillers: Pastes, granules, powders, beads or gels used to fill shallow wounds; some hydrate, some absorb. Needs secondary dressing. Use on partial and shallow full-thickness minimal to moderate exudate, necrotic and infected.

Wound pouches: Contains heavy exudating malodorous drainage, adapted from ostomy care.

Antimicrobials: Controls or decreases bioburden (e.g., silver dressings, hydrofera blue, cadezomer iodine, honey).

Collagen: May enhance deposition of organized collagen fibers, thereby acclerating wound repair. For partial and full-thickness wounds with minimum to moderate exudate.

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 *(Shea, 1975 [R]; Witkowski, 1982 [D])*. Slough tends to have more moisture and less adherence to the wound bed than eschar, having little to no moisture and much adherence *(Sussman, 2007 [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 *(Alterescu, 1988 [R]; Sapico, 1986 [D]; Winter, 1979 [NA])*.

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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** is the facilitation of a natural process by which the body's leukocytes and proteolytic enzymes digest nonviable tissue. This process is selective for necrotic tissue only and maintains a moist healing environment. This can be done by adding moisture to the wound bed and occluding it with a moisture retentive dressing such as a hydrocolloid or film. Clinicians must review the patient's medical history and medications list to ensure that the patient has an intact immune system. If the patient cannot mount an immunoresponse, there is a risk of developing infection in the wound bed with this method.
2. **Chemical/enzymatic debridement** is the application of concentrated, commercially prepared enzymes to the surface of the necrotic tissue in the expectation that it will aggressively degrade necrosis by digesting devitalized tissue *(Sussman, 2007 [R])*. A provider's order is required. These ointments are intended to work in moist environments, and do not work well on eschar unless it has been prepared via cross-hatching and keeping the surface moist. They also work best in a particular pH range and can be deactivated by heavy metals found in wound cleansers, topical dressings and antimicrobial preparations. Frequency of application varies with each brand; refer to manufacturer's instructions for use.
3. **Conservative sharp debridement** is the excision of necrotic material up to but NOT including viable tissue. Physical therapists and registered nurses may conservatively sharp debride wounds. Nurses must complete a course on wound debridement with competence validation of wound debridement skills by a qualified mentor. Because sharp debridement involves use of a scalpel, scissors or other sharp instrument for the removal of dead tissue, it is a more rapid form of selective debridement. Sharp debridement may be combined with the above forms of debridement to quickly clean up the wound and shorten time to closure. If the patient is sensate, consider a form of analgesia, as sharp debridement may be painful to the patient *(Sussman, 2007 [R])*.
4. **Biosurgical debridement** or larval debridement therapy is the application of disinfected maggots to the wound bed, whereby they secrete proteolytic enzymes to degrade and then ingest necrotic tissue *(Zacur, 2002 [R]; Prete, 1997 [NA])*. The secretions of *Lucilia sericata* or *Phaenicia sericata* also have antimicrobial properties even for methicillin-resistant *staphylococcus aureus (Prete, 1997 [NA])*. The secretions promote human fibroblast activity *(Prete, 1997 [NA])*. A review of the evidence concluded that maggot therapy is no more effective than other methods of debridement *(Gray, 2008 [R])*.
5. **Ultrasonic mist** therapy uses saline coupled with the acoustic wave to produce mechanical and thermal effects. Destruction of fibrin may occur when the probe delivering the mist comes in contact with the wound *(Stanisic, 2005 [R])*. The debridement effect is not seen, though, when contact with the wound is avoided, as in low-frequency, low-intensity, non-contact ultrasound *(Ramundo, 2008 [R])*.

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Non-selective debridement

1. **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 *(Anderson, 2006 [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 *(European Pressure Ulcer Advisory Panel, 2009 [R])*.

2. **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.

   - **Hydrotherapy** may be used to remove bacteria and debris from the surface of pressure ulcers. Whirlpool can help to soften and loosen adherent necrotic tissue while removing wound exudates *(European Pressure Ulcer Advisory Panel, 2009 [R])*. Prolonged periods of wetness to the tissue may be associated with bacterial contamination *(Whitney, 2006 [R])*. Wound care professionals have moved away from whirlpool to pulsed laser with suction, which allows the use of sterile solutions and selective debridement settings. 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 *(Hopf, 2006 [R]; Robson, 2006 [R]; Steed, 2006 [R])*. 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. More specific information can be obtained at http://www.cdc.gov.

   - **Wet-to-dry dressings** are indicated for heavily necrotic wounds, and not for wounds with primarily viable tissue *(Lawrence, 1992 [NA])*. It is recommended to progress to other dressing plans that minimize wound trauma and maintain a moist wound healing environment. Wet-to-dry dressings will require adequate pain management to address the associated pain to the patient.

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. Below is 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. Refer to recommendations discussed at the end of the annotation. Note: there is little data comparing the use of one adjunct therapy to another.

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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 capacitive coupled electrical current to transfer energy to a wound. The type of electricity that is transferred to the target tissue is controlled by the electrical source. 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. Electrical stimulation to the wound bed uses galvanotaxis to attract cells of repair to the site. There is a significant body of research that demonstrates that polarity influences healing in different ways at different phases *(Sussman, 2007 [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 *(Sussman, 2007 [R])*.

Hyperbaric oxygen therapy is the application of oxygen to the host's tissues above atmospheric pressure. Hyperbaric oxygen therapy can increase oxygen diffusion to a wound and the hemoglobin's ability to carry oxygen, therefore meeting the increased demand of oxygen for cellular metabolism. It may also eliminate oxygen-free radicals; reduce bacterial growth; increase the ability for white blood cells to kill bacteria; and increase angiogenesis, collagen synthesis, granulation tissue formation, epithelialization, and wound contraction. 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. Again, if a pressure ulcer is present distal to the knee, check for adequate blood flow *(Meyers, 2007 [R])*.

Negative pressure wound therapy devices apply negative pressure, or suction, to the wound bed. The negative pressure applied to the wound bed creates three main physical effects: 1) tension on tissues that stimulate mitotic division, 2) increased local blood flow in the capillary bed, and 3) evacuation of excess interstitial fluids. The subsequent physiological effects to the wound bed are exudate control, increased granulation tissue formation, reduced wound and periwound edema, increased wound contraction, and increased epithelialization *(Meyers, 2007 [R]; Gupta, 2004 [M])*. 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.

(European Pressure Ulcer Advisory Panel, 2009 [R])

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The Federal Drug Administration has received reports of serious complications, including death, associated with the use of negative pressure wound therapy systems. The Federal Drug Administration 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. To see full alert, refer to the Federal Drug Administration alert (02/24/2011) addressing negative pressure wound therapy at http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm244211.htm. 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. To see the full alert, refer to the Food and Drug Administration alert (02/28/2011) http://www.fda.gov/Safety/MedWatch/SafetyInformation/SafetyAlertsforHumanMedicalProducts/ucm190704.htm.

Non-contact, non-thermal ultrasound is a mechanical vibration transmitted at a frequency beyond the upper limit of human hearing *(Ennis, 2005 [A])*. These sound waves are transmitted in human tissues and cause vibration within them. That vibration causes acoustic cavitation and acoustic streaming, which ultimately create waves of pressure on the cell membrane and fluid movement around the membrane, stimulating all the structures on the cell membrane, including receptor sites. Studies have shown that these effects create increased membrane permeability and cell activity. The acoustic pressure is not tolerated by the more rigid cell walls of bacteria. Ultrasound can be modulated for thermal effects, non-thermal effects, diagnostic reading, and excision as in debridement. It is not in the scope of this protocol to discuss the diagnostic or debriding ultrasound devices. If set for thermal effects, using MHz ultrasound, a chronic wound can be returned to acute wound healing. Non-thermal ultrasound, most commonly administered as kHz ultrasound, can stimulate the cells of repair to do more of what they are already programmed to do: be bacteriocidal, and stimulate capillary growth in the wound bed, depending on the kind of kHz device selected. Physical therapists are trained in ultrasound application and variation, and registered nurses can apply ultrasound that is already set for wound healing by the device. When determining who will administer this modality, check your state's scope of practice acts.

Phototherapy: Photobiologists are studying the effects of different wavelengths of light on human tissues. When focused and intensified, as in laser form, doses of light can quickly and painlessly be administered to patients. The two most studied phototherapies are infrared and ultraviolet. Ultraviolet aides in wound healing because it is bacteriocidal, including methicillin-resistant staphylococcus aureus, vancomycin-resistant enterococci, and pseudomonas *(Conner-Kerr, 1999 [NA]; Conner-Kerr, 1998 [NA])*. Infared has two main effects: the release of nitric oxide, a known vasodilator and angiogenic stimulator; and increasing cellular activity of all cells. The infrared rays are absorbed by cell mitochondria and converted into ATP, just like photosynthesis, which increases DNA and RNA synthesis, protein production in ribosomes, and all other cellular functions of a cell. This increases the cycle of mitosis and cell proliferation. Historically, physical therapists have had the class II and class III laser phototherapy devices. Please check the practice acts in your state.

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 you refer the patient to a wound-focused physician or clinician, who will be able to help select the appropriate product.

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Pain Management

Pressure ulcers can be extremely painful, and it is important to assess every patient with a pressure ulcer for pain *(Rastinehad, 2006 [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 other painful interventions *(Szor, 1999 [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 *(Flock, 2003 [A]; Twillman, 1999 [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 *(Rastinehad, 2006 [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, 1mL 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 *(American Society for Parenteral and Enteral Nutrition, 2007 [R]; Dorner 2004 [R])*.

2. Protein recommendations vary from 1-2 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 *(European Pressure Ulcer Advisory Panel, 2009 [R]; American Society for Parenteral and Enteral Nutrition, 2007 [R]; Dorner, 2004 [R])*. Protein requirements may vary by stage of pressure ulcer, from 1.25-1.5 g/kg/day for stages I-IV and 1.5-2 g/kg/day with those patients with larger stage III or IV or for those with multiple pressure ulcers *(American Society for Parenteral and Enteral Nutrition, 2007 [R])*. The amount of wound exudate, which contains significant amounts of protein, may also affect the amount of protein needed *(Doley, 2010 [R])*.

3. Caloric requirements are based on the patient's individual nutritional goal. There are various methods to determine include Harris Benedict and use of 30-35 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 *(American Society for Parenteral and Enteral Nutrition, 2007 [R]; Dorner, 2004 [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 50-100 mg of Vitamin C is recommended *(Dorner, 2004 [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 *(Dorner, 2004 [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 *(Dorner, 2004 [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 *(Dorner, 2009 [R]; European Pressure Ulcer Advisory Panel, 2009 [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 *(American Dietetic Association Nutrition Care Manual, 2009 [R]; Dorner, 2009 [R]; Dorner, 2004 [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 *(American Society for Parenteral and Enteral Nutrition, 2007 [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, and
- dressing change technique, goal and purpose.

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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.

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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, 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.

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This section provides resources, strategies and measurement for use in closing the gap between current clinical practice and the recommendations set forth in the protocol.

The subdivisions of this section are:

- Aims and Measures
  - Measurement Specifications
- Implementation Recommendations
- Resources
- Resources Table

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Aims and Measures

Outcome Aims and Measures

1. Eliminate the incidence of pressure ulcer development.

   Measures for accomplishing this aim:

   a. (Inpatient) Rate or percentage of patients with documentation of a pressure ulcer.

   b. (Outpatient) Rate or percentage of patients, evaluated for pressure ulcer, with documentation of a pressure ulcer.

Process Aims and Measures

2. Accurately identify patients at risk of developing a pressure ulcer in the inpatient and outpatient care setting.

   Measures for accomplishing this aim:

   a. (Inpatient) Percentage of patients with documentation in the medical record indicating a risk assessment (using the Braden Scale or Braden Q) was completed upon admission. (Upon admission/daily)

   b. (Inpatient) Percentage of patients with documentation in the medical record indicating patient risk was reassessed daily using the Braden Scale or Braden Q or as indicated for care setting.

   c. (Outpatient) Percentage of patients with documentation in the medical record indicating a risk assessment was done, using the following questions:

      - Is the patient bed- or wheelchair-bound, or does he/she require assistance to transfer? *(Reddy, 2006 [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 or history of pressure ulcers?
      - Does the patient appear visibly malnourished?

      For younger children, is the baby/child demonstrating inadequate tissue perfusion with evidence of skin breakdown?

3. Improve the frequency of skin inspections and re-inspections in hospitalized patients and outpatient care patients with identified pressure ulcer(s).

   Measures for accomplishing this aim:

   a. (Inpatient) Percentage of patients with documentation in the medical record that a head-to-toe skin inspection and palpation were completed within six hours of admission.

   b. (Inpatient) Percentage of patients with documentation in the medical record that a head-to-toe re-inspection and palpation were completed every 8-24 hours, depending on the status of the patient.

   c. (Outpatient) Percentage of at-risk patients with documentation in the medical record that a head-to-toe skin inspection was completed.

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4. Increase the use and implementation of pressure ulcer prevention plans.

   Measure for accomplishing this aim:

   a. Percentage of patients with documentation of interventions, including patient education, in the medical record.

5. Improve the completion of a comprehensive patient assessment, including wound evaluation, in patients with an identified pressure ulcer.

   Measures for accomplishing this aim:

   a. (Inpatient) Percentage of patients with pressure ulcer(s) whose medical record contains documentation of a comprehensive patient assessment and thorough wound evaluation including staging classification upon admission/identification of a hospital-acquired pressure ulcer that includes the following:

      - History and physical
      - Wound description/staging
      - Etiology of pressure
      - Nutritional status
      - Bacterial colonization/infection
      - Psychosocial needs (anxiety, depression, worries)

   b. (Inpatient) Percentage of patients whose medical record contains documentation of a partial wound assessment with every dressing change.

   c. (Outpatient) Percentage of patients with pressure ulcer(s) whose medical record contains documentation of a comprehensive patient assessment and thorough wound evaluation that includes the following:

      - History and physical
      - Wound description/staging
      - Etiology of pressure
      - Nutritional status
      - Bacterial colonization/infection
      - Psychosocial needs (anxiety, depression, worries)

6. Increase the use and implementation of pressure ulcer treatment plans.

   Measure for accomplishing this aim:

   a. Percentage of patients with pressure ulcer(s) whose medical record contains documentation of a pressure ulcer treatment plan in their plan of care.

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7. Improve education in the prevention and progression of pressure ulcers to patients, families, and caregivers.

   Measures for accomplishing this aim:

   a. (Outpatient) Percentage of patients with a pressure ulcer(s) with documentation in the medical record that education was provided to patient, family and/or caregiver regarding the treatment, progression, and prevention of pressure ulcers.

   b. (Inpatient) Percentage of patients with a pressure ulcer who are discharged home, with documentation in the medical record that written instructions and educational materials were given to the patient and/or his/her caregiver at discharge or during the hospital stay to (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 techniques, goal and purpose).

8. Improve the coordination and communication between care providers/care institutions regarding the transfer/discharge plan for patients with identified pressure ulcer(s).

   Measures for accomplishing this aim:

   a. Percentage of patients with documentation in the medical record that communication of a transfer/discharge plan for patients with a pressure ulcer(s) took place addressing skin status and the pressure ulcer prevention plan when transferring patient care to another care provider:

      - Change of shifts
      - Transfers between departments
      - Transfer to another unit or facility
      - At time of discharge

   b. Percentage of patients with a pressure ulcer who are transferred/discharged, with documentation in the medical record of the transfer/discharge plan.

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Measurement Specifications

Measurement #1a

Rate or percentage of patients with documentation of a pressure ulcer.

Population Definition

All patients admitted to the hospital.

Data of Interest

$$\frac{\text{\# of patients with documentation of a pressure ulcer}}{\text{\# of patients admitted to the hospital}}$$

Numerator/Denominator Definitions

Numerator: Number of patients with documentation of a pressure ulcer.

Denominator: Number of patients admitted to the hospital for any reason.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients admitted to the hospital for any reason. Out of that number, determine the number of patients with documentation of a pressure ulcer.

Notes

This is an outcome measure, and improvement is noted as a decrease in the rate.

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Measurement #1b

Rate or percentage of patients, evaluated for pressure ulcer, with documentation of a pressure ulcer.

Population Definition

All patients seen in an outpatient care setting after hospitalization.

Data of Interest

$$\frac{\text{\# of patients with evaluation and documentation of a pressure ulcer}}{\text{\# of patients seen in an outpatient care setting after hospitalization}}$$

Numerator/Denominator Definitions

Numerator: Number of patients with evaluation and documentation of a pressure ulcer.

Denominator: Number of patients seen in an outpatient care setting after hospitalization.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients seen in an outpatient care setting. Out of that number, determine the number of patients with evaluation and documentation of a pressure ulcer.

Notes

This is an outcome measure, and improvement is noted as a decrease in the rate.

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Measurement #2a

Percentage of patients with documentation in the medical record indicating a risk assessment (using the Braden Scale or Braden Q) was completed upon admission.

Population Definition

All patients admitted to the hospital.

Data of Interest

$$\frac{\text{\# of patients who had pressure ulcer risk assessment done upon admission}}{\text{\# of patients admitted to the hospital}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who had pressure ulcer risk assessment done upon admission into the hospital using the Braden Scale or Braden Q.

Denominator: Number of patients admitted to the hospital.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients admitted to the hospital. Out of that number, determine the number of patients who had pressure ulcer risk assessment done upon admission into the hospital using the Braden Scale or Braden Q.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #2b

Percentage of patients with documentation in the medical record indicating patient risk was reassessed daily (using the Braden Scale or Braden Q) or as indicated for care setting.

Population Definition

All patients in the hospital.

Data of Interest

$$\frac{\text{\# of patients who had pressure ulcer risk reassessment done daily}}{\text{\# of patients in the hospital}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who had pressure ulcer risk reassessment done daily after admission into the hospital using the Braden Scale or Braden Q.

Denominator: Number of patients in the hospital.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients admitted to the hospital. Out of that number, determine the number of patients who had pressure ulcer risk reassessment done daily after admission into the hospital using the Braden Scale or Braden Q.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #2c

Percentage of patients with documentation in the medical record indicating a risk assessment was done, using the following questions:

- Is the patient bed- or wheelchair-bound, or does he/she require assistance to transfer?
- 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 or history of pressure ulcers?
- Does the patient appear visibly malnourished?

For younger children, is the baby/child demonstrating inadequate tissue perfusion with evidence of skin breakdown?

Population Definition

All patients seen in an outpatient care setting after hospitalization.

Data of Interest

$$\frac{\text{\# of patients who had pressure ulcer risk reassessment done using specific questions}}{\text{\# of patients seen in an outpatient care setting}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who had pressure ulcer risk reassessment done using following questions:

- Is the patient bed- or wheelchair-bound, or does he/she require assistance to transfer?
- 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 or history of pressure ulcers?
- Does the patient appear visibly malnourished?

For younger children, is the baby/child demonstrating inadequate tissue perfusion with evidence of skin breakdown?

Denominator: Number of patients seen in an outpatient care setting.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients seen in an outpatient care setting. Out of that number, determine the number of patients who had pressure ulcer risk reassessment done using the questions specified in the numerator statement.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #3a

Percentage of patients with documentation in the medical record that a head-to-toe skin inspection and palpation were completed within six hours of admission.

Population Definition

All patients admitted to the hospital.

Data of Interest

$$\frac{\text{\# of patients who had a head-to-toe skin inspection and palpation were completed within six hours of admission}}{\text{\# of patients admitted to the hospital}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who had a head-to-toe skin inspection and palpation completed within six hours of admission.

Denominator: Number of patients admitted to the hospital.

Measurement Period

Monthly.

Explanation of Interventions

- Upon admission to the hospital, inspect the skin of every patient; palpate when indicated.
- Palpation is performed on all areas of discoloration or redness in order to determine any change in temperature compared to surrounding skin, or feeling of bogginess (soft) or induration (hard). Particular attention should be paid to bony prominences.
- Look for alterations in skin moisture, texture, temperature, color or consistency.
- Look for purplish/bluish localized areas and/or localized warm areas that become cold.

Method/Source of Data Collection

Determine the number of patients admitted to the hospital. Out of that number, determine the number of patients who had a head-to-toe skin inspection and palpation completed within six hours of admission.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #3b

Percentage of patients with documentation in the medical record that a head-to-toe re-inspection and palpation were completed every 8-24 hours, depending on the status of the patient.

Population Definition

All patients in the hospital with a pressure ulcer.

Data of Interest

$$\frac{\text{\# of patients who had a head-to-toe skin inspection and palpation completed every 8-24 hours, depending on the status of the patient}}{\text{\# of patients in the hospital with a pressure ulcer}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who had a head-to-toe skin inspection and palpation completed every 8-24 hours, depending on the status of the patient.

Denominator: Number of patients in the hospital with a pressure ulcer.

Measurement Period

Monthly.

Explanation of Interventions

- Upon admission to the hospital, inspect the skin of every patient; palpate when indicated.
- Palpation is performed on all areas of discoloration or redness in order to determine any change in temperature compared to surrounding skin, or feeling of bogginess (soft) or induration (hard). Particular attention should be paid to bony prominences.
- Look for alterations in skin moisture, texture, temperature, color or consistency.
- Look for purplish/bluish localized areas and/or localized warm areas that become cold.

Method/Source of Data Collection

Determine the number of patients admitted to the hospital. Out of that number, determine the number of patients who had a head-to-toe skin inspection and palpation completed every 8-24 hours, depending on the status of the patient.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #3c

Percentage of at-risk patients with documentation in the medical record that a head-to-toe skin inspection was completed.

Population Definition

All patients seen in an outpatient care setting after hospitalization and at risk for pressure ulcers.

Data of Interest

$$\frac{\text{\# of patients who had a head-to-toe skin inspection completed}}{\text{\# patients seen in an outpatient setting and at risk for pressure ulcers}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who had a head-to-toe skin inspection completed.

Denominator: Number of patients seen in an outpatient care setting and at risk for pressure ulcers.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients seen in an outpatient care setting and at risk for pressure ulcers. Out of that number, determine the number of patients who had a head-to-toe skin inspection completed.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #4a

Percentage of patients with documentation of interventions, including patient education, in the medical record.

Population Definition

All patients seen in an outpatient care setting after hospitalization and/or patients admitted to the hospital.

Data of Interest

$$\frac{\text{\# of patients with documentation of interventions, including patient education, in the medical record}}{\text{\# of patients from population definition}}$$

Numerator/Denominator Definitions

Numerator: Number of patients with documentation of interventions, including patient education, in the medical record.

Denominator: Number of patients seen in an outpatient care setting after hospitalization and/or patients admitted to the hospital.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients seen in an outpatient care setting after hospitalization and/or patients admitted to the hospital. Out of that number, determine the number of patients with documentation of interventions, including patient education, in the medical record.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #5a

(Inpatient) Percentage of patients with pressure ulcer(s) whose medical record contains documentation of a comprehensive patient assessment and thorough wound evaluation including staging classification upon admission/identification of a hospital-acquired pressure ulcer that includes the following:

- History and physical
- Wound description/staging
- Etiology of pressure
- Nutritional status
- Bacterial colonization/infection
- Psychosocial needs (anxiety, depression, worries)

Population Definition

All patients admitted to the hospital who have pressure ulcers.

Data of Interest

$$\frac{\text{\# of patients who had comprehensive patient assessment and thorough wound evaluation}}{\text{\# of patients admitted to the hospital who have pressure ulcers}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who had comprehensive patient assessment and thorough wound evaluation including staging classification upon admission/identification of a hospital-acquired pressure ulcer that includes the following:

- History and physical
- Wound description/staging
- Etiology of pressure
- Nutritional status
- Bacterial colonization/infection
- Psychosocial needs (anxiety, depression, worries)

Denominator: Number of patients admitted to the hospital who have pressure ulcers.

Measurement Period

Monthly.

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Method/Source of Data Collection

Determine the number of patients admitted to the hospital and have pressure ulcers. Out of that number, determine the number of patients who had comprehensive patient assessment and thorough wound evaluation including staging classification upon admission/identification of a hospital-acquired pressure ulcer that includes the following:

- History and physical
- Wound description/staging
- Etiology of pressure
- Nutritional status
- Bacterial colonization/infection
- Psychosocial needs (anxiety, depression, worries)

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #5b

(Inpatient) Percentage of patients with pressure ulcers whose medical record contains documentation of a partial wound assessment with every dressing change.

Population Definition

All patients in the hospital who have pressure ulcers.

Data of Interest

$$\frac{\text{\# of patients who had partial wound assessment with every dressing change}}{\text{\# of patients in the hospital who have pressure ulcers}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who had partial wound assessment with every dressing change.

Denominator: Number of patients in the hospital who have pressure ulcers.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients in the hospital who have pressure ulcers. Out of that number, determine the number of patients who had partial wound assessment with every dressing change.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #5c

(Outpatient) Percentage of patients with pressure ulcer(s) whose medical record contains documentation of a comprehensive patient assessment and thorough wound evaluation that includes the following:

- History and physical
- Wound description/staging
- Etiology of pressure
- Nutritional status
- Bacterial colonization/infection
- Psychosocial needs (anxiety, depression, worries)

Population Definition

All patients seen in outpatient care settings after hospitalization and have pressure ulcers.

Data of Interest

$$\frac{\text{\# of patients who had comprehensive patient assessment and thorough wound evaluation}}{\text{\# of patients seen in outpatient care settings and have pressure ulcers}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who had comprehensive patient assessment and thorough wound evaluation that includes the following:

- History and physical
- Wound description/staging
- Etiology of pressure
- Nutritional status
- Bacterial colonization/infection
- Psychosocial needs (anxiety, depression, worries)

Denominator: Number of patients seen in outpatient care settings and have pressure ulcers.

Measurement Period

Monthly.

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Method/Source of Data Collection

Determine the number of patients seen in outpatient care settings and have pressure ulcers. Out of that number, determine the number of patients who had comprehensive patient assessment and thorough wound evaluation that includes the following:

- History and physical
- Wound description/staging
- Etiology of pressure
- Nutritional status
- Bacterial colonization/infection
- Psychosocial needs (anxiety, depression, worries)

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #6a

Percentage of patients with pressure ulcer(s) whose medical record contains documentation of a pressure ulcer treatment plan in their plan of care.

Population Definition

All patients seen in outpatient care settings after hospitalization and/or admitted to the hospital and have pressure ulcers.

Data of Interest

$$\frac{\text{\# of patients with pressure ulcer treatment plan in the plan of care}}{\text{\# of patients seen in outpatient care settings and/or admitted to the hospital and have pressure ulcers}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who have documentation of a pressure ulcer treatment plan in their plan of care.

Denominator: Number of patients seen in outpatient care settings after hospitalization and/or admitted to the hospital and have pressure ulcers.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients seen in outpatient care settings after hospitalization and/or admitted to the hospital and have pressure ulcers. Out of that number, determine the number of patients who had documentation of a pressure ulcer treatment plan in their plan of care.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #7a

(Outpatient) Percentage of patients with a pressure ulcer(s) with documentation in the medical record that education was provided to patient, family and/or caregiver regarding the treatment, progression, and prevention of pressure ulcers.

Population Definition

All patients seen in outpatient care settings after hospitalization and have pressure ulcers.

Data of Interest

$$\frac{\text{\# of patients who had education}}{\text{\# of patients seen in outpatient care settings and have pressure ulcers}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who had education provided to patient, family and/or caregiver regarding the treatment, progression, and prevention of pressure ulcers.

Denominator: Number of patients seen in outpatient care settings after hospitalization and have pressure ulcers.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients seen in outpatient care settings after hospitalization and have pressure ulcers. Out of that number, determine the number of patients who had documentation that education was provided to patient, family and/or caregiver regarding the treatment, progression, and prevention of pressure ulcers.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #7b

(Inpatient) Percentage of patients with a pressure ulcer who are discharged home, with documentation in the medical record that written instructions and educational materials were given to the patient and/or his/her caregiver at discharge or during the hospital stay (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 techniques, goal and purpose).

Population Definition

All patients admitted to the hospital who have pressure ulcers and were discharged.

Data of Interest

$$\frac{\text{\# of patients who had written instructions regarding care for pressure ulcers upon discharge}}{\text{\# of patients seen admitted to the hospital and discharged and have pressure ulcers}}$$

Numerator/Denominator Definitions

Numerator: Number of patients who, upon the discharge from hospital, had documentation in the medical record that written instructions and educational materials were given to the patient and/or his/her caregiver at discharge or during the hospital stay (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 techniques, goal and purpose).

Denominator: Number of patients admitted to the hospital and discharged from the hospital who have pressure ulcers.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients admitted to the hospital and discharged from the hospital who had pressure ulcers. Out of that number, determine the number of patients who, upon discharge, had documentation in the medical record that written instructions and educational materials were given to the patient and/or his/her caregiver at discharge or during the hospital stay (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 techniques, goal and purpose).

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #8a

Percentage of patients with documentation in the medical record that communication of a transfer/discharge plan for patients with a pressure ulcer(s) took place addressing skin status and the pressure ulcer prevention plan when transferring patient care to another care provider:

- Change of shifts
- Transfers between departments
- Transfer to another unit or facility
- At time of discharge

Population Definition

All patients admitted to the hospital who have pressure ulcers and were discharged or transferred to another care system.

Data of Interest

$$\frac{\text{\# of patients for whom there was documentation of a discharge/transfer communication}}{\text{\# of patients seen admitted to the hospital and discharged or transferred who have pressure ulcers}}$$

Numerator/Denominator Definitions

Numerator: Number of patients with documentation in the medical record that communication of a transfer/discharge plan for patients with a pressure ulcer(s) took place addressing skin status and the pressure ulcer prevention plan when transferring patient care to another care provider:

- Change of shifts
- Transfers between departments
- Transfer to another unit or facility
- At time of discharge

Denominator: Number of patients admitted to the hospital and discharged from the hospital or transferred to another care system who have pressure ulcers.

Measurement Period

Monthly.

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Method/Source of Data Collection

Determine the number of patients admitted to the hospital and discharged from the hospital or transferred to another care system who have pressure ulcers. Out of that number, determine the number of patients with documentation in the medical record that communication of a transfer/discharge plan for patients with a pressure ulcer(s) took place addressing skin status and the pressure ulcer prevention plan when transferring patient care to another care provider:

- Change of shifts
- Transfers between departments
- Transfer to another unit or facility
- At time of discharge

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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Measurement #8b

Percentage of patients with a pressure ulcer who are transferred/discharged, with documentation in the medical record of the transfer/discharge plan.

Population Definition

All patients admitted to the hospital who have pressure ulcers and were discharged or transferred to another care system.

Data of Interest

$$\frac{\text{\# of patients with a pressure ulcer who have a transfer/discharge plan}}{\text{\# of patients seen admitted to the hospital and discharged or transferred with a pressure ulcer}}$$

Numerator/Denominator Definitions

Numerator: Number of patients with a pressure ulcer with documentation in the medical record of the transfer/discharge plan.

Denominator: Number of patients admitted to the hospital and discharged from the hospital or transferred to another care system who have pressure ulcers.

Measurement Period

Monthly.

Method/Source of Data Collection

Determine the number of patients admitted to the hospital and discharged from the hospital or transferred to another care system who have pressure ulcers. Out of that number, determine the number of patients with documentation in the medical record of the transfer/discharge plan.

Notes

This is a process measure, and improvement is noted as an increase in the rate.

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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 protocol 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 systemwide 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 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.

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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.

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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 this protocol.
- 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.

Measurement

Continuous quality improvement strategies may be used to measure the degree to which implementation of the protocol reduces pressure ulcers incidence.

Measurement activities may include:

- prevalence and incidence studies,
- concurrent audits,
- comparing admission skin inspection to discharge skin inspection,
- review of assessment and prevention documentation, and/or
- ensuring that pressure ulcer risk assessment and skin inspection are completed for all patients.

Overall improvement strategies may include consideration of the following:

- Establish/improve processes to ensure that risk assessment is conducted within six hours of admission for all patients.
- Agree on the use of a standard risk assessment tool, e.g., Braden or Braden Q Scale.

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- Develop and utilize multiple methods to visually cue staff as to which patients are at risk. For example, consider using stickers in the patient's chart or on the patient's door so that all who enter will realize the patient is at risk for pressure ulcer development.
- Build shared pride in progress. Post "Days since Last Pressure Ulcer" data. Refer to Resources Table, Institute for Healthcare Improvement.

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

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

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

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

What changes can we make to ensure effective management of moisture?

- Look for opportunities to design a process for periodic activities such as repositioning, assessing for wet skin, applying barrier agents, offering toilet opportunities and even offering oral fluids (water). For example: By combining routine activities in a protocol such as a "pressure ulcer prevention protocol" (a care efficiency), staff can complete multiple tasks while in the room every two hours and document them all at once.
- Keep supplies at the bedside for patients who are incontinent. This provides the staff with the supplies they need to immediately clean, dry and protect the patient's skin after each episode of incontinence.
- Provide underpads that pull the moisture away from the skin, and limit the use of disposable briefs or containment garments if at all possible.
- Provide pre-moistened, disposable barrier wipes to help cleanse, moisturize, deodorize and protect patients from perineal dermatitis due to incontinence.

What changes can we make to optimize nutrition and hydration?

- Assist patient with meals, snacks and hydration. Every effort should be made to allow patient preferences when medically appropriate.
- Document the amount of nutritional intake.
- Consult a dietician.

What changes can we make to minimize pressure?

- See Annotation #3, "Pressure Ulcer Prevention Plan, Documentation and Education of Patient and Caregivers."

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What changes can we make to minimize or eliminate friction and sheer?

- See Annotation #3, "Pressure Ulcer Prevention Plan, Documentation and Education of Patient and Caregivers."

Ensure consistent assessment of the patients with pressures ulcers using the following components:

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

What processes can be put in place to ensure appropriate treatment of all patients with pressure ulcers?

- See Annotation #10, "Implement and Document Interventions."

What processes can be put in place to ensure appropriate education for patients and families related to the prevention and treatment of all pressure ulcers?

- See Annotation #11, "Interdisciplinary and Interfacility Communication and Documentation."

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Resources

Criteria for Selecting Resources

The following resources were selected by the protocol work group as additional resources for providers and/or patients. The following criteria were considered in selecting these resources.

- The site contains information specific to the topic of the protocol.
- The content is supported by evidence-based research.
- The content includes the source/author and contact information.
- The content clearly states revision dates or the date the information was published.
- The content is clear about potential biases, noting conflict of interest and/or disclaimers as appropriate.

Resources Available to ICSI Members Only

ICSI has a wide variety of knowledge resources that are ***only*** available to ICSI members (these are indicated with an asterisk in far left-hand column of the Resources table). In addition to the resources listed in the table, ICSI members have access to a broad range of materials including tool kits on CQI processes and Rapid Cycling that can be helpful. To obtain copies of these or other Resources, go to http://www.icsi.org/improvement_resources. To access these materials on the Web site, you must be logged in as an ICSI member.

The resources in the table on the next page that are not reserved for ICSI members are available to the public free-of-charge.

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Resources Table

*	Author/Organization	Title/Description	Audience	Web Sites/Order Information
	Dr. Barbara Bates-Jensen, MD	**Bates-Jensen Wound Assessment Tool** The Tool assists the caregiver in evaluating a pressure ulcer by stage.	Health Care Professionals	http://www.geronet.med.ucla.edu/centers/borun/modules/Pressure_ulcer_prevention/puBWAT.pdf
	European Pressure Ulcer Advisory Panel	The European Pressure Ulcer Advisory Panel (EPUAP) serves as the authoritative voice for improved patient outcomes in pressure ulcer prevention and treatment through public policy, education and research.	Health Care Professionals	http://www.epuap.org
*	ICSI Pressure Ulcer Tool Kit	**ICSI Pressure Ulcer Tool Kit** **Prevention:** • Nursing Standard of Care • Nursing Care Plans and Interventions (PowerPoint Presentation) • Documentation Tool • Bed Selection • Specialty Bed Training (PowerPoint Presentation) • Position Guide for Patients and Families • Patient and Family Guide to Pressure Ulcer Prevention • Standard Bed Algorithm **Assessment:** • Braden Scale Training - Adult Health Care Training (PowerPoint Presentation) - OR/PACU Training (PowerPoint Presentation) - Non-licensed Staff (PowerPoint Presentation) - Group Scenarios - Braden Scale Training Quiz • Braden Subscale and "Skin Safety" Interventions • Position Guide for Patients and Families • Patient and Family Guide to Pressure Ulcer Prevention	Health Care Professionals	http://www.icsi.org/improvement_resources/knowledge_resources/tools

* Available to ICSI members only.

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*	Author/Organization	Title/Description	Audience	Web Sites/Order Information
	IHI provides a number of links to a variety of resources addressing prevention, identification and patient education.	**Institute for Healthcare Improvement:** The Institute for Healthcare Improvement (IHI) is a not-for-profit organization leading the improvement of health care throughout the world. IHI was founded in 1991 and is based in Cambridge, Massachusetts.	Health Care Professionals	http://www.ihi.org
	Mayo Clinic	**Mayo Clinic** Contains information about pressure ulcers, from how they develop to possible treatments.	Health Care Professionals; Patients and Families	http://www.mayoclinic.com/health/bedsores/DS00570
	Minnesota Alliance for Patient Safety (MAPS) along with links to various resources	**Minnesota Alliance for Patient Safety (MAPS):** One of MAPS' goals is to develop a statewide model for a "Just Culture," which is a culture that: • strikes a balance between a punitive environment and a "blame-free" culture; • differentiates between individual behaviors and system failures; and • recognizes humans make errors, yet should be held accountable for at-risk and reckless behaviors.	Health Care Professionals	http://www.mnpatientsafety.org
	Minnesota Hospital Association (MHA)	**Minnesota Hospital Association (MHA)** MHA Represents hospitals' interests through advocacy and representation, as well as educational programming, communication efforts, information resources and issue area expertise. Includes Safe Skin Call to Action; information and presentations including an anti-embolism stocking training video.	Health Care Professionals	http://www.mnhospitals.org/index/tools-app/tool.353
	National Database of Nursing Quality Indicators (NDNQI)	**National Database of Nursing Quality Indicators (NDNQI)** The NDNQI is a proprietary database of the American Nurses Association. The database collects and evaluates unit-specific nurse-sensitive data from hospitals in the United States. Comparative data reports are available to use for quality improvement purposes.	Health Care Professionals	http://www.nursingquality.org/NDNQIPressureUlcerTraining

* Available to ICSI members only.

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*	Author/Organization	Title/Description	Audience	Web Sites/Order Information
	National Pressure Ulcer Advisory Panel	**National Pressure Ulcer Advisory Panel** The National Pressure Ulcer Advisory Panel (NPUAP) serves as the authoritative voice for improved patient outcomes in pressure ulcer prevention and treatment through public policy, education and research.	Health Care Professionals	http://www.npuap.org
	National Pressure Ulcer Advisory Panel	**PUSH Tool** The PUSH Tool assists the caregiver in measuring the pressure ulcer. Categorize the pressure ulcer with respect to surface area, exudates and type of wound tissue.	Health Care Professionals	http://www.npuap.org/PDF/push3.pdf
	Prevention Plus, LLC Barbara Braden and Nancy Bergstrom	The Web site provides services and products related to the Braden Scale for Predicting Pressure Sore Risk©: The actual Braden Scale assessment is provided in PDF format.	Health Care Professionals	http://www.bradenscale.com
	Wound, Ostomy and Continence Nurses	**The WOCN Society** A professional nursing society that supports its members by promoting educational, clinical and research opportunities to advance the practice and guide the delivery of expert health care to individuals with wounds, ostomies and incontinence.	Health Care Professionals	http://www.wocn.org

* Available to ICSI members only.

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The subdivisions of this section are:

- References
- Appendices

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Appendix A – Braden Scale for Predicting Pressure Sore Risk© (Braden Scale)

Risk Score: Mild risk 15-18, Moderate risk 13-14, High risk 10-12, Very High risk 9 or below

BRADEN SCALE FOR PREDICTING PRESSURE SORE RISK

Patient's Name _____ Evaluator's Name _____ Date of Assessment

SENSORY PERCEPTION ability to respond meaningfully to pressure-related discomfort	**1. Completely Limited** Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of con-sciousness or sedation. OR limited ability to feel pain over most of body	**2. Very Limited** Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness OR has a sensory impairment which limits the ability to feel pain or discomfort over □ of body.	**3. Slightly Limited** Responds to verbal commands, but cannot always communicate discomfort or the need to be turned. OR has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.	**4. No Impairment** Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort..				
MOISTURE degree to which skin is exposed to moisture	**1. Constantly Moist** Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.	**2. Very Moist** Skin is often, but not always moist. Linen must be changed at least once a shift.	**3. Occasionally Moist:** Skin is occasionally moist, requiring an extra linen change approximately once a day.	**4. Rarely Moist** Skin is usually dry, linen only requires changing at routine intervals.				
ACTIVITY degree of physical activity	**1. Bedfast** Confined to bed.	**2. Chairfast** Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.	**3. Walks Occasionally** Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair	**4. Walks Frequently** Walks outside room at least twice a day and inside room at least once every two hours during waking hours				
MOBILITY ability to change and control body position	**1. Completely Immobile** Does not make even slight changes in body or extremity position without assistance	**2. Very Limited** Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	**3. Slightly Limited** Makes frequent though slight changes in body or extremity position independently.	**4. No Limitation** Makes major and frequent changes in position without assistance.				
NUTRITION usual food intake pattern	**1. Very Poor** Never eats a complete meal. Rarely eats more than □ of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement OR is NPO and/or maintained on clear liquids or IV□s for more than 5 days.	**2. Probably Inadequate** Rarely eats a complete meal and generally eats only about □ of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement. OR receives less than optimum amount of liquid diet or tube feeding	**3. Adequate** Eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products per day. Occasionally will refuse a meal, but will usually take a supplement when offered OR is on a tube feeding or TPN regimen which probably meets most of nutritional needs	**4. Excellent** Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.				
FRICTION & SHEAR	**1. Problem** Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures or agitation leads to almost constant friction	**2. Potential Problem** Moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	**3. No Apparent Problem** Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair.					
				Total Score				

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Used with Permission. Braden B, Bergstrom N. A conceptual schema for the study of the etiology of pressure sores. *Rehab Nurs* 1987;12:8-12. (Class R)

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Appendix B – Braden Q Scale©

Risk Score: Mild risk 22-25, Moderate risk 17-21, High risk 16 or below

Braden Q Scale					
		Intensity and	**Duration of**	**Pressure**	**Score**
Mobility The ability to change and control body position	1. **Completely immobile**: does not make even slight changes in body or extremity position without assistance	2. **Very Limited**: Makes occasional slight changes in body or extremity position but unable to completely turn self independently.	3. **Slightly limited**; makes frequent though slight changes in body or extremity position independently.	4. **No limitations**: makes major and frequent changes in position without assistance.	
Activity The degree of physical activity	1. **Bedfast**: Confined to bed.	2. **Chairfast:** Ability to walk severely limited or nonexistent. Cannot bear own eight and/or must be assisted in to chair or wheelchair.	3. **Walks occasionally**: Walks occasionally during day., but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.	4. **All patients too young to ambulate OR walks frequently**: Walks outside the room at least twice a day and inside room at least once every 2 hours during waking hours.	
Sensory Perception The ability to respond in a developmentally appropriate way to pressure related• discomfort	1. **Completely Limited**: Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation. OR limited ability to feel pain over most of body surface.	2. **Very Limited**: Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness OR has sensory impairment which limits the ability to feel pain or discomfort over ½ of body.	3. **Slightly Limited**: Responds to verbal commands, but cannot always communicate discomfort or need to be turned OR has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities	4. **No impairment:** Responds to verbal commands. Has no sensory deficit which would limit ability to feel or communicate pain or discomfort.	
	Tolerance of	**The Skin and**	**Supporting**	**Structure**	
Moisture Degree to which skin is exposed to moisture	1. **Constantly Moist:** Skin is cept moist almost constantly by perspiration, urine, drainage, etc. Dampness is detected every time patient is moved or turned	2. **Very moist:** Skin is often, but not always moist. Linen must be changed at least once every 8 hours.	3. **Occasionally moist**: Skin is occasionally moist, requiring linen change every 12 hours.	4. **Rarely moist:** Skin is usually dry, routine diaper changes, linen only requires changing every 24 hours.	
Friction-Shear *Friction*: occurs when skin moves against support surfaces *Shear*: occurs when skin and adjacent bony surface slide across one another.	1. **Significant problem**: Spasticity, contracture, itching or agitation leads to an almost constant thrashing and friction.	2. **Problem:** Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance.	3. **Potential Problem:** Moves feeble or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relative good position inc hair or bed most of the time but occasionally slides down.	4. **No apparent problem**: Able to completely lift patient during a position change; moves in bed and in chaar independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair at all times.	
Nutrition Usual food intake pattern	1. **Very Poor**: NPO and/or maintained on clear liquids or IVs for more the an 5 days OR Albumin <2.5mg/dl OR Never eats a complete meal. Rarely eats more than _ of any food offered. Protein intake includes only 2 servings of meat or dairy products per day. Takes fluids poorly. Does not take a liquid dietary supplement.	2. **Inadequate**: Is on liquid diet or tube feedings/TPN which provide inadequate calories and minerals for age OR Albumin<3mg/dl OR rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement.	3. **Adequate**: Is on tube feedings or TPN which provide adequate calories and minerals for age OR eats over ½ of most meals. Eats a total of 4 servings of protein (meat, dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement if offered.	4. **Excellent**: Is on a normal diet providing adequate calories for rage. For example, eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.	
Tissue Perfusion & Oxygenation	1. **Extremely compromised**: hypotensive (MAP <50mmHg; <40 in a newborn) or the patient does not physiologically tolerate position changes.	2. **Compromised:** Normotensive; Oxygen saturation may be <95%; Hemoglobin maybe <10mg/dl; Capillary refill may be >2 seconds: serum pH is <7.40	3. **Adequate:** Normotensive; Oxygen saturation may be <95%; Hemoglobin may be <10mg/dl; Capillary refill may be>2 seconds; serum pH is normal.	4. **Excellent**: Normotensive; Oxygen saturation >95%; Normal Hgb; Capillary refill< 2seconds.	
				TOTAL	

Used with permission. Pediatric Skin Care: Guidelines for Assessment, Prevention and Treatment. Dermatology Nursing, Oct 2007/Vol 19/No.5, pg 471-485.

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Appendix C – Outpatient Risk Assessment Plan

Outpatient Risk Assessment

Perform skin assessment and initiate a pressure ulcer prevention plan if any of the following questions are "yes":

	YES	NO
Is the patient bed- or wheelchair-bound or does he/she require assistance to transfer?	☐	☐
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 or comorbidities?	☐	☐
Does the patient appear visibly malnourished?	☐	☐
Additional question for young children:		
Is the child demonstrating inadequate tissue perfusion with evidence of skin breakdown?	☐	☐

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Appendix D – Pressure Ulcer Prevention Plan

Minimize or Eliminate Friction and Shear

- ☐ Utilize transfer or assistive devices to reduce friction and/or shear, e.g., transfer mat, ceiling lift.
- ☐ Use lift sheets or devices to turn, reposition or transfer.
- ☐ Maintain head of bed at, or below, 30 degrees, or lowest possible level based on medical condition, i.e., head of bed 30 degrees to prevent ventilator-associated pneumonia. Match knee angle with angle of head of bed (use knee gatch).
- ☐ Keep skin clean and dry.
- ☐ Use trapeze when not contraindicated.

Minimize Pressure

All patients:

- ☐ Use pressure support surfaces to redistribute pressure as indicated for beds and chairs.
- ☐ 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.
- ☐ Use a pressure support surface as indicated. Free-float heels by elevating calves on pillows and keeping heels free of all surfaces.
- ☐ Minimize/eliminate pressure from medical devices such as oxygen masks and tubing, catheters, halo/cervical collars, casts, intravenous tubing, nasogastric tubes, external stabilizers on percutaneous endoscopic gastrostomy tubes, orthopedic splints/immobilizers and restraints.
- ☐ Limit the number of layers between the support surface and patient.
- ☐ Maintain **or enhance patient's level of activity**.

Patients in bed:

- ☐ Make frequent, small position changes.
- ☐ Use pillows or wedges to reduce pressure on bony prominences.
- ☐ Turn at least every two hours.
- ☐ For patient lying on one side, do not position directly on trochanter (hip).
- ☐ Use pressure redistribution mattresses/surfaces.
- ☐ 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."

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Manage Moisture

- ☐ Evaluate type of incontinence – urinary/fecal or both, and contributing factors. Elimiate 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.
- ☐ 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, Federal Drug Administration-approved rectal tube). Assess the stool, consistency, frequency and the effectiveness of the above actions before initiation of devices. Initiate devices before skin breakdown occurs.
- ☐ 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.
- ☐ Contain wound drainage.
- ☐ Separate skin folds, use a skin sealant and change dressings frequently.
- ☐ Change linen frequently.

Maintain Adequate Nutrition/Hydration

- ☐ Provide nutrition compatible with the patient's wishes or condition.
- ☐ Alert caregiver/unit when nourishment is delayed, or provide prompt food and fluids following a procedure in which nutrition has been withheld.
- ☐ Consult/refer with dietician when nutrition score on either Braden Scale or patient's condition indicates.
- ☐ Advance diet, providing and encouraging intake of supplements/fluids as medically indicated.

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Appendix E – Mnemonics for Critical Colonization

NERDS

Non-healing wounds

Exudative wounds

Red and bleeding wound surface granulation tissue

Debris (yellow or black necrotic tissue) on wound surface

Smell or unpleasant odor from wound

Mnemonic for deep infection:

STONES

Size is bigger

Temperature is increased

Os (probe to or expose bone)

New or satellite areas of breakdown

Exudate, erythema, edema

Smell

(Sibbald, 2006 [R])

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INSTITUTE FOR CLINICAL SYSTEMS IMPROVEMENT

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ICSI Document Development and Revision Process

Overview

Since 1993, the Institute for Clinical Systems Improvement (ICSI) has developed more than 60 evidence-based health care documents that support best practices for the prevention, diagnosis, treatment or management of a given symptom, disease or condition for patients.

Document Development and Revision Process

The development process is based on a number of long-proven approaches. ICSI staff first conducts a literature search to identify pertinent clinical trials, meta-analysis, systematic reviews, regulatory statements and other professional protocols. The literature is reviewed and graded based on the ICSI Evidence Grading System.

ICSI facilitators identify gaps between current and optimal practices. The work group uses this information to develop or revise the clinical flow and algorithm, drafting of annotations and identification of the literature citations. ICSI staff reviews existing regulatory and standard measures and drafts outcome and process measures for work group consideration. The work group gives consideration to the importance of changing systems and physician behavior so that outcomes such as health status, patient and provider satisfaction, and cost/utilization are maximized.

Medical groups, who are members of ICSI, review each protocol as part of the revision process. The medical groups provide feedback on new literature, identify areas needing clarification, offer recommended changes, outline successful implementation strategies and list barriers to implementation. A summary of the feedback from all medical groups is provided to the protocol work group for use in the revision of the protocol.

Implementation Recommendations and Measures

Each protocol includes implementation strategies related to key clinical recommendations. In addition, ICSI offers protocol-derived measures. Assisted by measurement consultants on the protocol development work group, ICSI's measures flow from each protocol's clinical recommendations and implementation strategies. Most regulatory and publicly reported measures are included but, more importantly, measures are recommended to assist medical groups with implementation; thus, both process and outcomes measures are offered.

Document Revision Cycle

Scientific documents are revised every 12-24 months as indicated by changes in clinical practice and literature. Each ICSI staff monitors major peer-reviewed journals every month for the protocols for which they are responsible. Work group members are also asked to provide any pertinent literature through check-ins with the work group mid-cycle and annually to determine if there have been changes in the evidence significant enough to warrant document revision earlier than scheduled. This process complements the exhaustive literature search that is done on the subject prior to development of the first version of a protocol.

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