Revised March 2007

Nursing Best Practice Guideline
Shaping the future of Nursing

Assessment & Management of Stage I to IV Pressure Ulcers

RNAO
Registered Nurses' Association of Ontario
L'Association des infirmières et infirmiers autorisés de l'Ontario
NURSING BEST PRACTICE GUIDELINES PROGRAM

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NURSING BEST PRACTICE GUIDELINES PROGRAM

Greetings from Doris Grinspun
Executive Director
Registered Nurses' Association of Ontario

It is with great excitement that the Registered Nurses' Association of Ontario disseminates this **revised** nursing best practice guideline to you. Evidence-based practice supports the excellence in service that nurses are committed to deliver in our day-to-day practice. The RNAO is committed to ensuring that the evidence supporting guideline recommendations is the best available, and this guideline has been recently reviewed and revised to reflect the current state of knowledge.

We offer our endless thanks to the many institutions and individuals that are making RNAO's vision for Nursing Best Practice Guidelines (NBPG) a reality. The Government of Ontario recognized RNAO's ability to lead this program and is providing multi-year funding. Tazim Virani – NBPG program director – with her fearless determination and skills, is moving the program forward faster and stronger than ever imagined. The nursing community, with its commitment and passion for excellence in nursing care, is providing the knowledge and countless hours essential to the creation, evaluation and revision of each guideline. Employers have responded enthusiastically by getting involved in nominating best practice champions, implementing and evaluating the NBPG and working towards an evidence-based practice culture.

Now comes the true test in this phenomenal journey: will nurses utilize the guidelines in their day-to-day practice?

Successful uptake of these NBPG requires a concerted effort of four groups: nurses themselves, other healthcare colleagues, nurse educators in academic and practice settings, and employers. After lodging these guidelines into their minds and hearts, knowledgeable and skillful nurses and nursing students need healthy and supportive work environments to help bring these guidelines to life.

We ask that you share this NBPG, and others, with members of the interdisciplinary team. There is much to learn from one another. Together, we can ensure that Ontarians receive the best possible care every time they come in contact with us. Let's make them the real winners of this important effort!

RNAO will continue to work hard at developing, evaluating and ensuring current evidence for all future guidelines. We wish you the best for a successful implementation!

Doris Grinspun, RN, MSN, PhD(c), OOnt

Executive Director
Registered Nurses' Association of Ontario

Assessment & Management of Stage I to IV Pressure Ulcers

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RNAO sincerely acknowledges the leadership and dedication of the researchers who directed the evaluation phase of the Nursing Best Practice Guidelines Project in 2002. The Evaluation Team was comprised of:

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Assessment & Management of Stage I to IV Pressure Ulcers

Disclaimer

These best practice guidelines are related only to nursing practice and not intended to take into account fiscal efficiencies. These guidelines are not binding for nurses and their use should be flexible to accommodate client/family wishes and local circumstances. They neither constitute a liability or discharge from liability. While every effort has been made to ensure the accuracy of the contents at the time of publication, neither the authors nor the Registered Nurses' Association of Ontario give any guarantee as to the accuracy of the information contained in them nor accept any liability, with respect to loss, damage, injury or expense arising from any such errors or omission in the contents of this work. Any reference throughout the document to specific pharmaceutical products as examples does not imply endorsement of any of these products.

How to Use this Document

This nursing best practice guideline is a comprehensive document providing resources necessary for the support of evidence-based nursing practice. The document needs to be reviewed and applied, based on the specific needs of the organization or practice setting, as well as the needs and wishes of the client. Guidelines should not be applied in a "cookbook" fashion but used as a tool to assist in decision making for individualized client care, as well as ensuring that appropriate structures and supports are in place to provide the best possible care.

Nurses, other health care professionals and administrators who are leading and facilitating practice changes will find this document valuable for the development of policies, procedures, protocols, educational programs, assessment and documentation tools, etc. It is recommended that the nursing best practice guidelines be used as a resource tool. Nurses providing direct client care will benefit from reviewing the recommendations, the evidence in support of the recommendations and the process that was used to develop the guidelines. However, it is highly recommended that practice settings adapt these guidelines in formats that would be user-friendly for daily use.

Organizations wishing to use the guideline may decide to do so in a number of ways:

- Assess current nursing and health care practices using the recommendations in the guideline.
- Identify recommendations that will address identified recognized needs in practice approaches or gaps in services.
- Systematically develop a plan to implement the recommendations using associated tools and resources.

Implementation resources will be made available through the RNAO website to assist individuals and organizations to implement best practice guidelines. RNAO is interested in hearing how you have implemented this guideline. Please contact us to share your story.

Table of Contents

Summary of Recommendations

	RECOMMENDATION	*LEVEL OF EVIDENCE
Practice Recommendations		
Assessment	1.1 Conduct a history and focused physical assessment.	IV
	1.2 Conduct a psychosocial assessment to determine the client's goals and their ability and motivation to comprehend and adhere to the treatment plan of care options.	IV
	1.3 Assess quality of life from the client's perspective.	IV
	1.4 Ensure adequate dietary intake to prevent malnutrition or replace existing deficiencies to the extent that this is compatible with the individual's wishes.	III
	1.5 Prevent clinical nutrient deficiencies by ensuring that the patient is provided with optimal nutritional support through one or more of the following: ■ Consultation with a Registered Dietitian for assessment (IV) ■ Consultation with a speech language pathologist for swallowing assessment (IV) ■ A varied, balanced diet to meet clinical requirements for healing and co-existing diseases (e.g., renal failure and diabetes) (IV) ■ Nutritional supplements if needed (Ia) ■ Multivitamin and mineral preparations (Ib) ■ Enteral tube feeding (IV) ■ Parenteral nutrition (IV) ■ Ongoing monitoring of nutritional intake, laboratory data and anthropometric data (IV).	Ia-IV
	1.6 Assess all patients for pain related to the pressure ulcer or its treatment.	IV
	1.7 Assess location, frequency and intensity of pain to determine the presence of underlying disease, the exposure of nerve endings, efficacy of local wound care and psychological need.	IIb
	1.8 Assess all patients with EXISTING PRESSURE ULCERS to determine their risk for developing additional pressure ulcers using the "Braden Scale for Predicting Pressure Sore Risk".	IV
	1.9 If the patient remains at risk for other pressure ulcers, a high specification foam mattress instead of a standard hospital mattress should be used to prevent pressure ulcers in moderate to high risk patients.	Ia
	1.10 Vascular assessment (e.g., clinical assessment, palpable pedal pulses, capillary refill, ankle/brachial pressure index and toe pressure) is recommended for ulcers in lower extremities to rule out vascular compromise.	IV
Management of causative/contributing factors	2.1 Choose the support surface which best fits with the overall care plan for the client considering the goals of treatment, client bed mobility, transfers, caregiver impacts, ease of use, cost/benefit, etc. Ensure ongoing monitoring and evaluation to ensure that the support surface continues to meet the client's needs and that the surface is used appropriately and is properly maintained. If the wound is not healing, consider the total care plan for the client before replacing the surface.	IV

* Refer to page 17 for the Interpretation of Evidence

	RECOMMENDATION	
	2.2 Pressure management of the heels while in bed should be considered independently of the support surface.	III
	2.3 Use pressure management for clients in the Operating Room to reduce the incidence of pressure ulcers post operatively.	Ia
	2.4 Obtain a seating assessment if a client has a pressure ulcer on a sitting surface.	IV
	2.5 Refer patients at RISK to appropriate interdisciplinary team members (Occupational Therapist, Physiotherapist, Enterostomal Therapist, etc.). Utilize those with expertise in seating, postural alignment, distribution of weight, balance, stability and pressure management when determining positioning for sitting individuals. Ensure support surfaces are used appropriately and are properly maintained.	IV
	2.6 A client with a pressure ulcer on the buttocks and/or trochanter should optimize mobilization. If pressure on the ulcer can be managed, encourage sitting as tolerated.	IV
Local Wound Care	**Assessment**	
	3.1a To plan treatment and evaluate its effectiveness, assess the pressure ulcer(s) initially for: ■ Stage/Depth; ■ Location; ■ Surface Area (*length x width*) (mm^2, cm^2); ■ Odour; ■ Sinus tracts/Undermining/Tunneling; ■ Exudate; ■ Appearance of the wound bed; and ■ Condition of the surrounding skin (periwound) and wound edges.	IV
	3.1b Conduct a comprehensive reassessment weekly to determine wound progress and the effectiveness of the treatment plan. Monitor for variances from assessment with each dressing change. Identification of variances indicates need for reassessment.	IV
	Debridement	
	3.2a Lower extremity ulcers or wounds in patients who are gravely palliative with dry eschar need not be debrided if they do not have edema, erythema, fluctuance or drainage. Assess these wounds daily to monitor for pressure ulcer complications that would require debridement.	IV
	3.2b Prior to debridement on ulcers on the lower extremities, complete a vascular assessment (e.g., clinical assessment, palpable pedal pulses, capillary refill, ankle/brachial pressure index and toe pressure) to rule out vascular compromise.	IV
	3.2c Determine if debridement is appropriate for the patient and the wound.	IV

	RECOMMENDATION	
Local Wound Care	3.2d If debridement is indicated, select the appropriate method of debridement considering: ■ Goals of treatment (e.g., healability); ■ Client's condition (e.g., end of life, pain, risk of bleeding, patient preference, etc.); ■ Type, quantity and location of necrotic tissue; ■ The depth and amount of drainage; and ■ Availability of resources.	IV
	3.2e Sharp debridement should be selected when the need is urgent, such as with advancing cellulitis or sepsis, increased pain, exudate and odour. Sharp debridement must be conducted by a qualified person.	IV
	3.2f Use sterile instruments to debride pressure ulcers.	IV
	3.2g Prevent or manage pain associated with debridement. Consult with a member of the healthcare team with expertise in pain management. Refer to the RNAO Best Practice Guideline *Assessment and Management of Pain* (Revised) (2007).	IV
	Control Bacteria/Infection	
	3.3a The treatment of infection is managed by wound cleansing, systemic antibiotics, and debridement, as needed.	Ib
	3.3b Protect pressure ulcers from sources of contamination, e.g., fecal matter.	IIa
	3.3c Follow Body Substance Precautions (BSP) or an equivalent protocol appropriate for the healthcare setting and the client's condition when treating pressure ulcers.	IV
	3.3d Medical management may include initiating a two-week trial of topical antibiotics for clean pressure ulcers that are not healing or are continuing to produce exudate after two to four weeks of optimal patient care. The antibiotic should be effective against gram-negative, gram-positive and anaerobic organisms.	Ib
	3.3e Medical management may include appropriate systemic antibiotic therapy for patients with bacteremia, sepsis, advancing cellulitis or osteomyelitis.	Ib
	3.3f To obtain a wound culture, cleanse wound with normal saline first. Swab wound bed, not eschar, slough, exudate or edges.	IV
	3.3g The use of cytotoxic antiseptics to reduce bacteria in wound tissue is not usually recommended.	IIb
	Wound Cleansing	
	3.4a Do not use skin cleansers or antiseptic agents (e.g., povidine iodine, iodophor, sodium hypochlorite solution, hydrogen peroxide, acetic acid) to clean ulcer wounds.	III
	3.4b Use normal saline, Ringer's lactate, sterile water or non-cytoxic wound cleansers for wound cleansing.	IV
	3.4c Fluid used for cleansing should be warmed at least to room temperature.	III
	3.4d Cleanse wounds at each dressing change.	IV

	RECOMMENDATION	
Local Wound Care	**3.4e** To reduce surface bacteria and tissue trauma, the wound should be gently irrigated with 100 to 150 milliliters of solution.	IV
	3.4f Use enough irrigation pressure to enhance wound cleansing without causing trauma to the wound bed. Safe and effective ulcer irrigation pressures range from 4 to 15 psi. Pressure of 4 to 15 psi is achieved by using: ■ 35 milliliter syringe with a 19 gauge angiocath, or ■ single-use 100 milliliter saline squeeze bottle.	IIa
	Management Approaches	
	3.5a For comprehensive wound management options, consider the following: ■ Etiology of the wound; ■ Client's general health status, preference, goals of care and environment; ■ Lifestyle; ■ Quality of life; ■ Location of the wound; ■ Size of the wound, including depth and undermining; ■ Pain; ■ A dressing that will loosely fill wound cavity; ■ Exudate: type and amount; ■ Risk of infection; ■ Risk of recurrence; ■ Type of tissue involved; ■ Phase of the wound healing process; ■ Frequency of the dressing change; ■ Comfort and cosmetic appearance; ■ Where and by whom the dressing will be changed; ■ Product availability; and ■ Adjunctive therapies.	IV
	3.5b Moisture-retentive dressings optimize the local wound environment and promote healing.	Ia
	3.5c Consider caregiver time when selecting a dressing.	Ib
	3.5d Consider the following criteria when selecting an interactive dressing: ■ Maintains a moist environment (Ia) ■ Controls wound exudate, keeping the wound bed moist and the surrounding intact skin dry (IV) ■ Provides thermal insulation and wound temperature stability (IV) ■ Protects from contamination of outside micro-organisms (IV) ■ Maintains its integrity and does not leave fibres or foreign substances within the wound (IV) ■ Does not cause trauma to wound bed on removal (IV) ■ Client/patient preference (IV) ■ Is simple to handle, and is economical in cost and time (IV).	Ia-IV
	3.5e Monitor dressings applied near the anus, since they are difficult to keep intact. Consider use of special sacral-shaped dressings.	Ib

	RECOMMENDATION	
Local Wound Care	**Adjunctive Therapies**	
	3.6a Refer to physiotherapy for a course of treatment with electrotherapy for Stage III and IV pressure ulcers that have proved unresponsive to conventional therapy. Electrical stimulation may also be useful for recalcitrant Stage II ulcers.	Ib
	3.6b Chronic pressure ulcers may be treated by: ■ Electrical stimulation (Ib) ■ Ultraviolet light C (IIa) ■ Warming therapy (Ib) ■ Growth factors (Ib) ■ Skin equivalents (IV) ■ Negative pressure wound therapy (IV) ■ Hyperbaric oxygen (IV)	Ib-IV
	Surgical Intervention	
	3.7 Possible candidates for operative repair are medically stable, adequately nourished and are able to tolerate operative blood loss and postoperative immobility.	IV
Discharge/Transfer of Care Arrangements	**4.1** Clients moving between care settings should have the following information provided: ■ Risk factors identified; ■ Details of pressure points and skin condition prior to transfer; ■ Need for pressure management/mobility equipment (e.g., support surfaces, seating, special transfer equipment, heel boots); ■ Details of healed ulcers; ■ Stage, site and size of existing ulcers; ■ History of ulcers, previous treatments and dressings (generic) used; ■ Type of dressing currently used and frequency of change; ■ Any allergies to dressing products; and ■ Need for on-going nutritional support.	IV
	4.2 Use the RNAO Best Practice Guideline *Risk Assessment and Prevention of Pressure Ulcers* (Revised) (2005).	IV
Patient Education	**5.1** Involve the patient and caregiver, when possible, in pressure ulcer treatment and prevention strategies and options. Include information on pain, discomfort, possible outcomes and duration of treatment, if known. Other areas of education may include patient information regarding appropriate support surfaces, as well as roles of various health professionals. Collaborate with patient, family and caregivers to design and implement a plan for pressure ulcer prevention and treatment.	IV

RECOMMENDATION		
Education Recommendations		
	6.1 Design, develop and implement educational programs that reflect a continuum of care. The program should begin with a structured, comprehensive and organized approach to prevention and should culminate in effective treatment protocols that promote healing as well as prevent recurrence.	IV
	6.2 Develop educational programs that target appropriate healthcare providers, patients, family members and caregivers. Present information at an appropriate level for the target audience, in order to maximize retention and facilitate translation into practice.	IV
	6.3 Include the following information when developing an educational program on the treatment of pressure ulcers: ■ Role of the interdisciplinary team; ■ Etiology and pathology; ■ Risk factors; ■ Individualized program of skin care, quality of life and pain management; ■ Uniform terminology for stages of tissue damage based on specific classifications; ■ Need for accurate, consistent and uniform assessment, description and documentation of the extent of tissue damage; ■ Principles of wound healing; ■ Principles of cleansing, debridement and infection control; ■ Principles of nutritional support with regard to tissue integrity; ■ Product selection (i.e., support surfaces, dressings, topical antibiotics, antimicrobials); ■ Principles of postoperative care including positioning and support surfaces; ■ Principles of pressure management; ■ Mechanisms for accurate documentation and monitoring of pertinent data, including treatment interventions and healing progress; and ■ Principles of patient education related to prevention to reduce recurrence.	IV
	6.4 Update knowledge and skills related to the assessment and management of pressure ulcers on an ongoing basis. Organizations should provide opportunities for professional development related to the best practice guideline and support its use in daily practice.	IV

RECOMMENDATION		
Organization & Policy Recommendations		
	7.1 Guidelines are more likely to be effective if they take into account local circumstances and are disseminated by an active ongoing educational and training program.	IV
	7.2 Practice settings need a policy with respect to providing and requesting advance notice when transferring or admitting clients between practice settings when special resources (e.g., surfaces) are required.	IV
	7.3 Practice settings must ensure that resources are available to clients and staff, e.g., appropriate moisturizers, barriers, dressings, documentation systems, access to equipment and clinical experts, etc.	IV
	7.4 Practice settings need a policy that requires product vendors to be registered as a regulated healthcare professional if they provide assessment and/or recommendations on any aspect of pressure ulcer related practice.	IV
	7.5 Practice settings need an interdisciplinary team of interested and knowledgeable persons to address quality improvement in pressure ulcer management. This team requires representation across departments and programs.	IV
	7.6 Nursing best practice guidelines can be successfully implemented only where there are adequate planning, resources, organizational and administrative support, as well as the appropriate facilitation. Organizations may wish to develop a plan for implementation that includes: ■ An assessment of organizational readiness and barriers to implementation. ■ Involvement of all members (whether in a direct or indirect supportive function) who will contribute to the implementation process. ■ Dedication of a qualified individual to provide the support needed for the education and implementation process. ■ Ongoing opportunities for discussion and education to reinforce the importance of best practices. ■ Opportunities for reflection on personal and organizational experience in implementing guidelines.	IV

Interpretation of Evidence

Levels of Evidence

Ia	Evidence obtained from meta-analysis or systematic review of randomized controlled trials.
Ib	Evidence obtained from at least one randomized controlled trial.
IIa	Evidence obtained from at least one well-designed controlled study without randomization.
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study without randomization.
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

Responsibility for Guideline Development

The Registered Nurses' Association of Ontario (RNAO), with funding from the Government of Ontario, has embarked on a multi-year program of nursing best practice guideline development, pilot implementation, evaluation and dissemination. One of the areas of focus is on the assessment and management of pressure ulcers. This guideline was originally developed, and subsequently revised, by a panel of nurses and researchers convened by the RNAO and conducting its work independent of any bias or influence from the Government of Ontario.

Purpose and Scope

Pressure ulcer management includes the principles of pressure ulcer prevention. For this reason, the development panel strongly encourages the implementation of this guideline in conjunction with the RNAO Best Practice Guideline *Risk Assessment and Prevention of Pressure Ulcers* (Revised) (2005).

The purpose of this guideline, *Assessment and Management of Stage I to IV Pressure Ulcers* (Revised), is to identify nursing care related to assessment, management of tissue load, ulcer care and the management of bacterial colonization and infection of pressure ulcers. The guideline has relevance to all areas of clinical practice including acute care, chronic care, rehabilitation, community care and long-term care. The guideline focuses on three areas of pressure ulcer care: (1) practice recommendations, including assessment, planning and interventions; (2) education recommendations; and (3) organization & policy recommendations.

This guideline contains recommendations for Registered Nurses (RNs) and Registered Practical Nurses (RPNs). **Although the guideline is written for the nurse, wound healing is an interdisciplinary endeavour. Many settings have formalized interdisciplinary teams and the guideline development panel strongly supports this structure. Collaborative assessment and treatment planning with the client is essential**. The recommendations made are not binding for nurses and should accommodate patient/family wishes and local circumstances.

It is the intention of this guideline to identify best nursing practices in the assessment and management of pressure ulcers in the adult population. It is acknowledged that the individual competency of nurses varies between nurses and across categories of nursing professionals (RPNs and RNs) and is based on the knowledge, skills, attitudes and judgment enhanced over time by experience and education. It is expected that individual nurses will perform only those aspects of pressure ulcer assessment and management for which they have appropriate education and experience. Further, it is expected that nurses, both RPNs and RNs, will seek consultation in instances where the patient's care needs surpass the individual nurse's ability to act independently. It is acknowledged that effective patient care depends on a coordinated interdisciplinary approach incorporating ongoing communication between health professionals and patients, ever mindful of the personal preferences and unique needs of each individual patient.

Original Development Process – 2002

In January of 2000, a panel of nurses with expertise in clinical practice and research in the assessment and management of pressure ulcers, from both institutional and community settings, was convened under the auspices of the RNAO. The panel identified a set of five clinical practice guidelines related to the assessment and management of pressure ulcers. A quality appraisal was conducted on these five guidelines using an adapted tool from Cluzeau, Littlejohns, Grimshaw, Feder and Moran (1997). From this systematic evaluation, the following guidelines, and related updates, were identified to adapt and modify:

Agency for Health Care Policy and Research (AHCPR). (1994). *Treatment of Pressure Ulcers.* Clinical Practice Guideline, Number 15. AHCPR Publication Number 95-0652. Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services.

Updates:

Krasner, D. (1999). The AHCPR pressure ulcer infection control recommendations revisited. *Ostomy/Wound Management, 45*(Suppl. 1A), 88S-91S.

Ovington, L. (1999). Dressings and adjunctive therapies. AHCPR guidelines revisited. *Ostomy/Wound Management, 45*(Suppl. 1A), 94S-106S.

van Rijswijk, L. & Braden, B. (1999). Pressure ulcer patient and wound assessment: An AHCPR clinical practice guideline update. *Ostomy/Wound Management, 45*(Suppl. IA), 56S-67S.

Compliance Network Physicians/Health Force Initiative. (1999). *Guidelines for the outpatient treatment of chronic wounds and burns.* Berlin: Blackwell Science Ltd.

Clinical Resource Efficiency Support Team [CREST]. (1998). *Guidelines for the prevention and management of pressure sores.* Belfast, Northern Ireland: CREST Secretariat.

The guideline development panel proceeded to develop a synthesis table of the recommendations from the selected clinical practice guidelines. The panel adapted practice recommendations within these guidelines in order to ensure their applicability to best nursing practice. Systematic and narrative reviews of the literature were used in the development of practice recommendations that could not be extracted from existing guidelines. Panel consensus was obtained for each recommendation.

A draft guideline was submitted to a set of external stakeholders for review. The feedback received was reviewed and incorporated into the final draft guideline. This draft nursing best practice guideline was pilot implemented in selected practice settings in Ontario. Pilot implementation practice settings were identified through a "request for proposal" process conducted by the RNAO. The implementation phase was evaluated, and the guideline was further refined taking into consideration the pilot site feedback and evaluation results, as well as current literature.

Revision Process – 2006/2007

The Registered Nurses' Association of Ontario (RNAO) has made a commitment to ensure that this best practice guideline is based on the best available knowledge. In order to meet this commitment, a monitoring and revision process has been established for each published guideline.

Guideline development staff have reviewed abstracts published in key databases on the topic of assessment and management of pressure ulcers, focusing on systematic reviews, RCTs and recently published clinical practice guidelines twice a year since the nursing best practice guideline *Assessment and Management of Stage I to IV Pressure Ulcers* was originally published. The purpose of this monitoring was to identify evidence that would impact on the recommendations, either further supporting the published recommendations, or indicating that a recommendation was no longer appropriate. In the later case a full review would be conducted prior to the three-year schedule. No evidence of this nature was identified during the ongoing monitoring phase, and this guideline moved into the revision phase as originally scheduled.

In June 2006, a panel of wound care experts with particular specialty in pressure ulcer management from a range of practice settings (including institutional, community and academic sectors) was convened by the RNAO. This group was invited to participate as a review panel to revise the *Assessment and Management of Stage I to IV Pressure Ulcers* guideline that was originally published in 2002. This panel was comprised of members of the original development panel, as well as other recommended specialists.

The panel members were given the mandate to review the guideline, focusing on the currency of the recommendations and evidence, keeping to the original scope of the document. This work was conducted as follows:

Planning:

- Clinical questions were identified to structure the literature search.
- Search terms were generated from the recommendations in the guideline.
- Literature search was conducted by a health sciences librarian.

Quality Appraisal:

- Search results were reviewed by a Research Assistant assigned to the panel. This review included assessing for inclusion/exclusion related to the clinical questions. Refer to Appendix A for a detailed description of the search strategy.
- Systematic reviews and studies that met the inclusion/exclusion criteria were retrieved. Quality appraisal and data extraction was conducted by the Research Assistant. These results were summarized and circulated to the panel.
- Recently published clinical practice guidelines on the assessment and management of pressure ulcers were critically appraised by the revision panel with the Appraisal of Guidelines for Research and Evaluation (AGREE) instrument (AGREE Collaboration, 2001). Refer to Appendix A for details of the AGREE review.

Panel Review:

- Panel members reviewed the data extraction tables, systematic reviews, and where appropriate, original studies and clinical guidelines.
- Recommendations for additional search strategies were identified, as required.
- Through a process of consensus, recommendations for revision to the guideline were identified.

Definition of Terms

For clinical terms not identified here, please refer to Appendix B – Glossary of Clinical Terms.

Clinical Practice Guidelines or Best Practice Guidelines: Systematically developed statements (based on best available evidence) to assist practitioner and patient decisions about appropriate health care for specific clinical (practice) circumstances (Field & Lohr, 1990).

Education Recommendations: Statements of educational requirements and educational approaches/strategies for the introduction, implementation and sustainability of the best practice guideline.

Evidence: Evidence is information that comes closest to the facts of a matter. The form it takes depends on context. The findings of high-quality, methodologically appropriate research are the most accurate evidence. Because research is often incomplete and sometimes contradictory or unavailable, other kinds of information are necessary supplements to or stand-ins for research. The evidence base for a decision is the multiple forms of evidence combined to balance rigour with expedience – while privileging the former over the latter. (Canadian Health Services Research Foundation, 2006).

Organization & Policy Recommendations: Statements of conditions required for a practice setting that enables the successful implementation of the best practice guideline. The conditions for success are largely the responsibility of the organization, although they may have implications for policy at a broader government or societal level.

Practice Recommendations: Statements of best practice directed at the practice of health care professionals, which are ideally evidence-based.

Pressure Ulcer: Any lesion caused by unrelieved pressure that results in damage to underlying tissue. Pressure ulcers usually occur over a bony prominence and are staged to classify the degree of tissue damage observed.

Stages of Pressure Ulcers –
Defined by the National Pressure Ulcer Advisory Panel (NPUAP, 2007)

Suspected Deep Tissue Injury: Purple or maroon localized area of discoloured 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. Deep tissue injury may be difficult to detect in individuals with dark skin tones.

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 colour may differ from the surrounding area.

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.

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.

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 includes undermining and tunneling.

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.

Reverse Staging of Pressure Ulcers: As adopted by the NPUAP (2000) and the AHCPR guideline (1994), pressure ulcer staging describes the depth of tissue involvement in a unilateral dimension of deterioration. When pressure ulcers heal, they do not regenerate the same lost tissue. The wound heals with granulation tissue composed of endothelial cells, fibroblasts, collagen and an extracellular matrix. Therefore, to describe a healing pressure ulcer by using the staging of I to IV in reverse order is incorrect. The guideline development panel, therefore, recommends that reverse staging not be used to describe the healing process of a wound.

Stakeholder: A stakeholder is an individual, group or organization with a vested interest in the decisions and actions of organizations who may attempt to influence decisions and actions (Baker, Ogden, Prapaipanich, Keith, Beattie, & Nickleson, 1999). Stakeholders include all individuals or groups who will be directly or indirectly affected by the change or solution to the problem. Stakeholders can be of various types, and can be divided into opponents, supporters and neutrals (Ontario Public Health Association, 1996).

Systematic Review: Application of a rigorous scientific approach to the preparation of a review article (National Health and Medical Research Centre, 1998). Systematic reviews establish where the effects of healthcare are consistent and research results can be applied across populations, settings and differences in treatment (e.g., dose); and where effects may vary significantly. The use of explicit, systematic methods in reviews limits bias (systematic errors) and reduces chance effects, thus providing more reliable results upon which to draw conclusions and make decisions (Clarke & Oxman, 1999).

Wound Healing: A cascade of events of the biologic and immunologic system (CREST, 1998b). The recognized end point in healing is total wound closure (Robson, Maggi, Smith, Wasserman, Mosiello, Hill et al., 1999).

- Acute wounds: Proceed normally through the repair process from injury to healing.
- Chronic wounds: Indolent and fail to heal in a timely and orderly process (Waldrop & Doughty, 2000). Viability of tissue will determine the course and quality of healing (West & Gimbel, 2000).

Wound Healing (Phases): The wound healing response can be divided into distinct but overlapping phases:

HEMOSTASIS: Protects the body from excessive blood loss and increased exposure to bacterial contamination.

- Vasoconstriction controls blood loss.
- Vasodilation and increase of capillary permeability to leukocytes and platelets.
- Formation of clot.

INFLAMMATION: Prepares wound bed for healing by natural autolysis.

- Disintegration or liquefaction of tissue or cells by leukocytes and enzymes.

PROLIFERATION: Filling in and coverage of the wound bed.

- *Neoangiogenesis* is the production of a capillary and arteriole network.
- *Granulation* is the development of connective tissue.
- *Contraction* is the mobilizing force of pulling the wound edges together.
- *Epithelialization* is the resurfacing and closure of the wound.

REMODELLING: Maturation of the wound.

- Tensile strength of the scar tissue increases to not more than 80% of the tensile strength of non-wounded tissue.

Background Context

Pressure ulcers have a significant impact on both quality of life and healthcare costs. The most recent national survey of pressure ulcer prevalence suggests that one in four people within the Canadian healthcare system have problems with skin integrity. Sector prevalence analysis is as follows: 25% in acute care, 30% in non-acute care, 22% in mixed healthcare settings, and 15% in community care (Woodbury & Houghton, 2004).

Estimates of the proportion of people with chronic wounds over the past 10 years suggest that despite recent efforts, the number of persons with chronic wounds has not improved. In fact, since the first edition of the RNAO best practice guideline *Assessment and Management of Stage I to IV Pressure Ulcers* (2002a), prevalence across all sectors has increased. This may be due in part to an increase in acuity and complexity of disease processes as well as the increase in the elderly within population demographics. Starting in 2014, for the first time in Canada, seniors will outnumber children (Statistics Canada, 2005).

Although annual costs of wound care in Canada are not available, one month of care in the community for a pressure ulcer is $9,000 (Allen & Houghton, 2004). A recent study from Great Britain has estimated monthly costs of treating each pressure ulcer by degree of trauma (stages) and complication as (shown here in Canadian dollars):

- Uncomplicated Stage I = $2,450 to Stage IV: $3,230
- Complicated with critical colonization Stage II = $3,616 to Stage III / IV = $4,003
- Complicated with osteomyelitis Stage II to IV = $12,658 (Bennett, Dealy, & Posnett, 2004)

Clarke, Bradley, Whytock, Handfield, van der Wal and Gundry (2005) further identify the substantial burden of these wounds on the healthcare system, citing an estimated 50% increase of nursing time related to pressure ulcers and treatment costs per ulcer ranging from US$10,000 to $86,000.

Prevalence, cost, use of hospital and other healthcare resources, and quality of life issues all point to the need for action to prevent, treat and heal wounds. To advance pressure ulcer management, there is a clear need to provide a standardized approach across the continuum of care that is evidence-based and focused on the needs of the individual. This requires implementation of the most up-to-date research findings, along with the compilation of the best of expert consensus. This document is part of a series of guidelines providing practitioners and policy-makers with sound research and evidence-based recommendations regarding pressure ulcer prevention, treatment and management.

Governments, agencies and healthcare professionals need to be proactive in responding to the potentially overwhelming costs associated with pressure ulcers, as described above. It is their fiduciary responsibility to adopt policies that enable the funding of specialized products and equipment related to preventing and healing pressure ulcers. This will help ensure that all individuals, no matter where care is provided, have equal access to best practices related to pressure ulcer care.

It is clear that more effort needs to be taken in ensuring appropriate, evidence-based care is provided to patients across the continuum of care, in a collaborative approach to wound care prevention and treatment.

Practice Recommendations

Assessment

Recommendation 1.1

Conduct a history and focused physical assessment.

Level of Evidence – IV

Discussion of Evidence

Pressure ulcers should be assessed in the context of the patient's overall physical and psychological health (AHCPR, 1994; Compliance Network Physicians, 1999; Consortium for Spinal Cord Medicine, 2000). A focused physical assessment includes a risk assessment for pressure ulcer development – Appendix C provides a description of the *Braden Scale for Predicting Pressure Sore Risk*. A French translation of this scale has recently been shown to be reliable and valid in clinical practice (Denis & St-Cyr, 2006). The guideline development panel strongly supports consultation with interdisciplinary team members in the assessment process; in particular, the involvement of members who have wound care expertise.

Recommendation 1.2

Conduct a psychosocial assessment to determine the client's goals and their ability and motivation to comprehend and adhere to the treatment plan of care options.

Level of Evidence – IV

Recommendation 1.3

Assess quality of life from the client's perspective.

Level of Evidence – IV

Discussion of Evidence

The goal of a psychosocial assessment is to collect the information necessary to develop a plan of care with the client that is consistent with individual and family preferences, goals and resources (personal, financial, etc.). The findings regarding an individual's psychological health and the impact on pressure ulcer development is mixed; however, it is evident that many of the recommendations for prevention and management of existing ulcers require the understanding, cooperation and initiative of clients and their caregivers (Consortium for Spinal Cord Medicine, 2000). These complex behaviours suggest that a psychosocial assessment should be conducted to identify factors for consideration in developing prevention and management strategies.

A complete psychosocial assessment should include, but not be limited to, the following:

- Mental status, depression, client collaboration, learning ability (AHCPR, 1994; Compliance Network Physicians, 1999: Consortium for Spinal Cord Medicine, 2000);
- Social support and social integration in the family (AHCPR, 1994; Compliance Network Physicians, 1999; Consortium for Spinal Cord Medicine, 2000);
- Polypharmacy or overmedication; alcohol and/or drug abuse (AHCPR, 1994);
- Goals, values and lifestyle (AHCPR, 1994; Compliance Network Physicians, 1999);
- Sexuality (AHCPR, 1994);
- Culture and ethnicity (AHCPR, 1994);
- Resources (e.g., availability, utilization and skill of caregivers; finances; positioning, posture and related equipment) of individuals being treated for pressure ulcers in the home (AHCPR, 1994; Compliance Network Physicians, 1999; Consortium for Spinal Cord Medicine, 2000);
- Stressors, including pain as a symptom (AHCPR, 1994); and
- Quality of Life (Compliance Network Physicians, 1999).

The treatment plan should include interventions to address identified psychosocial needs and goals. Follow-up should be planned in cooperation with the individual and caregiver, in consultation with appropriate interdisciplinary team members (AHCPR, 1994).

Recommendation 1.4

Ensure adequate dietary intake to prevent malnutrition or replace existing deficiencies to the extent that this is compatible with the individual's wishes.

Level of Evidence – III

Recommendation 1.5

Prevent clinical nutrient deficiencies by ensuring that the patient is provided with optimal nutritional support through one or more of the following:

- **Consultation with a Registered Dietitian for assessment** *Level of Evidence – IV*
- **Consultation with a speech language pathologist for swallowing assessment** *Level of Evidence – IV*
- **A varied, balanced diet to meet clinical requirements for healing and co-existing diseases (e.g., renal failure and diabetes)** *Level of Evidence – IV*
- **Nutritional supplements if needed** *Level of Evidence – Ia*
- **Multivitamin and mineral preparations** *Level of Evidence – Ib*
- **Enteral tube feeding** *Level of Evidence – IV*
- **Parenteral nutrition** *Level of Evidence – IV*
- **Ongoing monitoring of nutritional intake, laboratory data and anthropometric data** *Level of Evidence – IV.*

Discussion of Evidence

Optimal nutrition facilitates wound healing, maintains immune competence and decreases the risk of infection. Most wounds tend to heal; however malnutrition and clinically evident deficiencies are risk factors for the development of pressure ulcers, and are commonly associated with a delayed healing response. The deficiencies of carbohydrate, protein, fat, vitamins or trace elements associated with reduced nutritional intake and/or chronic losses from the wound surfaces can delay wound healing.

Screening for nutritional deficiencies is an important part of the initial assessment, with the goal of nutritional assessment and management being to ensure that the diet of the individual with a pressure ulcer contains the nutrients necessary to support healing. The Compliance Network Physicians (1999) refers to nutritional management as a component of systemic treatment for the individual with a pressure ulcer. Nutritional management should address four rules: determine the nutritional status; ensure adequate nutritional intake; initiate additional nutrient intake and supplementation; and determine vitamin, mineral and trace element deficits and correct them.

A screening tool may be used by nurses to identify those at nutritional risk, however referral to those with expertise in nutritional interventions is necessary to establish an appropriate treatment plan (Ferguson, Cook, Rimmasch, Bender, & Voss, 2000). For a sample tool focusing on nutritional screening and assessment, refer to Appendix D which includes the Mini Nutritional Assessment (MNA). The Mini Nutritional Assessment has been validated for use with adults over the age of 55 (Nestle Clinical Services, 2002). In a small cross-sectional study of Veterans, MNA scores were associated with nutritional indicators, such as biochemical indices and body composition, in elderly people with stage II or higher pressure ulcers (Langkamp-Henken, Hudgens, Stechmiller, & Herrlinger-Garcia, 2005). Body Mass Index (BMI) is another nutritional screening tool, which is a valid measurement of weight in relation to health. It is not recommended however, for use as the sole measurement of either body composition or level of fitness. The BMI is available on Health Canada's website at http://www.hc-sc.gc.ca/hppb/ nutrition/bmi/index.html. Early identification and intervention to correct malnutrition can alter the healing trajectory in patients with wounds. A nutritional plan should be comprehensive and individualized, and therefore requires a multidisciplinary approach. The involvement of the interdisciplinary team and the patient in addressing nutritional goals is essential for successful outcomes (Maklebust & Sieggreen, 1996).

Nutritional interventions should be staged to meet the nutritional needs of the individual, and move from screening, monitoring of intake and supplementation (when necessary) to more intensive interventions including enteral or parenteral feeding (Consortium for Spinal Cord Medicine, 2000; Maklebust & Sieggreen, 1996). In an open prospective intervention evaluation of older adults with grade III and IV pressure ulcers, daily oral supplementation resulted in a significant reduction of wound area and an improvement in wound condition at three weeks (Frias Soriano et al., 2004). One small RCT found supplementary arginine, vitamin C and zinc to significantly improve the rate of pressure ulcer healing (Desneves, Todorovic, Cassar, & Crowe, 2005). Stratton et al. (2005) completed a systematic review and meta-analysis of 15 studies (eight of which were RCTs) to address the impact of enteral nutritional support on pressure ulcer incidence and healing and a range of other clinically relevant outcome measures, such as quality of life. This review found that enteral nutritional support, particularly high protein oral nutritional supplements, can significantly reduce the risk of developing pressure ulcers. The results also suggested an improvement in pressure ulcer healing, though there were no robust RCTs identified to confirm this.

Laboratory parameters should be monitored to identify nutritional status and impact of interventions. No single measurement or combination of measurements has been shown to accurately predict the risk of pressure ulcer development; however standard measurements of protein status – albumin, transferrin and pre-albumin – should be considered. Low serum albumin may be indicative of a chronic disease state rather than represent overall nutritional status and, due to its 20 day half-life, is not a sensitive measure of the effects of intervention. Pre-albumin, on the other hand, with a half-life of 2-3 days is more reflective of the individual's current protein stores. Protein-calorie malnutrition may also be noted in those with a decreased total lymphocyte count (WOCN, 2003).

Recommendation 1.6

Assess all patients for pain related to the pressure ulcer or its treatment.

Level of Evidence – IV

Recommendation 1.7

Assess location, frequency and intensity of pain to determine the presence of underlying disease, the exposure of nerve endings, efficacy of local wound care and psychological need.

Level of Evidence – IIb

Discussion of Evidence

Pain should be assessed routinely and regularly using the same validated tool each time (McCaffery & Pasero, 1999). Assessment tools should be appropriate for the cognitive ability of the patient, and should be easy to use. Although there are a number of validated tools, some of which are adapted for specific patient populations, there are no validated pain assessment tools for use specifically with clients experiencing pressure ulcer pain. However, recent studies have supported the use of the McGill Pain Questionnaire (Quirino, Conceicao de Gouveia Santos, Quednau, Martins, & Almeida, 2006), the Modified Functional Independence Measure (FIM) in combination with the Visual Analogue scale (Freedman, Cean, Duron, Tarnovskaya, & Brem, 2003), and the Faces Rating Scale, particularly with cognitively and sensory impaired elderly (Freeman, Smyth, Dallam & Jackson, 2001), to assess pain related to pressure ulcers or associated treatment. For sample assessment tools that have been tested for validity and reliability in adults, please refer to Appendix E – Tools for Assessment of Pain.

The AHCPR (1994) recommends that the management of pressure ulcer pain should include eliminating or controlling the source of pain (i.e., covering wounds, adjusting support surfaces, and repositioning), as well as providing analgesia to treat procedure-related and wound pain. Case and pilot studies indicate topical analgesia may be useful in treating pressure ulcer pain (Ashfield, 2005; Flock, 2003; Zepetella, Paul, & Ribeiro, 2003). Overall, however, the successful management of pain is a complex interdisciplinary effort requiring a multifaceted treatment plan, the discussion of which is beyond the scope of this guideline.

Accurate assessment and diagnosis of the type of pain, its intensity, and its effect on the person are necessary to plan appropriate interventions or treatments, and are an integral part of an overall clinical assessment. For comprehensive recommendations on the assessment and management of pain, and a discussion of the evidence, please refer to the RNAO Nursing Best Practice Guideline *Assessment and Management of Pain* (Revised) (2007).

Recommendation 1.8

Assess all patients with EXISTING PRESSURE ULCERS to determine their risk for developing additional pressure ulcers using the "Braden Scale for Predicting Pressure Sore Risk".

Level of Evidence – IV

Recommendation 1.9

If the patient remains at risk for other pressure ulcers, a high specification foam mattress instead of a standard hospital mattress should be used to prevent pressure ulcers in moderate to high risk patients.

Level of Evidence – Ia

Clients identified at risk of developing a pressure ulcer should receive care on a **low interface pressure mattress**. Cullum, McInnes, Bell-Syer and Legood (2005) identified seven randomized controlled trials that indicated that the use of foam alternatives to the standard hospital mattress can reduce the incidence of ulcers in at-risk patients, including patients with a fracture of the neck or femur. However, the authors were unable to make specific recommendations regarding types of low interface pressure mattresses based on the methodological flaws of the studies. The most clear conclusion from this review is that the standard hospital mattress is out performed by a range of foam based, low pressure mattresses and overlays, and also by "higher tech" pressure-relieving beds and mattresses in the prevention of pressure sores (NHS Centre for Reviews and Dissemination, 1995).

The panel recognizes that the definition of a "standard hospital mattress" can differ between organizations. The definition for **standard mattress** used by the panel is "a non-pressure reducing institutional mattress usually constructed of cold foam with 10-20% of the body being supported" (Defloor, de Bacquer, & Grypdonck, 2005, p.31). Given the need to balance equipment recommendations with available resources, it is suggested that decisions regarding mattress purchasing be made in collaboration between purchasing departments and the interdisciplinary health care team. Characteristics to consider when choosing a mattress include: weight capacity, pressure management properties, and ease of use by caregivers.

Even when using a high specification foam mattress, other pressure management devices, such as overlays, can be used in combination as needed. Importantly, **despite the use of any pressure management device, repositioning should also be used to prevent further pressure ulcers** (Defloor et al., 2005). Additional strategies, particularly for special needs pediatric and geriatric populations, can be designed in consultation with the interdisciplinary team.

For further discussion of prevention strategies, the reader is encouraged to consult the RNAO Nursing Best Practice Guideline *Risk Assessment and Prevention of Pressure Ulcers* (Revised) (2005).

Recommendation 1.10

Vascular assessment (e.g., clinical assessment, palpable pedal pulses, capillary refill, ankle/brachial pressure index and toe pressure) is recommended for ulcers in lower extremities to rule out vascular compromise.

Level of Evidence – IV

The guideline development panel recommends that vascular assessments, including **Ankle/Brachial Pressure Index** (ABPI) measurements, be used to rule out arterial disease and to determine appropriate therapy for those individuals with pressure ulcers on their lower extremities. It is cautioned, however, that ABPI readings may be unreliable and falsely elevated due to calcification of vessels in patients who have diabetes. Furthermore, research evidence indicates that Doppler ultrasound measurements of ABPI can be also unreliable if operators have not undergone training, adding that reliability can be considerably improved if operators have received appropriate education to undertake this measure (Cornwall, Dore, & Lewis, 1986).

Management of Causative/Contributing Factors

Recommendation 2.1

Choose the support surface which best fits with the overall care plan for the client considering the goals of treatment, client bed mobility, transfers, caregiver impacts, ease of use, cost/benefit, etc. Ensure ongoing monitoring and evaluation to ensure that the support surface continues to meet the client's needs and that the surface is used appropriately and is properly maintained. If the wound is not healing, consider the total care plan for the client before replacing the surface.

Level of Evidence – IV

Recommendation 2.2

Pressure management of the heels while in bed should be considered independently of the support surface.

Level of Evidence – III

Recommendation 2.3

Use pressure management for clients in the Operating Room to reduce the incidence of pressure ulcers post operatively.

Level of Evidence – Ia

Recommendation 2.4

Obtain a seating assessment if a client has a pressure ulcer on a sitting surface.

Level of Evidence – IV

Recommendation 2.5

Refer patients at RISK to appropriate interdisciplinary team members (Occupational Therapist, Physiotherapist, Enterostomal Therapist, etc.). Utilize those with expertise in seating, postural alignment, distribution of weight, balance, stability and pressure management when determining positioning for sitting individuals. Ensure support surfaces are used appropriately and are properly maintained.

Level of Evidence – IV

Recommendation 2.6

A client with a pressure ulcer on the buttocks and/or trochanter should optimize mobilization. If pressure on the ulcer can be managed, encourage sitting as tolerated.

Level of Evidence – IV

Discussion of Evidence

Pressure is the major causative factor in pressure ulcer formation. **Therefore, pressure ulcers will not heal if the etiology of pressure, shearing and friction are not addressed**. For clients at **risk** of developing pressure ulcers, or for those with **existing pressure ulcers**, institute the recommendations related to risk assessment and prevention described in the RNAO Nursing Best Practice Guideline *Risk Assessment and Prevention of Pressure Ulcers* (Revised) (2005), available at www.rnao.org/bestpractices. Appendix C provides a sample of the *Braden Scale for Predicting Pressure Sore Risk*.

Support surfaces can be classified as **active,** a powered support surface with the capability to change its load distribution properties with or without applied load (NPUAP, 2006), or **reactive,** a powered or non-powered support surface with the capability to change its load distributions properties only in response to applied load (NPUAP, 2006). These terms replace the traditionally used terms *static* and *dynamic*. In their systematic review Cullum et al. (2004) concluded that although high specification foam alternatives to the standard hospital foam mattress can reduce the incidence of pressure ulcers in people at risk, the relative merits of such devices are unclear, specifically related to poor reporting of the particular support surfaces evaluated in the literature. Eight randomized controlled trials comparing the various constant low pressure devices and alternating pressure devices were pooled with no significant difference detected in pressure ulcer incidence (Cullum et al., 2004). Furthermore, one case study (Russell & Longsdon, 2003) explored the role of skin assessment and a positioning schedule on clients on rotational surfaces. In this case study, manufacturer guidelines advising not to turn the patients on these rotational beds did not appear to protect the patient against pressure ulcer development. In fact, more than 50% of reported pressure ulcers in the facility during a six month period occurred in patients using lateral rotation beds (Russell & Longsdon, 2003). Therefore, the panel suggests that when choosing support surfaces, these decisions should be made to fit appropriately with the overall plan of care. Appendix F outlines support surface considerations.

Importantly, the panel recognizes that the use of support surfaces may be limited by the availability of resources. As there are many factors which may result in the poor healing of pressure ulcers, the panel suggests an exploration of alternative measures to support healing prior to proceeding to a powered support surface (e.g., nutrition, transferring strategies).

Heels are at particular risk of skin breakdown due to the relatively lower resting blood profusion level and high amount of surface pressure when under load (Mayrovitz, Sims, Taylor, & Dribin, 2003). Citing several comparison studies Wong and Stotts (2003) indicate that special support surfaces reduce heel pressure better than do standard hospital mattresses, however caution that the interface pressure of heels on these surfaces remain greater than that of the buttock and trochanter, and in some cases these surfaces offer no significant reduction on heel pressure at all. Despite the availability of various heel-protective devices, no one product has been identified as the most effective (Cullum et al., 2004; Cullum & Petherick, 2006; Gilcreast, Warren, Yoder, Clark, Wilson, & Mays, 2005; Wong & Stotts, 2003). For example, in one quasi-experimental study of 338 moderate-risk to high-risk patients, Gilcreast et al. (2005) compared three different heel ulcer-prevention devices and found no statistical difference in heel pressure ulcer development. It is suggested that keeping the heels off the bed with pillows is the best documented approach (Wong & Stotts, 2003).

All surfaces should be checked to ensure they are not "bottoming out". The condition of "**bottoming out**" occurs when a mattress overlay, support or wheelchair cushion is compressed by high pressure. A subjective estimate of the amount of compression can be achieved by palpation of the support thickness

at the bony prominence (Consortium for Spinal Cord Medicine, 2000). To determine if a patient has bottomed out, the caregiver should place an outstretched hand (palm up) under the mattress overlay below the part of the body at risk for ulcer formation. If the caregiver can feel that the support material is less than an inch thick at this site, the patient has bottomed out. Bottoming out should be checked at various anatomical sites and while the patient assumes various body positions (AHCPR, 1994; Consortium for Spinal Cord Medicine, 2000).

Pressure ulcer risk conditions often arise before patients even reach the **operating room**, particularly in emergency situations. Lying on hard stretchers, dehydration due to the withholding of fluids and lack of pain management prior to surgery (and resulting lack of movement) all contribute to pressure ulcer risk (Bliss & Simini, 1999). In addition, surgical patients who do not necessarily have predisposing risk factors for developing pressure ulcers may be considered at risk for ulcer formation. During surgery, individuals are immobile and unable to change position; they may be positioned in such a way that body surfaces are exposed to atypical and prolonged pressure; and the anaesthesia temporarily creates an absence of sensory perception (Aronovitch,1999; Beckrich & Aronovitch, 1999; Grous, Reilly, & Gift, 1997). A study conducted by Schultz, Bien, Dumond, Brown and Myers (1999) suggests that further work needs to be done to describe the best padding options for specific surgical procedures and that those with specific risk factors (diabetes, advanced age, smaller body size) need to have special guidelines for padding and positioning. Aronovitch (1999) found that the pressure ulcer prevalence rate for patients 20 to 40 years of age was 9.3%, and for those undergoing surgical procedures of three to four hours, the rate was nearly 6%. In this study, no significant relationship was found to link the presence of co-morbid conditions related to pressure ulcer risk to ulcer formation. Given the results of these studies, it would seem prudent that diligence should be used in protecting the skin of all patients who enter the operating room. A systematic review conducted by Cullum and Petherick (2006) supports this conclusion as they identified that the use of pressure relieving overlays on operating tables may reduce the risk of pressure ulcers compared to standard tables.

Clients who have a pressure ulcer on a sitting surface should be referred for a **seating assessment**. Pressure mapping technology has been shown to provide valuable information for a seating assessment (Crawford, 2005), but this technique should be used only as an adjunct to exiting assessment methods as its predictive validity still remains to be established. Interface pressure between the ischial tuberosities and seating surfaces is higher while sitting than lying down and must be relieved frequently to prevent tissue damage. However, while the need to prevent further pressure on existing ulcers on seating surfaces is recognized, the panel supports maximizing mobility in order to prevent further complications associated with prolonged bed rest, such as psychosocial isolation, muscle atrophy, decreased cardiac reserve, and respiratory compromise (Norton & Sibbald, 2004). Moreover, one study (Rosenthal, Felton, Nastasi, Naliboff, Harker, Navach, 2003) showed significantly lower interface pressures, lower Pressure Sore Status Scores (PSSS), more marked and rapid healing and better functional outcomes in participants randomized to a positioning routine involving a generic total contact seat as compared to those of a bed overlay or a low air loss bed. Therefore, when a pressure ulcer is present on a seating surface, encourage sitting as appropriate if pressure on the ulcer can be managed (AHCPR, 1994; Consortium for Spinal Cord Medicine, 2000).

Local Wound Care

Assessment

Recommendation 3.1a

To plan treatment and evaluate its effectiveness, assess the pressure ulcer(s) initially for:

- **Stage/Depth;**
- **Location;**
- **Surface Area *(length x width)* (mm^2, cm^2);**
- **Odour;**
- **Sinus tracts/Undermining/Tunneling;**
- **Exudate;**
- **Appearance of the wound bed; and**
- **Condition of the surrounding skin (periwound) and wound edges.**

Level of Evidence – IV

Recommendation 3.1b

Conduct a comprehensive reassessment weekly to determine wound progress and the effectiveness of the treatment plan. Monitor for variances from assessment with each dressing change. Identification of variances indicates need for reassessment.

Level of Evidence – IV

Discussion of Evidence

Consistency of the process for describing pressure ulcers facilitates communication among healthcare providers and with patients (AHCPR, 1994; Consortum for Spinal Cord Medicine, 2000).

Initial assessment of the pressure ulcer(s) should include:

- Stage/Depth (AHCPR, 1994; Baranoski, 1995; Consortium for Spinal Cord Medicine, 2000; van Rijswijk & Braden, 1999);
- Location (Baranoski, 1995; van Rijswijk & Braden, 1999);
- Surface area *(length x width)* (Sibbald, Orsted, Coutts, & Keast, 2006)
- Odour (CREST, 1998);
- Sinus tracts/Undermining/Tunneling (Consortium for Spinal Cord Medicine, 2000; van Rijswijk & Braden, 1999);
- Exudate – type and amount (CREST, 1998; van Rijswijk and Braden,1999);
- Appearance of the wound bed (Consortium for Spinal Cord Medicine, 2000; van Rijswijk & Braden, 1999); and
- Condition of the surrounding skin (periwound) and wound edges (Consortium for Spinal Cord Medicine, 2000).

There are several classification systems to describe wound stages, however the National Pressure Ulcer Advisory Panel (NPUAP) system is the method most widely accepted (AHCPR, 1994; Consortium for Spinal Cord Medicine, 2000; CREST, 1998; Ferguson et al., 2000; Ferrell, Josephson, Norvid, & Alcorn, 2000; Orlando, 1998; van Rijswijk & Braden, 1999). Refer to Appendix H for a description of the NPUAP classification system.

Appendix I – Wound Measurement, provides a diagram of the recommended technique for measuring pressure ulcer surface area and undermining. Combining multiple measurement techniques may help to more accurately monitor and evaluate pressure ulcers. This clinical measurement can be achieved by using a ruler (width/length/depth), other measurement devices, transparency tracings or photography (Consortium for Spinal Cord Medicine, 2000). *Length* is measured as the longest axis of the wound. *Width* is measured at 90 degrees to the length at the next longest axis. Lucas et al. (2002) combined full-scale photography and transparency tracings for highly reliable measurement of stage III pressure ulcers.

Sibbald, Orsted et al. (2006) suggest that the MEASURE mneumonic can be used to guide a consistent approach to local wound assessment, though it is also emphasized that assessment must occur within the context of a global assessment of the particular client and environment. Refer to Appendix J for a description of MEASURE.

Numerous tools have been developed for documenting wound assessment. These assessment tools include, but are not limited to: the Pressure Sore Status Tool (PSST); the National Pressure Ulcer Advisory Panel (NPUAP) Pressure Ulcer Scale for Healing (PUSH), the Wound Healing Scale (WHS), and the Sussman Wound Healing Tool (SWHT). Appendix K – Documentation: Wound Assessment Tools provides examples of tools for systematic assessment and documentation.

In order to determine the adequacy of the treatment plan, it has been suggested that pressure ulcers be monitored every time the dressing is changed and reassessed at least weekly (van Rijswijk & Braden, 1999). The panel further emphasizes that ongoing monitoring for emergent concerns and divergence from the assessment is essential for determining when a thorough re-assessment is warranted in advance of the weekly schedule.

A clean pressure ulcer with adequate vascular supply receiving adequate treatment should show signs of healing within two to four weeks (AHCPR, 1994). If the condition of the patient or of the wound deteriorates, or if the goal of care is healing and no progress can be demonstrated, re-evaluate the treatment plan and/or the presence of complications. Some wounds, however, will not heal. In this case, the goal of healing may be revised to prevent infection, to prevent further deterioration and to provide comfort, so that quality of life and diginity is maintained.

Debridement

Recommendation 3.2a

Lower extremity ulcers or wounds in patients who are gravely palliative with dry eschar need not be debrided if they do not have edema, erythema, fluctuance or drainage. Assess these wounds daily to monitor for pressure ulcer complications that would require debridement.

Level of Evidence – IV

Recommendation 3.2b

Prior to debridement on ulcers on the lower extremities, complete a vascular assessment (e.g., clinical assessment, palpable pedal pulses, capillary refill, ankle/brachial pressure index and toe pressure) to rule out vascular compromise.

Level of Evidence – IV

Recommendation 3.2c

Determine if debridement is appropriate for the patient and the wound.

Level of Evidence – IV

Given the risk and patient safety concerns associated with debridement procedures, the panel strongly emphasizes the need for caution in selecting debridement as an appropriate intervention.

In some instances however, debridement may not be appropriate. Situations of this nature would include a limb or digit that is ischemic, and amputation is not possible – these wounds will not heal. In these cases, the necrotic tissue should be kept as dry as possible to prevent odour and infection (CREST, 1998). The eschar provides a barrier to external contamination in a non-healing wound. The topical application of a drying, antimicrobial agent, such as betadine, may be beneficial. In addition, for some wounds the removal of eschar is not necessary (e.g., small areas on heels and toes) (AHCPR, 1994; CREST, 1998).

Vascular assessment is essential to ensure patient safety and to determine appropriate treatment options. Although it is recognized that false positive results are possible with palpable pedal pulses and capillary refill assessment, in cases where diagnostic tests are unavailable, these assessments are recognized as useful to support decision making.

Recommendation 3.2d

If debridement is indicated, select the appropriate method of debridement considering:

- **Goals of treatment (e.g., healability);**
- **Client's condition (e.g., end of life, pain, risk of bleeding, patient preference, etc.);**
- **Type, quantity and location of necrotic tissue;**
- **The depth and amount of drainage; and**
- **Availability of resources.**

Level of Evidence – IV

Recommendation 3.2e

Sharp debridement should be selected when the need is urgent, such as with advancing cellulitis or sepsis, increased pain, exudate and odour. Sharp debridement must be conducted by a qualified person.

Level of Evidence – IV

Recommendation 3.2f

Use sterile instruments to debride pressure ulcers.

Level of Evidence – IV

Recommendation 3.2g

Prevent or manage pain associated with debridement. Consult with a member of the healthcare team with expertise in pain management. Refer to the RNAO Best Practice Guideline *Assessment and Management of Pain* (Revised) (2007).

Level of Evidence – IV

Discussion of Evidence

Debridement is the removal of necrotic or devitalized tissue that interferes with wound healing. The removal of this tissue alters the healing environment of a wound by decreasing bacterial concentration and decreasing the risk of the spread of infection (AHCPR, 1994; Compliance Network Physicians, 1999; Consortium for Spinal Cord Medicine, 2000; Maklebust & Sieggreen, 1996). Choice of specific debridement method(s) should be determined by the client's clinical condition, and includes the client and caregiver's preferences. Other factors to consider are the type, quality, depth and location of the necrotic tissue. A distinction needs to be made between surface and deeper-lying necrotic tissue (AHCPR, 1994; Compliance Network Physicians, 1999; Consortium for Spinal Cord Medicine, 2000). It is preferable to remove devitalized tissue as quickly as possible, however, the clinical circumstances will impact on the method chosen (Consortium for Spinal Cord Medicine, 2000). The general categories of debridement are: sharp (or surgical), enzymatic, autolytic, biologic and mechanical. Refer to Appendix L for a description of key factors in deciding on a method of debridement.

Sharp debridement removes necrotic tissue through the use of a scalpel, scissor or other sharp instrument.

This is a high-risk procedure!
Debridement with a scalpel should be undertaken with caution and performed by specially trained and experienced health care professionals. Subcutaneous debridement with a scalpel is a controlled act that must be carried out by a physician or the delegate.

The advantages of this method are the immediate effect and the rapid response to the risk of infection (Compliance Network Physicians, 1999). Therefore, it is the preferred method for the treatment of advancing cellulitis or sepsis, as it quickly removes the source of infection. However, it does cause bleeding, may require an anesthetic (for surgical debridement of Stage IV wounds), and has the potential to cause injury to nervous or other viable tissue (AHCPR, 1994; Compliance Network Physicians, 1999; Consortium for Spinal Cord Medicine, 2000; Maklebust & Sieggreen, 1996).

The use of sterile instruments to debride pressure ulcers was recommended by the AHCPR panel (1994) and was further supported by Krasner (1999) in her review of the recommendations. There were no randomized controlled trials identified in the literature related to the use of sterile versus non-sterile instruments to debride pressure ulcers. This recommendation is supported by the general rules of surgical asepsis (Krasner, 1999).

Enzymatic debridement is a slower method, and useful for those not appropriate for surgical debridement, those in long-term care facilities, those receiving home care and where ulcer infection is not evident (AHCPR, 1994; Consortium for Spinal Cord Medicine, 2000).

Autolytic debridement is slow, and should not be utilized on infected ulcers (AHCPR, 1994; Compliance Network Physicians, 1999; Consortium for Spinal Cord Medicine, 2000). It may be prudent to avoid all occlusive dressings if anaerobic infection is suspected or cultured, as occlusive dressings are thought to promote an anaerobic environment (CREST, 1998).

Biological debridement involves the use of sterile larvae of *Lucilia seicata* (greenbottle fly) to digest necrotic tissue from the wound bed. Supported by recent studies, this therapy is gaining popularity but has still yet to find general acceptance in Canada (Sibbald, Orsted et al., 2006).

Mechanical debridement includes the use of wet-to-dry dressings at specific intervals, hydrotherapy (whirlpool) and wound irrigation. All of these methods can be utilized alone, or in preparation for surgical (sharp) debridement (AHCPR, 1994). Mechanical debridement is a slow process, can be painful and should be discontinued when necrotic tissue has been removed (Consortium for Spinal Cord Medicine, 2000). Wet-to-dry dressings in particular are nonselective in that they remove both viable and necrotic tissue, and are potentially damaging to granulation and epithelial tissue. It is important to ensure that appropriate and adequate pain management is incorporated into the plan of care when this method is utilized (AHCPR, 1994; Maklebust & Sieggreen, 1996; Ovington, 2002).

Control Bacteria/Infection

Recommendation 3.3a

The treatment of infection is managed by wound cleansing, systemic antibiotics and debridement, as needed.

Level of Evidence – Ib

Recommendation 3.3b

Protect pressure ulcers from sources of contamination, e.g., fecal matter.

Level of Evidence – IIa

Recommendation 3.3c

Follow Body Substance Precautions (BSP) or an equivalent protocol appropriate for the healthcare setting and the client's condition when treating pressure ulcers.

Level of Evidence – IV

Recommendation 3.3d

Medical management may include initiating a two-week trial of topical antibiotics for clean pressure ulcers that are not healing or are continuing to produce exudate after two to four weeks of optimal patient care. The antibiotic should be effective against gram-negative, gram-positive and anaerobic organisms.

Level of Evidence – Ib

Recommendation 3.3e

Medical management may include appropriate systemic antibiotic therapy for patients with bacteremia, sepsis, advancing cellulitis or osteomyelitis.

Level of Evidence – Ib

Recommendation 3.3f

To obtain a wound culture, cleanse wound with normal saline first. Swab wound bed, not eschar, slough, exudate or edges.

Level of Evidence – IV

Recommendation 3.3g

The use of cytotoxic antiseptics to reduce bacteria in wound tissue is not usually recommended.

Level of Evidence – IIb

Discussion of Evidence

All chronic wounds will become contaminated, but every chronic wound will not necessarily be infected, even if the wound is heavily colonized. Refer to Appendix M for a description of the clinical signs and symptoms of wound infection.

The treatment of pressure ulcer infection is managed by wound cleansing, debridement and systemic antibiotics, as necessary (AHCPR, 1994; Compliance Network Physicians, 1999). **Systemic antibiotics** are not required for pressure ulcers with only clinical signs of local infection**.** However, exceptions occur when locally infected wounds may require systemic antibiotics, such as when the virulence of the organism and the host defenses are taken into consideration. Indications for systemic antibiotics include: 1) the management of patients with bacteremia; 2) sepsis; 3) advancing cellulitis; or 4) osteomyelitis (AHCPR, 1994).

When clean pressure ulcers are not healing or are continuing to produce exudate after two to four weeks of optimal patient care, medical management may include the initiation of a **two-week trial** of **topical antibiotics**. The selected antibiotic should be effective against gram-negative, gram-positive and anaerobic organisms (AHCPR, 1994). Maklebust and Sieggreen (1996) suggest that their use needs to be monitored closely to identify evidence of sensitivity and their useage limited as prolonged use may facilitate the development of resistant organisms. Antibacterial dressings such as cadexamer iodine and silver may also be considered within the parameters of this treatment regimen. Hypertonic saline dressings are *not* considered to be antimicrobial, however they have shown some effect against Methicillin-resistant Staphylococcus aureus (MRSA) with in-vitro studies (S.Stewart, Mölnlycke Health Care, personal communication, July 9, 2002). Please refer to Appendix N for a listing of commonly used topical antimicrobial agents.

Krasner (1999) reviewed the AHCPR (1994) guideline recommendations related to clean versus sterile dressings. She reports that although there were no randomized controlled trials on this topic, two quasi-experimental studies suggest that contamination of gauze dressings is easier than clinicians may realize and that clean practices may significantly increase the bioburden of gauze and perhaps other types of dressings. The implications for wound healing outcomes are not known currently, however this is an important area of research, with significant economic and social ramifications. In facing colonization and infection issues in pressure ulcer management, clinicians should aim to decrease the bioburden in the wound wherever possible, and "do no harm" (Krasner, 1999, p. 90S). The development panel supports the use of **sterile dressings** in all care settings, whenever possible, in order to decrease the bioburden within pressure ulcers.

Proper technique in obtaining a wound **culture** is critical, and a standardized quantitative swab technique can accurately document the bioburden in pressure ulcers (Maklebust & Sieggreen, 1996; Bill, Ratliff, Donovan,

Knox, Morgan, & Rodeheaver, 2001). Though there remains much debate surrounding approaches to wound culture sampling (Bowler, Duerden, & Armstrong, 2001), the panel supports the Levine method as it has recently emerged in the literature and current practice as the best approach for obtaining semi-quantitative wound culture swabs (Dow, Browne, & Sibbald, 1999; Sibbald, Woo, & Ayello, 2006). This represents a change from the previously recommended zig-zag method. Most wounds need some form of preparation prior to the culture in order to reduce the risk of introducing extraneous microorganisms into the specimen (Crow, 1990; Cuzzell, 1993). The exudate that accumulates on the surface of the wound and under dressings contains bacteria that are not the same as those causing infection in the wound. Irrigate wounds with normal saline until all visible debris has been washed away. Successful culturing also involves culturing viable tissue, therefore never swab eschar or yellow fibrous slough. Ensure that the swab is moist or alternatively, add normal saline to the wound bed and/or swab. Rotate the swab tip in a 1 cm^2 area of the cleanest and deepest part of the wound and/or area of granulation, using enough pressure to release tissue exudate for a period of five seconds. This may be painful so warn the patient of the possibility of pain. Ensure adequate pain management and pre-medicate (e.g., topical wound analgesia) if possible. For a diagram of swabbing technique for accurate wound culture results, refer to Appendix O – Wound Cultures: Swabbing Techniques.

The AHCPR (1994) recommends that topical **antiseptics** should not be used to reduce bacteria in wound tissue. They report numerous studies that have documented the toxic effects of exposing wound-healing cells to antiseptics. Maklebust and Sieggreen (1996) describe antiseptics as highly reactive chemicals that indiscriminately destroy cell function, and that the use of antiseptics to decrease the bacterial counts in open wounds is contraindicated. However, in cases where a wound is non-healable and bacterial burden is more important than tissue toxicity, antiseptics may be used to dry the wound surface and decrease local bacterial proliferation (Sibbald, Orsted et al., 2006).

Protecting pressure ulcers from exogenous sources of bacteria e.g., fecal matter, will facilitate the management of bacterial contamination. Refer to the Discussion of Evidence related to dressing selection and sacral dressings.

Wound Cleansing

Recommendation 3.4a

Do not use skin cleansers or antiseptic agents (e.g., povidine iodine, iodophor, sodium hypochlorite solution, hydrogen peroxide, acetic acid) to clean ulcer wounds.

Level of Evidence – III

Recommendation 3.4b

Use normal saline, Ringer's lactate, sterile water or non-cytoxic wound cleansers for wound cleansing.

Level of Evidence – IV

Recommendation 3.4c

Fluid used for cleansing should be warmed at least to room temperature.

Level of Evidence – III

Recommendation 3.4d

Cleanse wounds at each dressing change.

Level of Evidence – IV

Recommendation 3.4e

To reduce surface bacteria and tissue trauma, the wound should be gently irrigated with 100 to 150 milliliters of solution.

Level of Evidence – IV

Recommendation 3.4f

Use enough irrigation pressure to enhance wound cleansing without causing trauma to the wound bed. Safe and effective ulcer irrigation pressures range from 4 to 15 psi. Pressure of 4 to 15 psi is achieved by using:

- **35 milliliter syringe with a 19 gauge angiocath, or**
- **single-use 100 milliliter saline squeeze bottle.**

Level of Evidence – IIa

Discussion of Evidence

Wound cleansing is the process of using non-cytotoxic fluids to reduce the bacterial burden and to remove devitalized tissue, metabolic wastes and topical agents that can delay wound healing (Consortium for Spinal Cord Medicine, 2000). This procedure must be done in such a way as to minimize wound trauma while obtaining a clean wound bed. Routine wound cleansing should be conducted with a minimum of chemical and mechanical trauma (AHCPR, 1994).

Commercial **wound cleaners** (not skin cleansers) may be appropriate when the wound has adherent material, however some have been shown to be toxic to white blood cells (Foresman, Payne, Becker, Lewis, & Rodeheaver, 1993). **Normal saline** is recommended for all wound types as it is compatible with human tissue and is unlikely to cause cellular damage (AHCPR, 1994: CREST, 1998). It contains no preservatives, and is recommended due to its non-cytotoxic effects in the wound (Consortium for Spinal Cord Medicine, 2000). In addition, it is commonly available and is cost effective (Maklebust & Sieggreen, 1996). Appendix P provides a summary of the various wound care cleansers, indications and considerations.

CREST (1998) reports that cleansing solutions should be warmed to body temperature as colder solutions slow down cellular repair. Rolstad, Ovington & Harris (2000) discuss the negative impact that hypothermia can have on the healing wound. They indicate that irrigating wounds with refrigerated solutions can induce hypothermia, and describe Thomas's research (1990) (as cited in Rolstad, Ovington & Harris, 2000) that studied 420 patients and found that local tissue temperatures were reduced for up to 40 minutes after wound cleansing. It was also discovered that mitosis and leukocyte activities were decreased for up to three hours after cleansing. The temperature of wound tissues should remain as close as possible to normal, however this ideal is difficult to achieve in clinical practice. Therefore, it is recommended that cleansing solutions be kept at a minimum of **room temperature**.

In order to establish and maintain a clean wound bed, the wound should be cleansed at **each dressing change** (AHCPR, 1994; Consortium for Spinal Cord Medicine, 2000). Although there are no randomized controlled trials regarding frequency of cleansing, ulcers should be cleansed prior to each dressing change without causing chemical or mechanical trauma to the wound or surrounding tissue (Consortium for Spinal Cord Medicine, 2000).

To ensure adequate cleansing of the wound bed, a sufficient **volume** of irrigation fluid is essential. The volume suggested for irrigation is between 100 – 150 ml of solution. However, the panel emphasizes that the amount used should be enough to adequately rinse the entire surface. The AHCPR (1994) guideline recommends a range of **irrigation pressure** between 4 – 15 psi as irrigation pressures below 4 psi have been found to be inadequate for thorough wound cleansing. They report on several studies indicating that pressurized irrigation was more effective in removing wound debris and bacteria than gravity or bulb syringe irrigation. A study by Rodeheaver, Pettry, Thacker, Edgerton and Edlich (1975) found that the efficiency of wound irrigation in traumatic wounds is markedly improved by delivering the irrigant to the wound under continuous high pressure. Irrigation of the wound with saline solution delivered at 15 pounds per square inch (psi) removed 84.8% of the soil infection potentiating factors from the wound. However, irrigation pressures that exceed 15 psi may cause wound trauma and force bacteria into the tissue. The work of Stevenson, Thacker, Rodeheaver, Baccetta, Edgerton, and Edlich (1976) found that high pressure irrigation at a psi of 8, achieved by using a 35 mL syringe with a 19-gauge needle, was sufficient to cleanse treated wounds of bacteria and reduce the risk of infection. The combination of a 35 mL syringe with a 19-gauge needle or angiocath has been recommended elsewhere as well (AHCPR, 1994; Consortium for Spinal Cord Medicine, 2000; Maklebust & Sieggreen, 1996). However, as this recommendation is based on the documented sizing from American research, differences in equipment availability in Canada may pose challenges to implementing this practice. As a result, the use of a 30 mL syringe with a 20-gauge needle or angiocath has been identified as a suitable Canadian equivalent (Rodeheaver, personal communication, February 14, 2003, with permission from C. Harris). Moreover, the use of an angiocath rather than a needle is suggested to reduce the danger from needle stick injuries (Maklebust & Sieggreen, 1996).

Management Approaches

Recommendation 3.5a

For comprehensive wound management options, consider the following:

- **Etiology of the wound;**
- **Client's general health status, preference, goals of care and environment;**
- **Lifestyle;**
- **Quality of life;**
- **Location of the wound;**
- **Size of the wound, including depth and undermining;**
- **Pain;**
- **A dressing that will loosely fill wound cavity;**
- **Exudate: type and amount;**
- **Risk of infection;**
- **Risk of recurrence;**
- **Type of tissue involved;**
- **Phase of the wound healing process;**
- **Frequency of the dressing change;**
- **Comfort and cosmetic appearance;**
- **Where and by whom the dressing will be changed;**
- **Product availability; and**
- **Adjunctive therapies.**

Level of Evidence – IV

Recommendation 3.5b

Moisture-retentive dressings optimize the local wound environment and promote healing.

Level of Evidence – Ia

Recommendation 3.5c

Consider caregiver time when selecting a dressing.

Level of Evidence – Ib

Recommendation 3.5d

Consider the following criteria when selecting an interactive dressing:

- **Maintains a moist environment** *Level of Evidence – Ia*
- **Controls wound exudate, keeping the wound bed moist and the surrounding intact skin dry** *Level of Evidence – IV*
- **Provides thermal insulation and wound temperature stability** *Level of Evidence – IV*
- **Protects from contamination of outside micro-organisms** *Level of Evidence – IV*
- **Maintains its integrity and does not leave fibres or foreign substances within the wound** *Level of Evidence – IV*
- **Does not cause trauma to wound bed on removal** *Level of Evidence – IV*
- **Client/patient preference** *Level of Evidence – IV*
- **Is simple to handle, and is economical in cost and time** *Level of Evidence – IV*

Recommendation 3.5e

Monitor dressings applied near the anus, since they are difficult to keep intact.
Consider use of special sacral-shaped dressings.

Level of Evidence – Ib

Discussion of Evidence

The basic functions of the dressing are: to protect the wound from contamination; to protect the wound from trauma; to provide compression if bleeding or swelling is anticipated; to apply medications; and to absorb drainage or debride necrotic tissue (Maklebust & Sieggreen, 1996). In addition to these traditional functions, the advent of interactive wound dressings has seen the development of products that work with the environment of the wound to promote wound healing (Consortium for Spinal Cord Medicine, 2000). However, the comparative efficacy of advanced dressings has yet to be confirmed (Bouza, Saz, Munoz, & Amate, 2005). Appendix Q provides a summary of various categories of wound dressings, indications and considerations.

In reviewing the AHCPR (1994) guideline regarding dressing selection, Ovington (1999) notes that the primary message is that ulcer management should involve the use of **moisture retentive dressings** versus dry dressing modalities. In a systematic review of studies examining dressings and topical agents used in the healing of chronic wounds (Bradley, Cullum, Nelson, Petticrew, Sheldon, & Torgerson, 1999) it was determined by a meta-analysis of five reports comparing a hydrocolloid dressing to a traditional treatment (saline-soaked gauze [4] and wet-to-dry and Dakin's solution [1]) that treatment with the hydrocolloid resulted in a statistically significant improvement in the rate of pressure ulcer healing. By pooling the five trials it was found that the hydrocolloid dressings increased the odds of healing by three-fold. The beneficial effects of a physiologically moist wound environment have been well established in the literature for various acute and chronic wounds (Ovington, 1999). In addition, studies have reported a reduction in caregiver time and overall cost effectiveness with moisture retentive dressings (see discussion below regarding caregiver time). Since then, Kaya, Turani and Akyuz (2005) conducted a prospective randomized controlled study in which the use of hydrogel dressings resulted in significantly more healed wounds and faster healing rates than the comparative group using providone-iodine-soaked gauze. Ovington (2002) reiterates that gauze dressings are not an optimal wound care modality for the client, the nurse or the healthcare system as they do not effectively support optimal healing and are more labour intensive to use.

There are numerous criteria to consider when selecting an interactive dressing. The need to **maintain a moist environment** has been previously discussed in the context of moisture retentive dressings. Dressings should not macerate surrounding tissue, as this phenomenon is associated with prolonged healing time (Consortium for Spinal Cord Medicine, 2000). The **control of wound exudate,** which involves keeping the wound bed moist and the surrounding intact skin dry, is another dressing criteria (AHCPR, 1994, Compliance Network Physicians, 1999; Consortium for Spinal Cord Medicine, 2000). Ovington (1999) reports that a literature review from 1993 to 1998 did not reveal any clinical trials or RCTs focusing on ulcer maceration or desiccation caused by inappropriate dressing selection. However, as many moisture-retentive dressings prevent lateral wicking and ultimately peri-wound maceration, clinical experience would support this feature in a dressing. In addition, it seems prudent to support the concept that a dressing should not dessicate the wound (Ovington, 1999). It also seems prudent to avoid occlusive dressings if anaerobic infection is suspected or cultured, as occlusive dressings are thought to promote an anaerobic environment (CREST, 1998). Odour and bacteria absorbing dressings should be changed daily in cases of wound infection. If purulence or foul odour is present, more frequent cleansing and possibly debridement are required.

Other criteria for the selection of an interactive dressing include:

- Provision of thermal insulation and wound temperature stability (CREST, 1998);
- Protection from contamination of outside micro-organisms (AHCPR, 1994; CREST, 1998);
- Maintenance of dressing integrity, not leaving residual fibres or foreign substances within the wound (Consortium for Spinal Cord Medicine, 2000; CREST, 1998);
- Lack of trauma to wound bed on removal (Compliance Network Physicians, 1999; CREST, 1998); and
- Is simple to handle, and is economical in cost and time (CREST, 1998).

Caregiver time is a significant consideration when selecting a dressing. Caregiver time and staff costs contribute significantly to expenditures related to pressure ulcer care (AHCPR, 1994; Consortium for Spinal Cord Medicine, 2000; Ovington, 1999). In her review of the AHCPR recommendations, Ovington (1999) describes a literature base that includes multiple, clinical, randomized, controlled studies that have documented that caregiver labour costs can exceed the cost of supplies in wound management. The use of moisture-retentive dressings for wound management in general (i.e., not limited to pressure ulcers) has also been reviewed, and the impact of these dressings on reducing caregiver time and overall cost-effectiveness has been supported in the literature. For example, one RCT (Kim, Shin, Park, Oh, Choi, & Kim, 1996) found that there was a difference in average treatment time for clients with Stage I and II pressure ulcers from 20.4 minutes/day (hydrocolloid group) to 201.7 minutes/day (wet-to-dry gauze dressing group). The hospital cost of ulcer treatment was higher in the gauze group compared to the hydrocolloid group – these results indicate that the hydrocolloid occlusive dressing technique offers a less time consuming and less expensive method of treatment compared to conventional techniques.

Current knowledge about wound care principles, assessment parameters and the variety of dressing options allows healthcare providers to select the right dressing for the wound. The choice of dressing is a clinical one, and is based on the assessment of the individual, the pressure ulcer(s) and the overall goal of care. This choice is not static, and care providers must be vigilant in recognizing conditions that require a change in the treatment plan and a different dressing (Baranoski, 1995; Consortium for Spinal Cord Medicine, 2000).

Factors to consider when selecting a dressing include:

- Etiology of the wound (Baranoski, 1995; CREST, 1998)
- Client's general health status, goals of care and environment (Baranoski, 1995; CREST, 1998; Maklebust & Sieggreen, 1996)
- Site of the wound (AHCPR, 1994; Consortium for Spinal Cord Medicine, 2000; CREST, 1998; Day, Dombranski, Farkas, Foster, Godin, Moody et al., 1995; Ovington, 1999)
- Size of the wound, including depth and undermining (AHCPR, 1994; CREST, 1998; Maklebust & Sieggreen, 1996)
- A dressing that will loosely fill wound cavity (AHCPR, 1994; Consortium for Spinal Cord Medicine, 2000)
- Exudate – type and amount (AHCPR, 1994; Compliance Network Physicians, 1999; Consortium for Spinal Cord Medicine, 2000; Ovington, 1999)
- Risk of infection (Consortium for Spinal Cord Medicine, 2000; Compliance Network Physicians, 1999; CREST, 1998)
- Type of tissue involved (Baranoski, 1995; Compliance Network Physicians, 1999; CREST, 1998)
- Phase of the wound healing process
- Frequency of the dressing change (AHCPR, 1994; CREST, 1998; Ovington, 1999)
- Comfort and cosmetic appearance (CREST, 1998)
- Where and by whom the dressing will be changed (AHCPR, 1994; Baranoski, 1995; CREST, 1998)
- Dressing availability (CREST, 1998)

AHCPR (1994) recommends careful monitoring of **sacral dressings** near the anus, as they are difficult to maintain. The sacral location is challenging because of inherent moisture from perspiration, incontinence, and shear forces (Ovington, 1999). A randomized controlled trial (Day et al.,1995) examined 103 patients with Stage II and III sacral pressure ulcers in a prospective, controlled, multi-centre clinical study to evaluate and compare dressing performance, safety and efficacy. Patients were randomized to treatment with a triangle-shaped hydrocolloid border dressing, to a different, oval shape hydrocolloid dressing, or to a pressure management surface. It was found that wear time was longest for wounds dressed with the triangle dressing (point applied down), however incontinence reduced the interval between dressing changes in both groups. Healing was more likely to occur in wounds dressed with the triangle border dressing, as those ulcers showed a greater reduction in ulcer width as compared to wounds dressed with the oval dressing.

Adjunctive Therapies

Recommendation 3.6a

Refer to physiotherapy for a course of treatment with electrotherapy for Stage III and IV pressure ulcers that have proved unresponsive to conventional therapy. Electrical stimulation may also be useful for recalcitrant Stage II ulcers.

Level of Evidence – Ib

Recommendation 3.6b

Chronic pressure ulcers may be treated by:

- **Electrical stimulation** *Level of Evidence – Ib*
- **Ultraviolet light C** *Level of Evidence – IIa*
- **Warming therapy** *Level of Evidence – Ib*
- **Growth factors** *Level of Evidence – Ib*
- **Skin equivalents** *Level of Evidence – IV*
- **Negative pressure wound therapy** *Level of Evidence – IV*
- **Hyperbaric oxygen** *Level of Evidence – IV*

Level of Evidence – Ib-IV

Discussion of Evidence

Candidates for adjunctive therapies include individuals with chronic wounds who have failed to respond to optimal standard wound care, those with pre-existing medical conditions that delay wound healing and/or who prefer a non-surgical, conservative option to facilitate wound healing. Prior to initiating an adjunctive therapy, the health care provider must ensure that the patient does not have any contraindications for that treatment modality (Houghton & Campbell, 2001).

Electrical current has been shown to induce cellular action in virtually all phases of the wound-healing cascade (Houghton & Campbell, 2001). Ovington (1999) in her review of the AHCPR (1994) recommendations, identified an additional RCT that supported the use of electrical stimulation for the treatment of pressure ulcers. This double-blind study randomized patients to active treatment or sham treatment. After eight weeks of treatment, 58% of actively treated ulcers reached complete healing and 3% of the sham-treated ulcers healed completely. The study concluded that pulsed low-intensity direct current represents a useful approach for the treatment of Stage II and Stage III chronic pressure ulcers by increasing the healing rate. The growth of fibroblasts and keratinocytes may be enhanced by pulsed low-intensity direct current due to

changes in calcium homeostasis. Cullum, Nelson and Nixon (2002) identified several RCTs of various quality that indicated that electrotherapy improved healing of pressure sores, however suggested a need for further confirmatory studies in this area. Most recently, Adunsky & Ohry (2005) conducted a multi-centre, double-blind RCT to test electrostimulation therapy with respect to rates of ulcer closure and wound area reduction. No significant differences between the placebo and treatment group was found, though trends towards a reduction in ulcer area and a faster rate of healing for the treatment group during that active phase of the treatment was observed.

Ultraviolet light C's inhibitory effects on bacterial growth are well established and are believed to occur through direct effects on the nuclear material and bacterial DNA synthesis. There are several clinical reports that document the acceleration of infected pressure ulcer wound closure with ultraviolet light C treatment (Nussbaum, Blemann, & Mustard, 1994; Thai Thao, Houghton, Keast, Campbell, & Woodbury, 2002; Wills, Anderson, Beattie, & Scott, 1983). In one controlled study of chronic pressure ulcers and leg wounds, a significant reduction in predominant bacteria, including methicillin-resistant Staphylococcus aureus (MRSA), was found after only one treatment with ultraviolet light C (Thai Thao, Keast, Campbell, Woodbury & Houghton, 2005).

Two randomized trials were found in support of **warming therapy** as an adjunctive treatment for pressure ulcers (Kloth, Berman, Nett, Papanek, & Dumit-Minkel, 2002; Witney, Salvadalena, Higa & Mich, 2001). In both studies, 1-hour treatment with noncontact normothermic wound therapy (NNWT) three times daily was compared to standard care with moisture-retentive dressing, resulting in significant increases in wound healing rates in the treatment groups.

Ovington (1999), in her review of the 1994 AHCPR adjunctive therapy recommendations, indicated **growth factors** and **skin equivalents** as valid and potential pressure ulcer therapies, but also cautioned that there are many different growth factors and skin equivalents, with little data specific to their use in pressure ulcers. However, literature support for the use of growth factors in particular, is increasing. In the same review, Ovington (1999) does provide examples of several clinical studies examining the use of individual growth factors and suggests that the use of rPDGF-BB (homodimeric recombinant platelet-derived growth factor) is supported by well-conducted clinical trials. More recently, a randomized, double-blind, placebo-controlled study (Landi, Aloe, Russo, Cesari, Onder, Bonini, et al., 2003) found topical application of nerve growth factor significantly reduced the pressure ulcer area in comparison to the placebo group.

Negative pressure wound therapy involves negative pressure (suction) being applied to a wound through an open cell dressing (e.g., foam, felt). Cullum and Petherick (2006) found two systematic reviews related to vacuum assisted closure. Although two randomized controlled trials found that topical negative pressure decreased wound volume, both reviews concluded that there was no clear evidence of improved healing (Evans & Land, 2002; Samson, Lefevre, & Aronson, 2004). The effect of vacuum closure on cost, quality of life, pain and comfort were not reported in the literature. Further, it was not possible to determine the optimum regimen.

Hyperbaric oxygen therapy is considered useful in ischemic wounds to provide the oxygen needed to support wound healing processes and to fight infection. In a systematic review of hyperbaric oxygen for chronic wounds, Roeckl-Wiedmann, Bennett and Kranke (2005) found a significant reduction in risk of amputation for diabetic wounds treated with this modality, but were unable to identify any appropriate trials with regards to treatment of pressure ulcers.

Other **adjunctive therapy options** encountered in practice may include topical oxygen, therapeutic ultrasound and electromagnetic fields, but current evidence fails to show the benefit of these modalities in the treatment of pressure ulcers (Baba-Akbari, Flemming, Cullum, & Wollina, 2005; Cullum & Petherick, 2006; Feldmeier, Hopf, Warriner, Fife, Gesell, & Bennett, 2005; Houghton & Campbell, 2001; Olyaee Manesh, Flemming, Cullum, & Ravaghi, 2006).

Surgical Intervention

Recommendation 3.7

Possible candidates for operative repair are medically stable, adequately nourished and are able to tolerate operative blood loss and postoperative immobility.

Level of Evidence – IV

Discussion of Evidence

Operative repair of pressure ulcers is an option for clean Stage III or Stage IV pressure ulcers that do not respond to optimal wound care (AHCPR, 1994; Maklebust & Sieggreen, 1996). The high recurrence rate and long duration to achieve complete healing are often given as reasons for surgical closure as an appropriate option (Consortium for Spinal Cord Medicine, 2000). Surgical procedures used to repair pressure ulcers include one or more of the following: direct closure, skin grafting, skin flaps, musculocutaneous flaps and free flaps (AHCPR, 1994; Compliance Network Physicians, 1999).

The decision for surgery is determined in collaboration with the interdisciplinary team and the client. Factors to consider prior to operative repair include: the patient's medical stability, nutritional status, ability to tolerate the recovery period as well as the likelihood that surgery will improve the patient's functional status (AHCPR, 1994; Consortium for Spinal Cord Medicine, 2000; Maklebust & Sieggreen, 1996).

Discharge/Transfer of Care Arrangements

Recommendation 4.1

Clients moving between care settings should have the following information provided:

- **Risk factors identified;**
- **Details of pressure points and skin condition prior to transfer;**
- **Need for pressure management/mobility equipment (e.g., support surfaces, seating, special transfer equipment, heel boots);**
- **Details of healed ulcers;**
- **Stage, site and size of existing ulcers;**
- **History of ulcers, previous treatments and dressings (generic) used;**
- **Type of dressing currently used and frequency of change;**
- **Any allergies to dressing products; and**
- **Need for on-going nutritional support.**

Level of Evidence – IV

Recommendation 4.2

Use the RNAO Best Practice Guideline *Risk Assessment and Prevention of Pressure Ulcers* (Revised) (2005).

Level of Evidence – IV

Discussion of Evidence

Advance notice should be given when transferring a client between settings (e.g., hospital to home/nursing home/hospice/residential care) if pressure management equipment is required to be in place at time of transfer, e.g., support surfaces, special transfer equipment. Discharge/transfer to another setting may require a site visit, client/family conference, and/or assessment for funding of resources to prevent deterioration, recurrence or the development of new pressure ulcers.

In order to ensure a smooth transfer of clients between practice settings, and to provide consistency of pressure ulcer prevention and care, it is essential to ensure that funding and equipment is in place to prevent interruption of the plan of care. Continuity of client care can be enhanced with the communication of specific client information (including information regarding necessary equipment) between settings. This information should be provided in writing as well as verbally in order to enhance communication (Consortium for Spinal Cord Medicine, 2000; CREST, 1998). Similar approaches to care in various settings will provide continuity and consistency for the client and their caregivers. The use of clinical practice guideline recommendations across the continuum of care can facilitate decision-making by practitioners and clients regarding appropriate health care for specific clinical circumstances (Field & Lohr, 1990).

Most healthcare organizations face the same issues of clinical practice guideline implementation, form design, cost containment and staff education. Most healthcare facilities deal with a wide variety of wound care issues. Sharing the research process design and education development lessens the burden on each organization.

Wound care professionals at different organizations are working on the same issues of: a)policy, b)education initiatives, and c)documentation and communication between organizations. Regional collaboration will encourage a community of practice and seamless service as opposed to fragmented care. Regional commitment to wound care can help organizations identify barriers to interdisciplinary practice and healthy work environments and strategize on how to support change.

There are many informal means of collaboration. Such alliances already exist in the day-to-day fabric of most healthcare organizations. For example, if there is more than one Enterostomal Therapist in a region there is generally communication between them if a client caseload overlaps. However, intentional collaboration in this area is rare.

Establishment of a Regional Wound Care Committee is one way to formalize such alliances and build the informal network of wound care interests. Such a committee would consist of clinicians and managers who are close geographically. Regional Wound Care Committees share expertise, educate each other and are educated around the broadly defined issues of best practice, accountability and professional issues related to the role of health care provider.

Regional efforts tap into existing Economies of Scale (ES). Economies of scale refers to the decreased per unit cost as output increases – and can relate to any matter – from education to units of production. ES allows for the division and specialization of labour to impact on the outcome. Tapping into the "healthcare community as a whole" can allow all associated organizations to take advantage of wound care experts and specialists working at each. It means that each organization does not have to re-invent the wheel (Heakal, 2003; Wikipedia, 2001).

An example of regional collaboration could begin with the development of a discharge transfer tool (Refer to Appendix R). It can also result in the establishment of Regional Wound Care Teams (Campbell, Teague, Hurd, & King, 2006).

Patient Education

Recommendation 5.1

Involve the patient and caregiver, when possible, in pressure ulcer treatment and prevention strategies and options. Include information on pain, discomfort, possible outcomes and duration of treatment, if known. Other areas of education may include patient information regarding appropriate support surfaces, as well as roles of various health professionals. Collaborate with patient, family and caregivers to design and implement a plan for pressure ulcer prevention and treatment.

Level of Evidence – IV

Involving the client and family members in discussions of care invites creative approaches to health education. In one study, pressure mapping technology provided valuable information relating to the client's overall seating system (Crawford, Strain, Gregg, Walsh, & Porter-Armstrong, 2005). Such information could be used as a biofeedback strategy to facilitate education regarding the importance of pressure management seating devices or repositioning techniques to meet the client's seating surface requirements.

Education Recommendations

Recommendation 6.1

Design, develop and implement educational programs that reflect a continuum of care. The program should begin with a structured, comprehensive and organized approach to prevention and should culminate in effective treatment protocols that promote healing as well as prevent recurrence.

Level of Evidence – IV

Recommendation 6.2

Develop educational programs that target appropriate healthcare providers, patients, family members and caregivers. Present information at an appropriate level for the target audience, in order to maximize retention and facilitate translation into practice.

Level of Evidence – IV

Recommendation 6.3

Include the following information when developing an educational program on the treatment of pressure ulcers:

- **Role of the interdisciplinary team;**
- **Etiology and pathology;**
- **Risk factors;**
- **Individualized program of skin care, quality of life and pain management;**
- **Uniform terminology for stages of tissue damage based on specific classifications;**
- **Need for accurate, consistent and uniform assessment, description and documentation of the extent of tissue damage;**
- **Principles of wound healing;**
- **Principles of cleansing, debridement and infection control;**
- **Principles of nutritional support with regard to tissue integrity;**
- **Product selection (i.e., support surfaces, dressings, topical antibiotics, antimicrobials);**
- **Principles of postoperative care including positioning and support surfaces;**
- **Principles of pressure management;**
- **Mechanisms for accurate documentation and monitoring of pertinent data, including treatment interventions and healing progress; and**
- **Principles of patient education related to prevention to reduce recurrence.**

Level of Evidence – IV

Recommendation 6.4

Update knowledge and skills related to the assessment and management of pressure ulcers on an ongoing basis. Organizations should provide opportunities for professional development related to the best practice guideline and support its use in daily practice.

Level of Evidence – IV

The educational recommendations identified in this section have been adapted from the educational recommendations in the AHCPR (1994) guideline. Healthcare organizations are responsible for developing and implementing educational programs that facilitate the translation of the current evidence base for pressure ulcer prevention, assessment and management into treatment strategies (AHCPR, 1994).

Additional educational resources for clinicians and educators are offered in Appendix S.

Organization & Policy Recommendations

Recommendation 7.1

Guidelines are more likely to be effective if they take into account local circumstances and are disseminated by an active ongoing educational and training program.

Level of Evidence – IV

Recommendation 7.2

Practice settings need a policy with respect to providing and requesting advance notice when transferring or admitting clients between practice settings when special resources (e.g., surfaces) are required.

Level of Evidence – IV

Recommendation 7.3

Practice settings must ensure that resources are available to clients and staff, e.g., appropriate moisturizers, barriers, dressings, documentation systems, access to equipment and clinical experts, etc.

Level of Evidence – IV

Recommendation 7.4

Practice settings need a policy that requires product vendors to be registered as a regulated health care professional if they provide assessment and/or recommendations on any aspect of pressure ulcer related practice.

Level of Evidence – IV

Recommendation 7.5

Practice settings need an interdisciplinary team of interested and knowledgeable persons to address quality improvement in pressure ulcer management. This team requires representation across departments and programs.

Level of Evidence – IV

Recommendation 7.6

Nursing best practice guidelines can be successfully implemented only where there are adequate planning, resources, organizational and administrative support, as well as the appropriate facilitation. Organizations may wish to develop a plan for implementation that includes:

- **An assessment of organizational readiness and barriers to implementation.**
- **Involvement of all members (whether in a direct or indirect supportive function) who will contribute to the implementation process.**
- **Dedication of a qualified individual to provide the support needed for the education and implementation process.**
- **Ongoing opportunities for discussion and education to reinforce the importance of best practices.**
- **Opportunities for reflection on personal and organizational experience in implementing guidelines.**

Level of Evidence – IV

A critical step in the implementation of guidelines must be the formal adoption of the guidelines. Organizations need to consider how to formally incorporate the recommendations to be adopted into their policy and procedure structure (Graham, Harrison, Brouwers, Davies, & Dunn, 2002). This initial step paves the way for general acceptance and integration of the guideline into such systems as the quality management process.

New initiatives such as the implementation of a best practice guideline require strong leadership from nurses who are able to transform the evidence-based recommendations into useful tools that will assist in directing practice. In this regard, RNAO (through a panel of nurses, researchers and administrators) has developed the *Toolkit: Implementation of Clinical Practice Guidelines* (2002b) based on available evidence, theoretical perspectives and consensus. The *Toolkit* is recommended for guiding the implementation of the RNAO best practice guideline *Assessment and Management of Stage I to IV Pressure Ulcers*. Refer to Appendix R for a description of the *Toolkit*.

Research Gaps & Future Implications

In reviewing the evidence for the revision of this guideline, it is clear that future research opportunities involve:

- The cost-effectiveness of various management modalities (e.g., support surfaces)
- Cost of preventing pressure ulcers
- Cost of heel ulcers versus prevention boots
- Total cost to health care system to heal pressure ulcers
- Numbers of patients admitted to home care and long-term care with pressure ulcers from acute care settings
- Some of the recommendations in this guideline are based on consensus or expert opinion. Further substantive research is required to validate the expert opinion. Increasing the research can impact knowledge that will lead to improved practice and outcomes for patients with stage I to IV pressure ulcers.

Evaluation & Monitoring

Organizations implementing the recommendations in this nursing best practice guideline are advised to consider how the implementation and its impact will be monitored and evaluated. The following table, based on the framework outlined in the RNAO *Toolkit: Implementation of clinical practice guidelines* (2002c), illustrates some suggested indicators for monitoring and evaluation:

	Structure	Process	Outcome
Objectives	To evaluate the supports available in the organization that allow for nurses to appropriately assess and manage pressure ulcers.	To evaluate changes in practice that lead towards improved assessment and management of pressure ulcers.	To evaluate the impact of implementing the recommendations.
Organization/ Unit	■ Review of best practice guideline recommendations by organizational committee(s) responsible for policies/procedures. ■ Availability of pressure management support surfaces for use by clients identified at risk for pressure ulcer development.	■ Modification to policies/ procedures consistent with the recommendations of the best practice guideline.	■ Presence of a process to monitor incidence/prevalence of pressure ulcers within the practice setting. ■ Decrease in incidence/prevalence of pressure ulcers within the practice setting.
Nurse	■ Availability of educational opportunities re: pressure ulcer assessment and management within organization. ■ Number of nurses attending educational sessions re: pressure ulcer assessment and management. ■ Availability of ongoing support for clinical application of educational content.	■ Percentage of nurses self-reporting: • Adequate assessment of client risk for developing pressure ulcers. • Monitoring the healing process of existing pressure ulcers. • Documenting stage, location and size of existing pressure ulcers. • Need for positioning/ support surfaces for client with, or at risk of, pressure ulcers. • Assessing and documenting the client's experience of pain related to pressure ulcer and its care.	■ Evidence of documentation in client record consistent with the guideline recommendations regarding: • Assessment • Positioning/Support Surfaces • Ulcer Management • Patient Teaching • Referral
Client		■ Client reports pain relief/reduction related to pressure ulcer care. ■ Client reports discharge teaching appropriate to his/her care needs and setting of care.	■ Reduction in wound volume/ area/depth (healing wound). ■ Absence of Stage I pressure ulcers (prevention). ■ Referrals to professionals with expertise in pressure ulcer care as appropriate.
Financial Costs	■ Wound care products and auxiliary supplies. ■ Support surface expenses. ■ Length of stay.	■ Nursing human resource expenditures related to pressure ulcer prevention, assessment and management.	

Implementation Strategies

There are several key strategies organizations can utilize to implement the *Assessment and Management of Stage I to IV Pressure Ulcers* guideline. These strategies are comprised of the following:

- Identification of an individual to lead the project that will dedicate time to implementation of the *Assessment and Management of Stage I to IV Pressure Ulcers* guideline. This nurse will provide support, clinical expertise and leadership to all nurses involved in implementation.
- Utilization of a systematic approach to planning, implementation and evaluation of the guideline initiative. A work plan is helpful to keep track of activities and timelines.
- Provide opportunities for staff to attend interactive, adult-learning programs which incorporate the key recommendation from the guideline.
- Teamwork and collaboration through an interdisciplinary approach is essential.
- Consider establishing an implementation team that includes not only the organization implementing the guideline, but others such as community partners (referral sources) and support groups.
- Leadership and commitment from nurse managers is vital to successful implementation (Clarke et al., 2005).
- "Best Practice" is quickly forgotten unless it becomes part of day-to-day care. This lapse in practice can happen regardless of the organization commitment to change. One way of improving ongoing application of a guideline is to insert information into the bedside documentation. This could include updates to flowsheets, care plans and/or admission/discharge summaries to reflect best practice in the day-to-day events seen in client care. For example, though many organizations use the *Braden Scale for Predicting Pressure Sore Risk* (Bergstrom, Braden, Laguzza, & Homan, 1987), often the client's condition is scored and the nurse moves on to other work without reflecting on the results. Documentation designed to compel a choice and which provides cues to action at the point of assessment, may be more useful (Bauer, Bushey, & Amaro, 2002). Certainly, the advent of electronic documentation has proved useful in this regard. As the nurse enters information electronically, certain fields will not permit the user to go on until such assessment, decisions or actions are documented. Appendix R provides an example of documentation tool to prompt decision making.

In addition to the tips mentioned above, RNAO has published implementation resources that are available on the website. A *Toolkit* for implementing guidelines can be helpful, if used appropriately. It is available for free download at www.rnao.org/bestpractices.

Process for Update/Review of Guideline

The Registered Nurses' Association of Ontario proposes to update the nursing best practice guidelines as follows:

1. Following dissemination, each nursing best practice guideline will be reviewed by a team of specialists (Review Team) in the topic area every three years following the last set of revisions.
2. During the three-year period between development and revision, RNAO Nursing Best Practice Guideline program staff will regularly monitor for new research, systematic reviews and randomized controlled trials.
3. Based on the results of the monitor, program staff may recommend an earlier revision period. Appropriate consultation with a team of members comprising original panel members and other specialists in the field will help inform the decision to review and revise the guideline earlier than the three-year milestone.
4. Three months prior to the three-year review milestone, guideline program staff will commence the planning of the review process as follows:
   a. Invite specialists in the field to participate in the Review Team. The Review Team will be comprised of members from the original panel as well as other recommended specialists.
   b. Compile feedback received, questions encountered during the dissemination phase as well as other comments and experiences of implementation sites.
   c. Compile new clinical practice guidelines in the field, systematic reviews, meta-analysis papers, technical reviews, randomized controlled trial research and other relevant literature.
   d. Develop a detailed work plan with target dates for deliverables.

The revised guideline will undergo dissemination based on established structures and processes.

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Appendix A: Search Strategy for Existing Evidence

The search strategy utilized during the revision of this guideline focused on two key areas. One was the identification of new guidelines published on the topic of assessment and management of stage I to IV pressure ulcers since the original guideline was published in 2002, and the second was to identify systematic reviews, and primary studies published in this area from 2001 to 2006.

STEP 1 – DATABASE Search

A database search for existing evidence related to pressure ulcer prevention was conducted by a university health sciences library. An initial search of the Medline, Embase and CINAHL databases for guidelines and studies published from 2001 to 2006 was conducted in February 2006. This search was structured to answer the following questions:

1. What assessment tools are available to guide treatment options?
2. What effective treatment interventions can nurses implement in practice?
3. What are the contributors to reoccurrence of pressure ulcers?
4. How can nurses accurately confirm the most appropriate and economic treatment options?

STEP 2 – Structured Website Search

One individual searched an established list of websites for content related to the topic area in May 2006. This list of sites, reviewed and updated in May 2006, was compiled based on existing knowledge of evidence-based practice websites, known guideline developers, and recommendations from the literature. Presence or absence of guidelines was noted for each site searched as well as date searched. The websites at times did not house a guideline but directed to another website or source for guideline retrieval. Guidelines were either downloaded if full versions were available or were ordered by phone/email.

- Agency for Healthcare Research and Quality: http://www.ahcpr.gov
- Alberta Medical Association – Clinical Practice Guidelines: http://www.albertadoctors.org
- Bandolier Journal: http://www.jr2.ox.ac.uk/bandolier
- BC Office of Health Technology Assessment: www.chspr.ubc.ca
- British Columbia Council on Clinical Practice Guidelines: http://www.hlth.gov.bc.ca/msp/protoguides/index.html
- Canadian Coordinating Office for Health Technology Assessment: http://www.ccohta.ca
- Canadian Institute of Health Information: http://www.cihi.ca
- Canadian Task Force on Preventive Health Care: http://www.ctfphc.org
- Centers for Disease Control and Prevention: http://www.cdc.gov
- Centre for Evidence-Based Mental Health: http://cebmh.com
- Clinical Evidence: www.clinicalevidence.org

- Clinical Resource Efficiency Support Team (CREST): http://www.crestni.org.uk
- CMA Infobase: Clinical Practice Guidelines: http://mdm.ca/cpgsnew/cpgs/index.asp
- Cochrane Library: Abstracts of Cochrane Reviews: http://www.thecochranelibrary.com
- Database of Abstracts of Reviews of Effectiveness (DARE): http://www.york.ac.uk/inst/crd/crddatabases.htm
- Evidence-based On-Call: http://www.eboncall.org
- Evidence Based Nursing: http://evidencebasednursing.com
- Guidelines Advisory Committee: http://gacguidelines.ca
- Guidelines International Network: http://www.g-i-n.net
- Institute for Clinical Systems Improvement: http://www.icsi.org/index.asp
- Joanna Briggs Institute: http://www.joannabriggs.edu.au
- Medic8.com: http://www.medic8.com/ClinicalGuidelines.htm
- National Guideline Clearinghouse: http://www.guidelines.gov
- National Library for Health: http://www.nelh.nhs.uk/
- New Zealand Guidelines Group: http://www.nzgg.org.nz
- PEDro: The Physiotherapy Evidence Database: http://www.pedro.fhs.usyd.edu.au/index.html
- Sarah Cole Hirsh Institute – Online Journal of Issues in Nursing: http://www.nursingworld.org/ojin/hirsh/hirshtoc,htm
- Scottish Intercollegiate Guidelines Network: http://www.sign.ac.uk
- TRIP Database: http://www.tripdatabase.com
- University of California, San Francisco: http://medicine.ucsf.edu/resources/guidelines/index.html

STEP 3 – Search Engine Web Search

A website search for existing practice guidelines on pressure ulcer risk assessment and prevention was conducted via the search engine "Google", using key search terms. One individual conducted this search, noting the results of the search, the websites reviewed, date and a summary of the results. The search results were further reviewed by a second individual who identified guidelines and literature not previously retrieved.

STEP 4 – Hand Search/Panel Contributions

Additionally, panel members were asked to review personal archives to identify guidelines not previously found through the above search strategy. Results of this strategy revealed no additional clinical practice guidelines.

STEP 5 – Core Screening Criteria

The final step in determining whether the clinical practice guideline would be critically appraised was to screen the guidelines based on the following criteria:

- Published in English
- Developed in 2001 or later
- Guideline is evidence based
- Strictly on the scope of the original guideline
- Available and accessible for retrieval

SEARCH RESULTS:

The search strategy described above resulted in the retrieval of 550 abstracts on the topic of pressure ulcers. These abstracts were then screened by a research assistant in order to identify duplications and assess for inclusion/exclusion criteria. A total of 59 abstracts were identified for article retrieval and quality appraisal.

In addition, three recently published clinical practice guidelines were identified for review and critical appraisal by the panel, using the *Appraisal of Guidelines for Research and Evaluation* (AGREE Collaboration, 2001) instrument. These critically appraised guidelines are listed below:

Singapore Ministry of Health. (2001). *Nursing management of pressure ulcers in adults.* Singapore: Singapore Ministry of Health.

Folkedahl, B. A., & Frantz, R. (2002). *Treatment of pressure ulcers.* Iowa City, IA: The University of Iowa College of Nursing Gerontological Nursing Interventions Research Center, Research Translation and Dissemination Core.

Wound, Ostomy, and Continence Nurses Society (WOCN). (2003). *Guideline for prevention and management of pressure ulcers.* Glenview, IL: Wound, Ostomy, and Continence Nurses Society.

Appendix B: Glossary of Clinical Terms

Abscess: A circumscribed collection of pus that forms in tissue as a result of acute or chronic localized infection. It is associated with tissue destruction and frequently swelling (AHCPR, 1994).

Analgesia: Relief of pain without loss of consciousness (AHCPR, 1994).

Antimicrobial: An agent that inhibits the growth of microbes (AHCPR, 1994).

Antiseptic (Topical): Product with antimicrobial activity designed for use on skin or other superficial tissues; may damage cells (AHCPR, 1994).

Anthropometric: Evaluation of nutritional status. Areas include weight, mid-arm muscle circumference, skin fold measures and head circumference.

Bacteremia: The presence of viable bacteria in the circulating blood (AHCPR, 1994).

Body Substance Isolation (BSI): A system of infection-control procedures routinely bused with all patients to prevent cross-contamination of pathogens. The system emphasizes the use of barrier precautions to isolate potentially infectious body substances (AHCPR, 1994).

Bottoming Out: Expression used to describe inadequate support from a mattress overlay or seat cushion as determined by a "hand check". To perform a hand check, the caregiver places an outstretched hand (palm up) under the overlay or cushion below the pressure ulcer or that part of the body at risk for a pressure ulcer. If the caregiver feels less than an inch of support material, the patient has bottomed out and the support surface is therefore inadequate (AHCPR, 1994).

Cell migration: Movement of cells in the repair process.

Cellulitis: Inflammation of cellular or connective tissue. Inflammation may be diminished or absent in immunosuppressed individuals (AHCPR, 1994).

Culture (Bacterial): Removal of bacteria from the wound for the purpose of placing them in a growth medium in the laboratory to propagate to the point where they can be identified and tested for sensitivity to various antibiotics. Swab cultures are generally inadequate for this purpose (AHCPR, 1994).

Culture (Swab): Techniques involving the use of a swab to remove bacteria from a wound and place them in a growth medium for propagation and identification. Swab cultures obtained from the surface of a pressure ulcer are usually positive because of surface colonization and should not be used to diagnose ulcer infection (AHCPR, 1994).

Dead Space: A cavity remaining in a wound (AHCPR, 1994).

Debridement: Removal of devitalized tissue and foreign matter from a wound. Various methods can be used for this purpose:

Autolytic Debridement: The use of synthetic dressings to cover a wound and allow eschar to self-disgest by the action of enzymes present in wound fluids (AHCPR, 1994).

Biological Debridement: The use of sterile larvae of *Lucilia seicata* (greenbottle fly) to remove non-viable tissue from the wound bed (Sibbald, Orsted et al., 2006).

Enzymatic (Chemical) Debridement: The topical application of proteolytic substances (enzymes) to breakdown devitalized tissue (AHCPR, 1994).

Mechanical Debridement: Removal of foreign material and devitalized or contaminated tissue from a wound by physical forces rather than by chemical (enzymatic) or natural (autolytic) forces. Examples are wet-to-dry dressings, wound irrigations, and whirlpool (AHCPR, 1994).

Sharp Debridement: Removal of foreign material or devitalized tissue by a sharp instrument such as a scalpel. Laser debridement is also considered a type of sharp debridement (AHCPR, 1994).

Dehiscence: Separation of the layers of a surgical wound (AHCPR, 1994).

Deterioration: Negative course. Failure of the pressure ulcer to heal, as shown by wound enlargement that is not brought about by debridement (AHCPR, 1994).

Disinfection: A process that eliminates many or all pathogenic microorganisms on inanimate objects, with the exception of bacterial spores. Disinfection of pressure ulcers is neither desirable nor feasible (AHCPR, 1994).

Donut-Type Device: A rigid, ring-shaped device created to relieve pressure on the sitting surface. This device is not recommended, because even though pressure is relieved in the tissue over the centre of the ring, pressure in tissue resting on the ring causes vascular congestion and may impede circulation to the tissues (AHCPR, 1994).

Dynamic Devices: Outdated term traditionally used to refer to devices that change support characteristics in a cyclical fashion (AHCPR, 1994)

Electrical Stimulation: The use of an electrical current to transfer energy to a wound. The type of electricity that is transferred is controlled by the electrical source (AHCPR, 1994).

Epithelial Tissue: Outer-most layer of skin, which is avascular and has 5 layers which is constantly being renewed every 45-75 days.

Epithelialization: The stage of tissue healing in which epithelial cells migrate (move) across the surface of a wound. During this stage of healing, the epithelium appears the colour of "ground glass" to pink (AHCPR, 1994).

Erythema: Redness of the skin.

Blanchable Erythema: Reddened area that temporarily turns white or pale when pressure is applied with a fingertip. Blanchable erythema over a pressure site is usually due to a normal reactive hyperemic response (AHCPR, 1994).

Nonblanchable Erythema: Redness that persists when fingertip pressure is applied. Nonblanchable erythema over a pressure site is a symptom of a Stage I pressure ulcer (AHCPR, 1994).

Eschar: Thick, hard, black, leathery, necrotic, devitalized tissue (AHCPR, 1994).

Fascia: A sheet or band of fibrous tissue that lies deep below the skin or encloses muscles and various organs of the body (AHCPR, 1994).

Fluctuance: Wavelike motion, indicative of the presence of fluid, used to describe the appearance of wound tissue (AHCPR, 1994).

Friction: Mechanical force exerted when skin is dragged across a coarse surface such as bed linens (AHCPR, 1994).

Full Thickness Tissue Loss: The absence of epidermis and dermis (AHCPR, 1994).

Granulation Tissue: The pink/red, moist tissue that contains new blood vessels, collagen, fibroblasts, and inflammatory cells, which fills an open, previously deep wound when it starts to heal (AHCPR, 1994).

Growth Factors: Proteins that affect the proliferation, movement, maturation, and biosynthetic activity of cells. For the purposes of this guideline, these are proteins that can be produced by living cells (AHCPR, 1994).

Healing: A dynamic process in which anatomical and functional integrity is restored. This process can be monitored and measured. For wounds of the skin, it involves repair of the dermis (granulation tissue formation) and epidermis (epithelialization). Healed wounds represent a spectrum of repair: they can be ideally healed (tissue regeneration), minimally healed (temporary return of anatomical continuity), or acceptably healed (sustained functional and anatomical result). The acceptably healed wound is the ultimate outcome of wound healing but not necessarily the appropriate outcome for all patients (AHCPR, 1994).

Primary Intention Healing: Closure and healing of wound edges using sutures, staples, steristrips or skingrafts.

Secondary Intention Healing: Closure and healing of a wound by the formation of granulation tissue and epithelization.

Hydrotherapy: Use of whirlpool or submersion in water for wound cleansing (AHCPR, 1994).

Incidence of pressure ulcers: The new cases appearing during a specified period in the "at risk" population identified in the prevalence survey. For instance, a surgical nursing unit that had admitted 100 patients over a month and showed documentation of 10 ulcers would have an incidence rate of 10%. The rate is generally calculated by case with a new occurrence (10) over all the cases (100) present during a specified time period (one month). Definition for quality improvement purposes may take into account all new occurrences even if it is a multiple occurrence during the time-frame for an individual. For example, if 5 of the 10 cases on the surgical unit had two ulcers during the one-month period the incidence rate would be 15%. It is important to make the formula you are using explicit.

Induration: Engorgement of tissues, evidenced as a hard, elevated area of inflammation.

Infection: Refer to Microbiologic States of the Wound.

Inflammatory Response: A localized protective response elicited by injury or destruction of tissues that serves to destroy, dilute, or wall off both the injurious agent and the injured tissue. Clinical signs include pain, heat, redness, swelling and loss of function. Inflammation may be diminished or absent in immunosuppressed patients (AHCPR, 1994).

Interdisciplinary: A process where health care professionals representing expertise from various health care disciplines participate in a prevention-based program standardizing and practicing pressure ulcer management.

Irrigation: Cleansing by a stream of fluid, preferably saline (AHCPR, 1994).

Ischemia: Deficiency of blood supply to a tissue, often leading to tissue necrosis (AHCPR, 1994).

Ischemic Pain Reflex: A protective response to tell the body to move when the body is sitting or lying in one position for a prolonged period of time. Diminished blood flow to the area results in tissue hypoxia and build up of toxic metabolic waste that produces a warning signal of pain. The body must reposition itself or be repositioned with assistance. If this does not happen, tissue damage is inevitable.

Low air loss: A series of interconnected woven fabric air pillows that allow some air to escape through the support surface. The pillows can be variably inflated to adjust the level of pressure relief (AHCPR, 1994).

Maceration: Softening of tissue by soaking in fluids. In this context, it refers to degenerative changes and disintegration of skin when it has been kept too moist (AHCPR, 1994).

Malnutrition: State of nutritional insufficiency due to either inadequate dietary intake or defective assimilation or utilization of food ingested (AHCPR, 1994).

Mechanical Loading: The contribution of mechanical forces e.g., pressure, friction and shear to the development of pressure ulcers (AHCPR, 1994).

Microbiologic States of the Wound:

Contamination: The presence of bacteria in the wound surface (Sibbald, Orsted et al., 2006).

Colonization: The presence of replicating bacteria attached to the wound tissue, but not causing injury to the host (Sibbald, Orsted et al., 2006).

Critical colonization: When bacteria delay or stop wound healing without the presence of classical symptoms and signs of infection (pain, erythema, edema, etc.). Clinical signs and symptoms of critical colonization include: non-healing, bright red granulation tissue, friable and exuberant granulation, new areas of breakdown or necrosis on the wound surface, increased exudate and foul odour (Sibbald, Orsted et al., 2006).

Infection: The presence of bacteria or other microorganisms in sufficient quantity to damage tissue or impair healing. Clinical experience has indicated that wounds can be classified as infected when the wound tissue contains 10^5 or greater microorganisms per gram of tissue. Clinical signs of infection may not be present, especially in the immunocompromised patient or the patient with a chronic wound (AHCPR, 1994).

Local Clinical Infection: A clinical infection that is confined to the wound and within a few millimeters of its margins.

Systemic Clinical Infection: A clinical infection that extends beyond the margins of the wound. Some systemic infectious complications of pressure ulcers include cellulitis, advancing cellulitis, osteomyelitis, meningitis, endocarditis, septic arthritis, bacteremia and sepsis (AHCPR, 1994).

Moisture: In the context of this document, moisture refers to skin moisture that may increase the risk of pressure ulcer development and impair healing of existing ulcers. Primary sources of skin moisture include perspiration, urine, feces, drainage from wounds or fistulas (AHCPR, 1994).

Necrosis/Necrotic Tissue: Describes devitalized (dead) tissue (e.g., eschar and slough).

Partial Thickness: Loss of epidermis and possible partial loss of dermis.

Polypharmacy: The administration of many drugs concurrently, usually meaning that a patient is receiving an excessive number of medications. Polypharmacy may negatively affect adherence to the pressure ulcer treatment plan (AHCPR, 1994).

Pressure (Interface): Force per unit area that acts perpendicularly between the body and the support surface. This parameter is affected by stiffness of the support surface, the composition of the body tissue, and the geometry of the body being supported (AHCPR, 1994).

Pressure Redistribution: The ability of a support surface to distribute load over the contact areas of the human body (NPUAP, 2006). The goal of this approach is to create an even interface pressure over the entire contact area, to reduce the overall pressure and avoid areas of focal pressure. In the past, the terms *pressure reduction* and *pressure relief* have been used to describe this approach.

Pressure reduction: Outdated term traditionally used to describe the reduction of interface pressure between the body surface and the resting surface but does not consistently maintain pressure below capillary closing pressure (AHCPR, 1994; Mulder, Fairchild, & Jeter, 1995).

Pressure relief: Outdated term traditionally used to describe the consistent reduction of interface pressure between the body surface and resting surface below capillary closing pressure (AHCPR, 1994; Mulder, Fairchild, & Jeter, 1995).

Pressure Redistribution Surface: Any support surface (cushion or mattress) designed to create an even interface pressure over the entire contact area, to reduce the overall pressure and avoid areas of focal pressure. In the past, the terms *pressure reducing surface* and *pressure relieving surface* have been used to describe these surfaces.

Pressure reducing surface: Outdated term traditionally used to describe a surface that lowers pressure as compared to a standard hospital mattress or chair surface but does not consistently reduce pressure to less than capillary closing pressure (WOCN, 1987).

Pressure relieving surface: Outdated term traditionally used to describe a surface that consistently reduces pressure below capillary closing pressure (WOCN, 1987).

Prevalence of pressure ulcers: A cross-sectional count of the number of cases at a specific point in time. The rate includes all old and new cases during the defined prevalence period (e.g., 12 hours). The formula for prevalence is based on one ulcer per case, thus the highest stage of ulcer is counted on those with multiple ulcers. The results are expressed as a percentage of the total number of clients assessed.

Prevalence Study: A prevalence study is defined as the number of cases of a disease in a population at a given point in time. This survey represents a 'snapshot' of the pressure ulcer population. It measures the presence or existence of pressure ulcers (admitted and hospital acquired) on the day of the survey with the population that is currently being managed by an organization.

PSI (pounds per square inch): A unit of pressure measurement. In this case, it is a measure of the pressure exerted by a stream of fluid against one square inch of skin and wound surface. PSI (greater than) 15 is injurious to tissue (AHCPR, 1994).

Purulent Discharge/Drainage: A product of inflammation that contains pus – e.g., cells (leukocytes, bacteria) and liquefied necrotic debris (AHCPR, 1994).

Recalcitrant: A recalcitrant wound is a chronic wound which has failed to respond to optimal standard wound care (Houghton & Campbell, 2001).

Repositioning: Any change in body position that relieves pressure from tissue overlaying bony prominences. Periodic repositioning of chair-bound and bedfast individuals is one of the most basic and frequently used methods of redistributing pressure. The overall goal of repositioning is to allow tissue reperfusion and thus prevent ischemic tissue changes. The term "repositioning" implies a sustained redistribution of pressure, not just a temporary shift. Specific repositioning techniques and the frequency of repositioning should be individualized according to the patient's level of risk and the goals of care (AHCPR, 1994).

Sepsis: The presence of various pus-forming and other pathogenic organisms or their toxins, in the blood or tissues. Clinical signs of blood-borne sepsis include fever, tachycardia, hypotension, leukocytosis and a deterioration in mental status. The same organism is often isolated in both the blood and the pressure ulcer (AHCPR, 1994).

Shear: Mechanical force that acts on a unit area of skin in a direction parallel to the body's surface. Shear is affected by the amount of pressure exerted, the coefficient of friction between the materials contacting each other (i.e. how easily one surface slides over another), and the extent to which the body makes contact with the support surface (AHCPR, 1994).

Sinus Tract: A cavity or channel underlying a wound that involves an area larger than the visible surface of the wound (AHCPR, 1994). It is a pathway that can extend in any direction from the wound surface, which results in dead space with potential for abscess formation.

Skin Equivalent: A material used to cover open tissue that acts as a substitute for nascent (beginning) dermis and epidermis and that has at least some of the characteristics of human skin (e.g., amniotic tissue, xenografts, human allografts). For the purpose of this guideline, only tissue with viable, biologically active cells is given this designation (AHCPR, 1994).

Slough: Necrotic (dead) tissue in the process of separating from viable portions of the body (AHCPR, 1994). It is seen as the accumulation of dead cellular debris on the wound surface, and tends to be yellow in colour due to the large amounts of leukocytes present. However, yellow tissue is not always indicative of slough but may be subcutaneous tissue, tendon or bone instead.

Standard Mattress: A non-pressure reducing institutional mattress usually constructed of cold foam with 10-20% of the body being supported (Defloor et al., 2005).

Static Devices: Outdated term traditionally used to refer to surfaces which remain motionless except in response to body movement and seek to redistribute the body weight by shifting the extra weight or load from areas with bony prominences to areas under low pressure (Holzapfel, 1993).

Support Surface: A specialized device for pressure redistribution designed for management of tissue loads, micro-climate, and/or other therapeutic functions (i.e., any mattresses, integrated bed system, mattress replacement, overlay, or seat cushion, or seat cushion overlay) (NPUAP, 2006).

Components of Support Surfaces (NPUAP, 2006) – can be used alone or in combination:

Cell/Bladder: A means of encapsulating a support medium.

Viscoelastic Foam: A type of porous polymer material that conforms in proportion to the applied weight. The air exits and enters the foam cell slowly which allows the material to respond slower than a standard elastic foam (memory foam).

Elastic Foam: A type of porous polymer material that conforms in proportion to the applied weight. Air enters and exits the foam cells more rapidly, due to greater density (non-memory).

Closed Cell Foam: A non-permeable structure in which there is a barrier between cells, preventing gases or liquids from passing through the foam.

Open Cell Foam: A permeable structure in which there is no barrier between cells, allowing gases or liquids to pass through the foam.

Gel: A semisolid system consisting of a network of solid aggregates, colloidal dispersions or polymers which may exhibit elastic properties (can range from a hard gel to a soft gel).

Pad: A cushion-like mass of soft material used for comfort, protection or positioning.

Viscous Fluid: A fluid with relatively high resistance to flow of the fluid.

Elastomer: Any material that can be repeatedly stretched to at least twice its original length: upon release, the stretch will return to approximately its original length.

Features of Support Surfaces (NPUAP, 2006):

Air-Fluidized: A feature of a support surface that provides pressure redistribution via a fluid-like medium created by forcing air through beads as characterized by immersion and envelopment.

Alternating Pressure: A feature of a support surface that provides pressure redistribution via cyclic changes in loading and unloading as characterized by frequency, duration, amplitude, and rate of change parameters.

Lateral Rotation: A feature of a support surface that provides rotation about a longitudinal axis as characterized by degree of patient turn, duration, and frequency.

Zone: A segment with a single pressure redistribution capability.

Multi-Zoned: A surface in which different segments can have different pressure redistribution capabilities.

Categories of Support Surfaces (NPUAP, 2006):

Reactive Support Surface: A powered or non-powered support surface with the capability to change its load distribution properties only in response to applied load.

Active Support Surface: A powered support surface with the capability to change its load distribution properties with or without the applied load.

Integrated Bed System: A bed frame and support surface that are combined into a single unit whereby the surface is unable to function separately.

Non-Powered: Any support surface not requiring or using external sources of energy for operation (Energy = D/C or A/C).

Powered: Any support surface requiring or using external sources of energy to operate (Energy = D/C or A/C).

Overlay: An additional support surface designed to be placed directly on top of an existing surface.

Mattress Replacement: A support surface designed to be placed directly on the existing bed frame.

Surfactants: A surface-active agent that reduces the surface tension of fluids to allow greater penetration (AHCPR, 1994).

Tissue Biopsy: Use of a sharp instrument to obtain a sample of skin, muscle, or bone (AHCPR, 1994).

Needle Aspiration Biopsy: The removal of tissue using a needle.

Punch Biopsy: The removal of a small piece of tissue with a hollow round cutting tool.

Tissue Load: The distribution of pressure, friction and shear on tissue (AHCPR, 1994).

Topical Antibiotic: A drug known to inhibit or kill microorganisms that can be applied locally to a tissue surface (AHCPR, 1994).

Topical Antiseptic: Product with antimicrobial activity designed for use on skin or other superficial tissues; may damage some cells (AHCPR, 1994).

Trochanter: Bony prominence on the upper part of the femur.

Tunneling: A passageway under the surface of the skin that is generally open at the skin level; however, most of the tunneling is not visible (AHCPR, 1994).

Underlying Tissue: Tissue that lies beneath the surface of the skin such as fatty tissue, supporting structures, muscle, and bone (AHCPR, 1994).

Undermining: A closed passageway under the surface of the skin that is open only at the skin surface. Generally it appears as an area of skin ulceration at the margins of the ulcer with skin overlaying the area. Undermining often develops from shearing forces (AHCPR, 1994).

Appendix C: Braden Scale for Predicting Pressure Sore Risk

Patient's Name _____ Evaluator's Name _____

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 consciousness 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 sensor impairment that limits the ability to feel pain or discomfort over 1/2 of body.
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.
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.
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.
NUTRITION usual food intake pattern	1. **Very Poor** Never eats a complete meal. Rarely eats more than 1/3 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 IVs for more than 5 days.	2. **Probably Inadequate** Rarely eats a complete meal and generally eats only about 1/2 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.
FRICTION AND 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 lead to almost constant friction.	2. **Potential Problems** 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.

Note: Individuals with a score of 18 or less are considered to be at risk of developing pressure ulcers. At risk – 15 to 18; Moderate Risk – 13 to 14; High Risk – 10 to 12; Very High Risk – 9 or below.

Braden, 2001

			Date of Assessment			
	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.				
	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.				
	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 the room at least twice a day and inside room at least every 2 hours during waking hours.				
	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.				
	3. **Adequate** Eats over half of most meals. Eats a total of 4 servings of protein (meat or dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement if offered, *OR* is on a tube feeding or TPN regimen, which 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.				
	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			

Appendix D: Nutritional Screening Tool

Source: Nestlé Clinical Services, 2002. Reprinted with permission.

NESTLÉ NUTRITION SERVICES

Nestlé

Mini Nutritional Assessment
MNA®

Last name: First name: Sex: Date:

Age: Weight, kg: Height, cm: I.D. Number:

Complete the screen by filling in the boxes with the appropriate numbers.
Add the numbers for the screen. If score is 11 or less, continue with the assessment to gain a Malnutrition Indicator Score.

Screening

A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?
0 = severe loss of appetite
1 = moderate loss of appetite
2 = no loss of appetite ☐

B Weight loss during the last 3 months
0 = weight loss greater than 3 kg (6.6 lbs)
1 = does not know
2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)
3 = no weight loss ☐

C Mobility
0 = bed or chair bound
1 = able to get out of bed/chair but does not go out
2 = goes out ☐

D Has suffered psychological stress or acute disease in the past 3 months
0 = yes 2 = no ☐

E Neuropsychological problems
0 = severe dementia or depression
1 = mild dementia
2 = no psychological problems ☐

F Body Mass Index (BMI) (weight in kg) / (height in m)²
0 = BMI less than 19
1 = BMI 19 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater ☐

Screening score (subtotal max. 14 points) ☐☐
12 points or greater Normal – not at risk – no need to complete assessment
11 points or below Possible malnutrition – continue assessment

Assessment

G Lives independently (not in a nursing home or hospital)
0 = no 1 = yes ☐

H Takes more than 3 prescription drugs per day
0 = yes 1 = no ☐

I Pressure sores or skin ulcers
0 = yes 1 = no ☐

J How many full meals does the patient eat daily?
0 = 1 meal
1 = 2 meals
2 = 3 meals ☐

K Selected consumption markers for protein intake
- At least one serving of dairy products (milk, cheese, yogurt) per day? yes ☐ no ☐
- Two or more servings of legumes or eggs per week? yes ☐ no ☐
- Meat, fish or poultry every day yes ☐ no ☐

0.0 = if 0 or 1 yes
0.5 = if 2 yes
1.0 = if 3 yes ☐.☐

L Consumes two or more servings of fruits or vegetables per day?
0 = no 1 = yes ☐

M How much fluid (water, juice, coffee, tea, milk…) is consumed per day?
0.0 = less than 3 cups
0.5 = 3 to 5 cups
1.0 = more than 5 cups ☐.☐

N Mode of feeding
0 = unable to eat without assistance
1 = self-fed with some difficulty
2 = self-fed without any problem ☐

O Self view of nutritional status
0 = views self as being malnourished
1 = is uncertain of nutritional state
2 = views self as having no nutritional problem ☐

P In comparison with other people of the same age, how does the patient consider his/her health status?
0.0 = not as good
0.5 = does not know
1.0 = as good
2.0 = better ☐.☐

Q Mid-arm circumference (MAC) in cm
0.0 = MAC less than 21
0.5 = MAC 21 to 22
1.0 = MAC 22 or greater ☐.☐

R Calf circumference (CC) in cm
0 = CC less than 31 1 = CC 31 or greater ☐

Assessment (max. 16 points) ☐☐.☐
Screening score ☐☐
Total Assessment (max. 30 points) ☐☐.☐

Malnutrition Indicator Score
17 to 23.5 points at risk of malnutrition ☐
Less than 17 points malnourished ☐

Ref.: Guigoz Y, Vellas B and Garry PJ. 1994. Mini Nutritional Assessment: A practical assessment tool for grading the nutritional state of elderly patients. *Facts and Research in Gerontology.* Supplement #2:15-59.
Rubenstein LZ, Harker J, Guigoz Y and Vellas B. Comprehensive Geriatric Assessment (CGA) and the MNA: An Overview of CGA, Nutritional Assessment, and Development of a Shortened Version of the MNA. In: "Mini Nutritional Assessment (MNA): Research and Practice in the Elderly". Vellas B, Garry PJ and Guigoz Y , editors. Nestlé Nutrition Workshop Series. Clinical & Performance Programme, vol. 1. Karger, Bâle, in press.

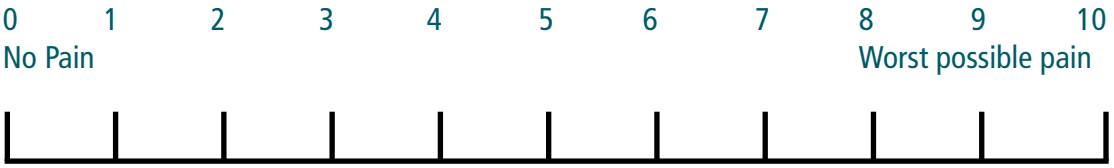
Appendix E: Tools for Assessment of Pain

The following tools, the Visual Analogue Scale (VAS), the Numeric Rating Scale (NRS), the Verbal Rating Scale (VRS), the Facial Grimace & Behaviour Checklist Flow Charts and the McGill Pain Questionnaire are provided as examples of validated tools that can be used by nurses for assessing pain.

Visual Analogue Scale (VAS)

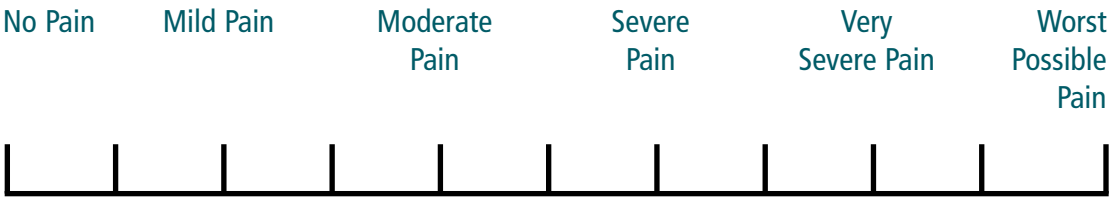
The client indicates intensity of pain on a 10 cm. line marked from "no pain" at one end to "pain as bad as it could possibly be" at the other end.

Numeric Rating Scale (NRS)



The client rates pain on a scale from 0 to 10.

Verbal Rating Scale (VRS)



The client rates the pain on a Likert scale verbally, e.g., "none", "mild pain", "moderate pain", "severe pain", "very severe pain" or "worst possible pain".

Facial Grimace & Behaviour Checklist Flow Charts

Name: _____ Active ❑ Resting ❑ Time: _____

0 no pain | 2 mild | 4 discomforting | 6 distressing | 8 horrible | 10 excruciating

Regular pain medication: _____ Rescue/PRN medication _____

Month:

Date or Time														
FACIAL SCORE														
10														
8														
6														
4														
2														
0														
PRN medication														

Facial Grimace Score: The facial grimace scale scores the level of pain (from 0-10 on the left) as assessed by the caregiver observing the facial expressions of the resident. Assessment is done once daily or more (14 days are indicated above). This assessment of the degree of discomfort should be done at the same time every day and during the same level of activity. **Note if rescue/PRN medication is given; yes (y), no (n) or dose.**

Behaviour Checklist

10 – always 8 – mostly 6 – often 4 – occasionally 2 – rarely 0 – never

Date or Time														
BEHAVIOUR														
eats poorly														
tense														
quiet														
indicates pain														
calls out														
paces														
noisy breathing														
sleeps poorly														
picks														
PRN medication														

Behaviour Checklist: Behaviour changes can be used to assess pain or distress, and thereby evaluate the efficacy of interventions. At the top of the scoring graph, when the specific behaviour has been observed, it can be rated from 10 (always) to 0 (never). The behaviours being rated and scored over 24 hours are listed down the left column. This chart scores 9 different behaviours over 14 days. The caregiver can expand on the checklist, i.e., rocking, screams, etc. **Note if rescue/PRN medication given. Both tools may be adapted for individual use.**

McGill Pain Questionnaire

Source: Melzack (1975). Reprinted with permission.

McGILL PAIN QUESTIONNAIRE

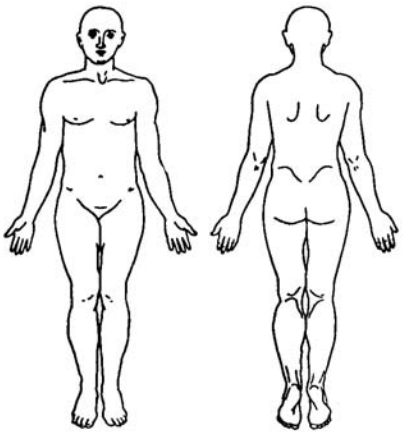
RONALD MELZACK

Patient's Name _____ Date _____ Time _____ am/pm

PRI: S _____ (1–10) A _____ (11–15) E _____ (16) M _____ (17–20) PRI(T) _____ (1–20) PPI _____

1 FLICKERING QUIVERING PULSING THROBBING BEATING POUNDING	11 TIRING EXHAUSTING	
2 JUMPING FLASHING SHOOTING	12 SICKENING SUFFOCATING	
3 PRICKING BORING DRILLING STABBING LANCINATING	13 FEARFUL FRIGHTFUL TERRIFYING	
4 SHARP CUTTING LACERATING	14 PUNISHING GRUELLING CRUEL VICIOUS KILLING	
5 PINCHING PRESSING GNAWING CRAMPING CRUSHING	15 WRETCHED BLINDING	
6 TUGGING PULLING WRENCHING	16 ANNOYING TROUBLESOME MISERABLE INTENSE UNBEARABLE	
7 HOT BURNING SCALDING SEARING	17 SPREADING RADIATING PENETRATING PIERCING	
8 TINGLING ITCHY SMARTING STINGING	18 TIGHT NUMB DRAWING SQUEEZING TEARING	
9 DULL SORE HURTING ACHING HEAVY	19 COOL COLD FREEZING	
10 TENDER TAUT RASPING SPLITTING	20 NAGGING NAUSEATING AGONIZING DREADFUL TORTURING	
	PPI 0 NO PAIN 1 MILD 2 DISCOMFORTING 3 DISTRESSING 4 HORRIBLE 5 EXCRUCIATING	

BRIEF MOMENTARY TRANSIENT	RHYTHMIC PERIODIC INTERMITTENT	CONTINUOUS STEADY CONSTANT



E = EXTERNAL
I = INTERNAL

COMMENTS:

© R. Melzack, 1975

Appendix F: Support Surface Considerations

Compiled by L. Norton (2006)

When choosing a support surface for a client, the clinician should consider not only its pressure management characteristics but also:

- The impact on the client (comfort, bed mobility, transfers, functional activities such as dressing in bed, etc.)
- The impact on the caregiver (skill required to properly set up and maintain the device, impact on caregiver burden)
- The environment (Where will the surface be used? Is it compatible with the bed or space within the room?)
- The product (fail safety, need for a power supply, need for specialized linens, etc.)

Category	Clinical considerations in addition to interface pressure
Standard (hospital bed or client's regular bed at home)	■ Client does not have to accommodate to a new surface ■ No additional costs incurred
Foam Overlay (4 inch egg-crate or convoluted foam)	■ May require frequent replacement (who will do this and when?) ■ Deteriorates when exposed to moisture ■ Can be warm
Foam Mattress (replaces the standard hospital mattress)	■ Can often be adapted with foam or gel in high risk areas ■ May be less expensive than active support surfaces ■ Generally do not impact transfers or bed mobility
Static Flotation (air cells, gel, fluid overlays/mattresses)	■ May be less expensive than active support surfaces ■ May require less maintenance (gel, fluid) ■ Air mattresses/overlays may require some maintenance
Alternating Air (large air bolsters alternately over-inflate and under-inflate in sequence)	■ Noise of the pump and movement of the mattress may be disturbing ■ Can decrease bed mobility and make transfers more difficult
Low Air Loss (air constantly escapes through the bladders, reducing surface tension)	■ Noise of the pump and movement of the mattress may be disturbing ■ Can decrease bed mobility and make transfers more difficult ■ Low air loss mattresses may be better able to manage excessive moisture, but the client's fluid balance should be monitored
Turning/Rotation (assists the client to change position)	■ Motion of the bed can disrupt sleep ■ Client may not be well positioned after the turn related to position on surface, contractures, etc. ■ Noise, ease of transfers and bed mobility remain issues ■ Client may find the gradual turning on the mattress more comfortable and less disruptive that being turned by caregivers
Air Fluidized (client is "floating" in silicone beads)	■ Client is unable to transfer/decreased independence with bed mobility ■ Care is more difficult ■ Usually requires a hospital admission

Appendix G: Positioning and Support Surfaces – A Checklist

When considering the impact of pressure, shear and friction on the client, review the following while planning care.

Don't forget to:

- Avoid positioning patients on a pressure ulcer. *(Level of Evidence = IV)*
- Avoid positioning immobile patients directly on their trochanters and use devices such as pillows and foam wedges to position a pressure ulcer off the support surface. *(Level of Evidence = IV)*
- Avoid positioning immobile patients with pressure directly on their heels and use devices such as pillows and foam wedges to position a pressure ulcer off the support surface, while avoiding pressure on the Achilles' tendon. *(Level of Evidence = IV)*
- Use positioning devices such as pillows or foam to prevent direct contact between bony prominence (such as knees or ankles). *(Level of Evidence = IV)*
- Avoid using donut-type devices. *(Level of Evidence = IV)*
- Maintain the head of the bed at the lowest degree of elevation consistent with medical conditions and other restrictions. Limit the amount of time the head of the bed is elevated. *(Level of Evidence = IV)*
- Establish a written repositioning schedule. *(Level of Evidence = IV)*
- Individuals who are able should be taught to shift their weight every 15 minutes (e.g., by leaning forward). Reposition the sitting individual so the points under pressure are shifted at least every hour. Consider the use of a wheelchair with a tilt mechanism. *(Level of Evidence = IV)*

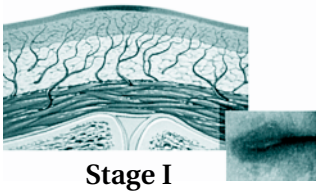
Appendix H: Staging of Wounds

Stages of Pressure Ulcers

(NPUAP, 2007)

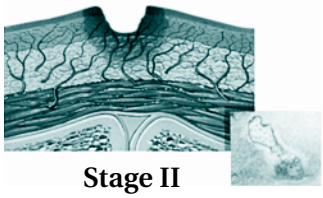
Suspected Deep Tissue Injury: Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue. Deep tissue injury may be difficult to detect in individuals with dark skin tones.

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.



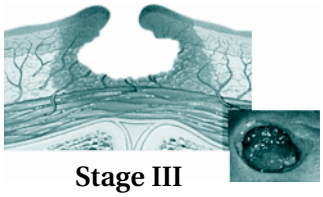
Stage I

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.



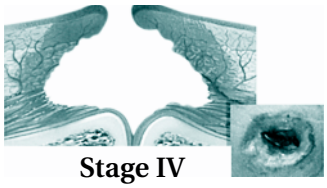
Stage II

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.



Stage III

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 includes undermining and tunneling.



Stage IV

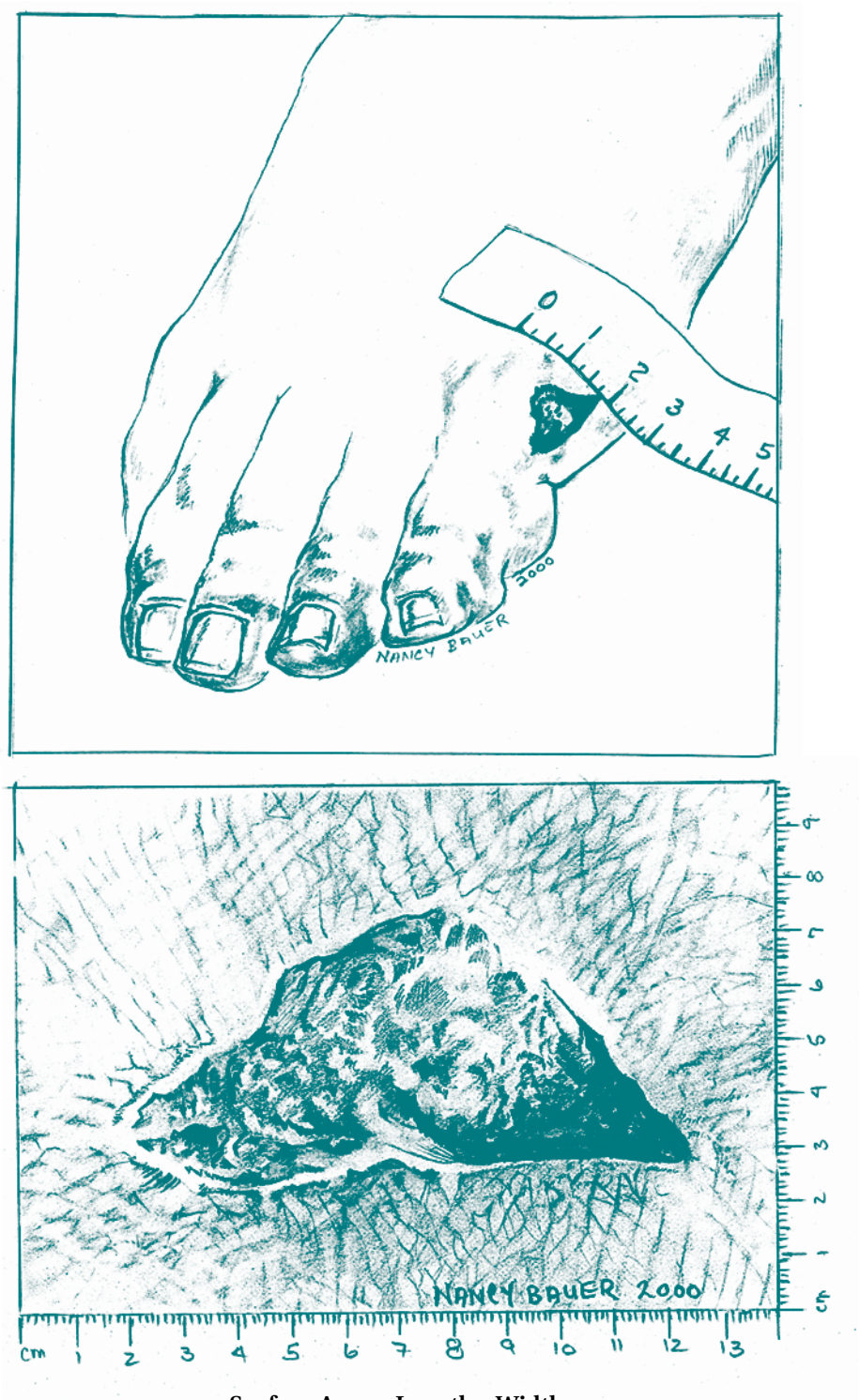
Unstageable: Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed.

It is recommended that reverse staging of pressure ulcers NOT be used to describe the healing process of a wound as this does not accurately reflect what is physiologically occurring in the ulcer (NPUAP, 2000). Please also refer to definition of **Reverse Staging of Pressure Ulcers**. Descriptive characteristics or a validated tool for measuring pressure ulcer healing, such as the PUSH tool, can be used to describe healing (NPUAP, 2000; Thomas et al., 1997).

Pictures courtesy of KCI Medical Canada, Inc.

Appendix I: Wound Measurement

Illustrated by N. Bauer. Published with permission.



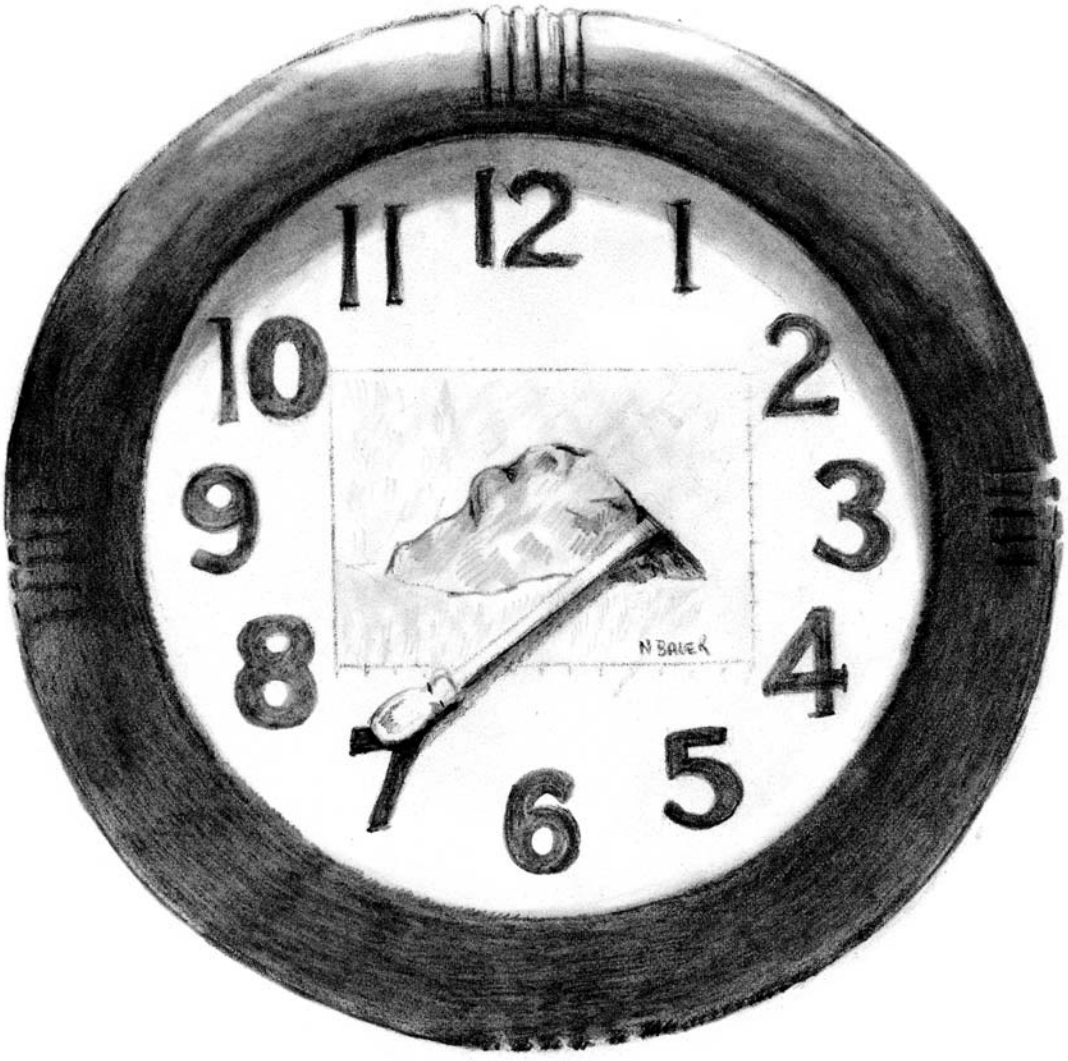
Surface Area = Length x Width

Where *length* is the longest axis of the wound and *width* is 90 degrees to the length at the next longest axis.

Measurement and Documentation of Undermining and Tunneling

Illustrated by N. Bauer. Published with permission.

The location of undermining and tunneling should be documented. This is generally done in terms of "time". The "clock face" is oriented according to the location of the wound on the client's body, with the head of the body at 12 o'clock and the feet at 6 o'clock.



In this illustration the undermining would be described as noted at approximately 2 o'clock.

Appendix J: MEASURE Assessment Guide

Source: Sibbald, Orsted et al. (2006). Reprinted with permission.

A Pocket Guide for Clinicians

Measurement Parameter	Clinical Observation	Indicator
Measure	Length, width, depth, area	Reduction or increase in wound surface area and/or depth
Exudate	Amount, quality	■ Decreased or increased amount ■ Decreased or increased purulence
Appearance	Wound bed appearance, tissue type and amount	■ Increased or decreased percentage of granulation tissue ■ Increased or decreased percentage of necrotic tissue ■ Friability of granulation tissue
Suffering	Patient pain level using validated pain scale	Improved or worsening wound-related pain
Undermining	Presence or absence	Decreased or increased amount
Re-evaluate	Monitor all parameters on regular basis – every one to four weeks	Parameters sequentially documented in patient record
Edge	Condition of wound edge and surrounding skin	■ Presence or absence of attached edge with advancing border of epithelium ■ Presence or absence of erythema and/or induration ■ Presence or absence of maceration

Appendix K: Documentation: Wound Assessment Tools

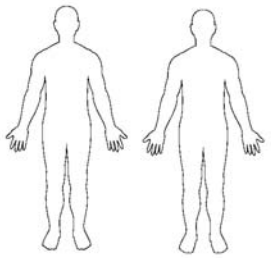
Sample 1) Bates-Jensen Wound Assessment Tool (BWAT)

Source: Bates-Jensen & Sussman (2006). Reprinted with permission.

Complete the rating sheet to assess wound status. Evaluate each item by picking the response that best describes the wound and entering the score in the item score column for the appropriate date.

Location: Anatomic site. Circle, identify right **(R)** or left **(L)** and use **"X"** to mark site on body diagrams:

____ Sacrum & coccyx
____ Trochanter
____ Ischial tuberosity
____ Lateral ankle
____ Medial ankle
____ Heel
Other Site



Shape: Overall wound pattern; assess by observing perimeter and depth.

Circle and date appropriate description:

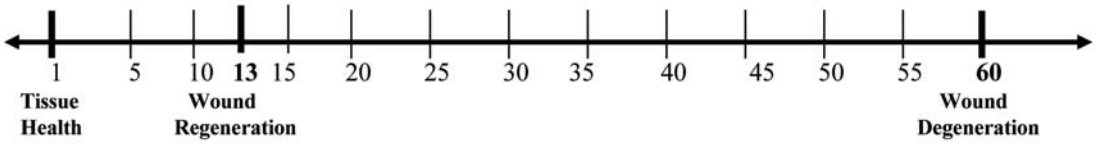
____ Irregular
____ Round/oval
____ Square/rectangle
____ Linear or elongated
____ Bowl/boat
____ Butterfly
Other Shape

Item	Assessment	Date Score	Date Score	Date Score
1. Size	1 = Length x width <4 sq cm 2 = Length x width 4--<16 sq cm 3 = Length x width 16.1--<36 sq cm 4 = Length x width 36.1--<80 sq cm 5 = Length x width >80 sq cm			
2. Depth	1 = Non-blanchable erythema on intact skin 2 = Partial thickness skin loss involving epidermis &/or dermis 3 = Full thickness skin loss involving damage or necrosis of subcutaneous tissue; may extend down to but not through underlying fascia; &/or mixed partial & full thickness &/or tissue layers obscured by granulation tissue 4 = Obscured by necrosis 5 = Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone or supporting structures			
3. Edges	1 = Indistinct, diffuse, none clearly visible 2 = Distinct, outline clearly visible, attached, even with wound base 3 = Well-defined, not attached to wound base 4 = Well-defined, not attached to base, rolled under, thickened 5 = Well-defined, fibrotic, scarred or hyperkeratotic			
4. Under-mining	1 = None present 2 =Undermining < 2 cm in any area 3 = Undermining 2-4 cm involving < 50% wound margins 4 = Undermining 2-4 cm involving > 50% wound margins 5 = Undermining > 4 cm or Tunneling in any area			
5. Necrotic Tissue Type	1 = None visible 2 = White/grey non-viable tissue &/or non-adherent yellow slough 3 = Loosely adherent yellow slough 4 = Adherent, soft, black eschar 5 = Firmly adherent, hard, black eschar			
6. Necrotic Tissue Amount	1 = None visible 2 = < 25% of wound bed covered 3 = 25% to 50% of wound covered 4 = > 50% and < 75% of wound covered 5 = 75% to 100% of wound covered			
7. Exudate Type	1 = None			

Sample 1) Bates-Jensen Wound Assessment Tool (BWAT) (cont'd)

Item	Assessment	Date Score	Date Score	Date Score
	2 = Bloody 3 = Serosanguineous: thin, watery, pale red/pink 4 = Serous: thin, watery, clear 5 = Purulent: thin or thick, opaque, tan/yellow, with or without odor			
8. Exudate Amount	1 = None, dry wound 2 = Scant, wound moist but no observable exudate 3 = Small 4 = Moderate 5 = Large			
9. Skin Color Surrounding Wound	1 = Pink or normal for ethnic group 2 = Bright red &/or blanches to touch 3 = White or grey pallor or hypopigmented 4 = Dark red or purple &/or non-blanchable 5 = Black or hyperpigmented			
10. Peripheral Tissue Edema	1 = No swelling or edema 2 = Non-pitting edema extends <4 cm around wound 3 = Non-pitting edema extends ≥4 cm around wound 4 = Pitting edema extends < 4 cm around wound 5 = Crepitus and/or pitting edema extends ≥4 cm around wound			
11. Peripheral Tissue Induration	1 = None present 2 = Induration, < 2 cm around wound 3 = Induration 2-4 cm extending < 50% around wound 4 = Induration 2-4 cm extending ≥ 50% around wound 5 = Induration > 4 cm in any area around wound			
12. Granulation Tissue	1 = Skin intact or partial thickness wound 2 = Bright, beefy red; 75% to 100% of wound filled &/or tissue overgrowth 3 = Bright, beefy red; < 75% & > 25% of wound filled 4 = Pink, &/or dull, dusky red &/or fills ≤ 25% of wound 5 = No granulation tissue present			
13. Epithelialization	1 = 100% wound covered, surface intact 2 = 75% to <100% wound covered &/or epithelial tissue extends >0.5cm into wound bed 3 = 50% to <75% wound covered &/or epithelial tissue extends to <0.5cm into wound bed 4 = 25% to < 50% wound covered 5 = < 25% wound covered			
	TOTAL SCORE			
	SIGNATURE			

WOUND STATUS CONTINUUM



Plot the total score on the Wound Status Continuum by putting an **"X"** on the line and the date beneath the line. Plot multiple scores with their dates to see-at-a-glance regeneration or degeneration of the wound.

Sample 2) Pressure Ulcer Scale for Healing (PUSH)

Source: NPUAP (1998). Reprinted with permission.

NATIONAL PRESSURE ULCER ADVISORY PANEL

Pressure Ulcer Scale for Healing (PUSH)
PUSH Tool 3.0

Patient Name_____ Patient ID# _____

Ulcer Location _____ Date _____

Directions:
Observe and measure the pressure ulcer. Categorize the ulcer with respect to surface area, exudate, and type of wound tissue. Record a sub-score for each of these ulcer characteristics. Add the sub-scores to obtain the total score. A comparison of total scores measured over time provides an indication of the improvement or deterioration in pressure ulcer healing.

LENGTH X WIDTH (in cm^2)	**0** 0	**1** < 0.3	**2** 0.3 – 0.6	**3** 0.7 – 1.0	**4** 1.1 – 2.0	**5** 2.1 – 3.0	**Sub-score**
		6 3.1 – 4.0	**7** 4.1 – 8.0	**8** 8.1 – 12.0	**9** 12.1 – 24.0	**10** > 24.0	
EXUDATE AMOUNT	**0** None	**1** Light	**2** Moderate	**3** Heavy			**Sub-score**
TISSUE TYPE	**0** Closed	**1** Epithelial Tissue	**2** Granulation Tissue	**3** Slough	**4** Necrotic Tissue		**Sub-score**
							TOTAL SCORE

Length x Width: Measure the greatest length (head to toe) and the greatest width (side to side) using a centimeter ruler. Multiply these two measurements (length x width) to obtain an estimate of surface area in square centimeters (cm^2). Caveat: Do not guess! Always use a centimeter ruler and always use the same method each time the ulcer is measured.

Exudate Amount: Estimate the amount of exudate (drainage) present after removal of the dressing and before applying any topical agent to the ulcer. Estimate the exudate (drainage) as none, light, moderate, or heavy.

Tissue Type: This refers to the types of tissue that are present in the wound (ulcer) bed. Score as a "4" if there is any necrotic tissue present. Score as a "3" if there is any amount of slough present and necrotic tissue is absent. Score as a "2" if the wound is clean and contains granulation tissue. A superficial wound that is reepithelializing is scored as a "1". When the wound is closed, score as a "0".

- 4 – **Necrotic Tissue (Eschar):** black, brown, or tan tissue that adheres firmly to the wound bed or ulcer edges and may be either firmer or softer than surrounding skin.
- 3 – **Slough:** yellow or white tissue that adheres to the ulcer bed in strings or thick clumps, or is mucinous.
- 2 – **Granulation Tissue:** pink or beefy red tissue with a shiny, moist, granular appearance.
- 1 – **Epithelial Tissue:** for superficial ulcers, new pink or shiny tissue (skin) that grows in from the edges or as islands on the ulcer surface.
- 0 – **Closed/Resurfaced:** the wound is completely covered with epithelium (new skin).

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Sample 2) Pressure Ulcer Scale for Healing (PUSH) (cont'd)

NATIONAL PRESSURE ULCER ADVISORY PANEL

Pressure Ulcer Healing Chart

To monitor trends in PUSH Scores over time

(Use a separate page for each pressure ulcer)

Patient Name_____ Patient ID# _____

Ulcer Location _____ Date _____

Directions:

Observe and measure pressure ulcers at regular intervals using the PUSH Tool.
Date and record PUSH Sub-scores and Total Scores on the Pressure Ulcer Healing Record below.

Pressure Ulcer Healing **Record**														
Date														
Length x Width														
Exudate Amount														
Tissue Type														
PUSH Total Score														

Graph the PUSH Total Scores on the Pressure Ulcer Healing Graph below.

PUSH Total Score	Pressure Ulcer Healing **Graph**													
17														
16														
15														
14														
13														
12														
11														
10														
9														
8														
7														
6														
5														
4														
3														
2														
1														
Healed = 0														
Date														

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Appendix L: Key Factors in Deciding Method of Debridement

Source: Sibbald, Orsted et al. (2006). Reprinted with permission.

Key Factors in Deciding Method of Debridement

	Surgical	Enzymatic	Autolytic	Biologic	Mechanical
Speed	1	3	5	2	4
Tissue selectivity	3	1	4	2	5
Painful wound	5	2	1	3	4
Exudate	1	4	3	5	2
Infection	1	4	5	2	3
Cost	5	2	1	3	4

Where 1 is most desirable and 5 is least desirable.

Appendix M: Clinical Signs and Symptoms of Wound Infection

Source: Sibbald, Orsted et al. (2006). Reprinted with permission.

Clinical Signs and Symptoms of Wound Infection

Superficial, Increased Bacterial Burden (Critically Colonized)	Deep Wound Infection	Systemic Infection
Non-healing	Pain	Fever
Bright red granulation tissue	Swelling, induration	Rigors
Friable and exuberant granulation	Erythema	Chills
New areas of breakdown or necrosis on the wound surface (slough)	Increased temperature	Hypotension
Increased exudates that may be translucent or clear before becoming purulent	Wound breakdown	Multiple organ failure
Foul odor	Increased size or satellite areas	
	Undermining	
	Probing to bone	

Appendix N: Topical Antimicrobial Agents

Source: Sibbald, Orsted et al. (2006). Reprinted with permission.

Topical Antimicrobials Useful in Wounds with Overt and Covert Infection

Agent	S. Aureus	MRSA	Streptococcus	Pseudomonas	Anaerobes	Comments	Summary
Cadexomer Iodine	+	+	+	+	+	Also debrides. Low potential for resistance. Caution with thyroid disease.	Low risk and effective
Silver	+	+	+	+	+	Do not use with saline. Low potential for resistance.	
Silver Sulfadiazine	+	+	+	+	+	Caution with sulphonamide sensitivity	
Polymycin B Sulphate/Bacitracin Zinc	+	+	+	+	+	Bacitracin in the ointment is an allergen; the cream formulation contains the less-sensitizing gramicidin.	Use selectively
Mupirocin		+				Reserve for MRSA and other resistant Gram+ species	
Metrondiazole					+	Reserve for anaerobes and odour control. Low or no resistance of anaerobes despite systemic use.	
Benzoyl peroxide	Weak	Weak	Weak		Weak	Large wounds. Can cause irritation and allergy.	
Gentamicin	+		+	+		Reserve for oral/IV use-topical use may encourage resistance.	Use with caution
Fusidin ointment	+		+			Contains lanolin (except in the cream).	
Polymyxin B sulphate/Bacitracin zinc neomycin	+	+	+	+	+	Neomycin component causes allergies, and possibly cross-sensitizes to aminoglycosides.	

Where "+" indicates the infection(s) to which the agent is useful.

Appendix O: Wound Cultures: Swabbing Techniques

Text and illustrations by Nancy A. Bauer. Published with permission.

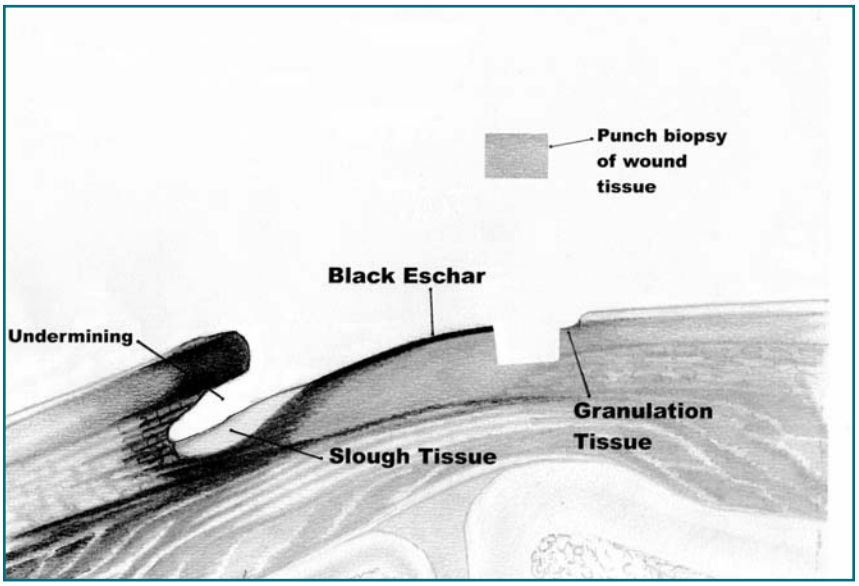


Figure 1 – The most accurate information about the health of a wound bed will come from a punch biopsy of the wound.

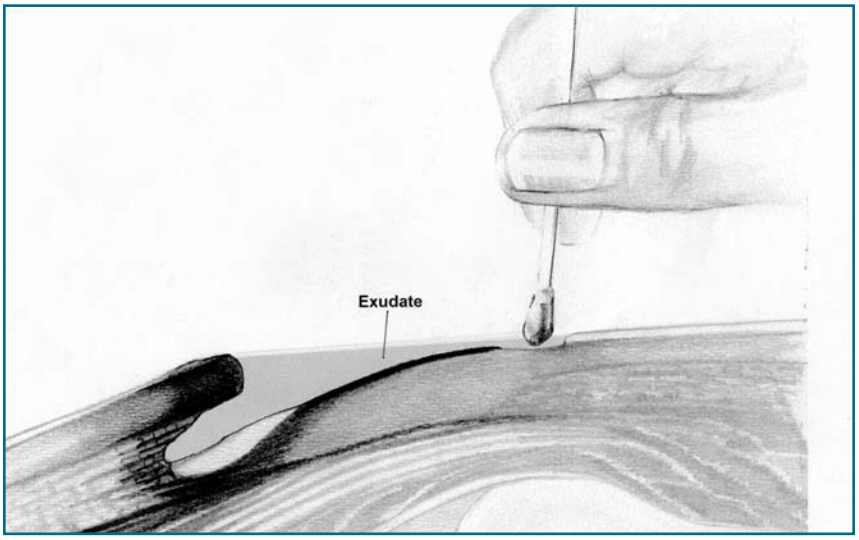


Figure 2 – Taking a swab from the drainage will yield information about the exudate which is most likely contaminated. It will tell you nothing about the wound tissue. The lab report may come back inconclusive and the wound culture may need to be repeated.

Appendix O: Wound Cultures: Swabbing Techniques (Cont'd)

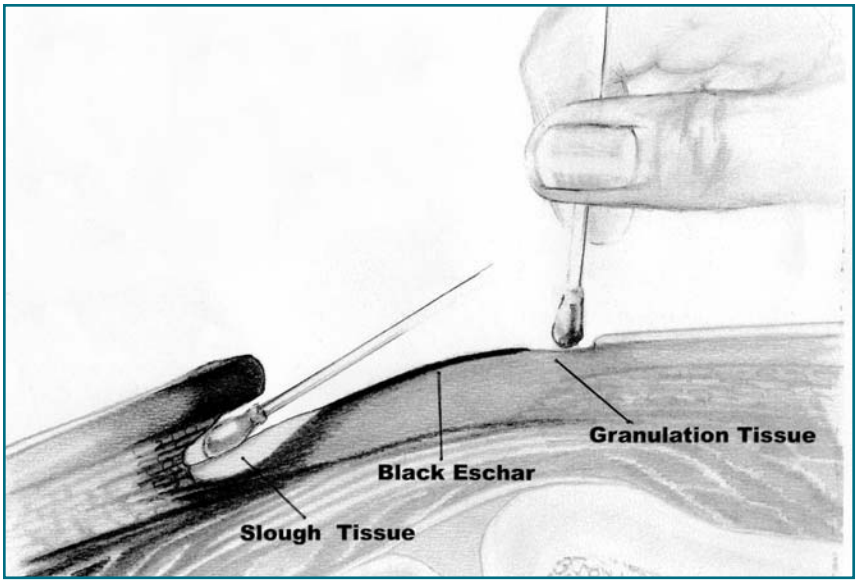


Figure 3 – However, if you clean the wound and remove the exudate and debris – THEN take a swab from the healthiest looking tissue – you should obtain results that are consistent with the infectious condition of the wound. It is also appropriate to swab any areas with undermining.

Appendix P: Wound Care Cleansing Solutions

Source: Sibbald, Orsted et al. (2006). Reprinted with permission.

Cleansing Solutions

Agent	Effects
Sodium hypochlorite solution	High pH causes irritation to skin. Dakins Solution and Eusol (buffered preparation) can select out gram-negative micro-organisms.
Hydrogen peroxide	De-sloughing agent while effervescing. Can harm healthy granulation tissue and may form air emboli if packed in deep tissue.
Mercuric chloride, crystal violet, Proflavine	Bacteriostatic agents active against Gram-positive species only. May be mutagens and can have systemic toxicity.
Cetrimide (quarternary ammonium)	Good detergent, active against Gram-positive and –negative organisms, but high toxicity to tissue.
Chlorhexidine	Active against gram-positive and -negative organisms, with small effect on tissue.
Acetic acid (0.5% to 5%)	Low pH, effective against Pseudomonas species, may select out S. aureus.
Povidone iodine	Broad spectrum of activity, although decreased in the presence of pus or exudates. Toxic with prolonged use or over large areas.

Appendix Q: Wound Care Dressings

Source: Sibbald, Orsted et al. (2006). Reprinted with permission.

Modern Classes of Dressing

Generic Categories		Local Wound Care			
Class	Description	Tissue Debridement	Infection	Moisture Balance	
1. Films/Membranes	Semi-permeable adhesive sheet. Impermeable to H_2O molecules and bacteria	+	–	–	
2. Non-adherent	Sheets of low adherence to tissue. Non-medicated tulles.	–	–	–	
3. Hydrogels	Polymers with high H_2O content. Available in gels, solid sheets or impregnated gauze.	++	–	+	
4. Hydrocolloids	May contain gelatin, sodium cabozymethylcellulose, polysaccharides and/or pectin. Sheet dressings are occlusive with polyurethane film outer layer	+++	–/+	++	
5. Calcium alginates	Sheets or fibrous ropes of calcium sodium alginate (seaweed derivative). Have hemostatic capabilities.	++	+	+++	
6. Composite dressings	Multilayered, combination dressings to increase absorbency and autolysis.	+	–	+++	
7. Foams	Non-adhesive or adhesive polyurethane foam. May have occlusive backing. Sheets or cavity packing. Some have fluid lock.	–	–	+++	
8. Charcoal	Contains odour-adsorbent charcoal within product.	–	–	+	
9. Hypertonic	Sheet, ribbon or gel impregnated with sodium concentrate.	+	+	++	
10. Hydrophilic fibres	Sheet or packing strip of sodium carboxymethylcellulose. Converts to a solid gel when activated by moisture (fluid lock).	+	–	+++	
11. Antimicrobials	Silver or cadexomer iodine with vehicle for delivery: sheets, gels, alginates, foams or paste.	+	+++	+	
12. Other devices	Negative pressure wound therapy (NPWT) applies localized negative pressure to the surface and margins of the wound. Dressings consist of polyurethane or polyvinyl alcohol materials.	–	+	+++	
13. Biologics	Living human fibroblasts provided in sheets at ambient or frozen temperatures. Extracellular matrix. Collagen-containing preparations. Hyaluronic acid. Platelet derived growth factor.	–	–	–	

Where "+" indicates the appropriateness of the dressing to address tissue debridement, infection and/or moisture balance.
Where the local wound care situation is identified by "-", the dressing is not considered beneficial.
* Use with caution if critical colonization is suspected.

Care Considerations

Indications/Contraindications

Moisture vapour transmission rate varies from film to film. Should not be used on draining or infected wounds.* Create occlusive barrier against infection.
Allow drainage to seep through pores to secondary dressing. Facilitate application of topicals.
Should not be used on draining wounds. Solid sheets should not be used on infected wounds.
Should be used with care on fragile skin. Should not be used on heavily draining or infected wounds.* Create occlusive barrier to protect the wound from outside contamination. Characteristic odour may accompany dressing change and should not be confused with infection.
Should not be used on dry wounds. Low tensile strength – avoid packing into narrow deep sinuses. Bioreabsorbable.
Use on wounds where dressing may stay in place for several days.*
Use on moderate to heavily draining wounds. Occlusive foams should not be used on heavily draining or infected wounds.*
Some charcoal products are inactivated by moisture. Ensure that dressing edges are sealed.
Gauze ribbon should not be used on dry wounds. May be painful on sensitive tissue. Gel may be used on dry wounds.
Best for moderate amount of exudate. Should not be used on dry wounds. Low tensile strength – avoid packing into narrow deep sinuses.
Broad spectrum against bacteria. Not to be used on patients with known hypersensitivities to any product components.
This pressure-distributing wound dressing actively removes fluid from the wound and promotes wound edge approximation. Advanced skill required for patient selection for this therapy.
Should not be used on wounds with infection, sinus tracts, excessive exudate, or on patients known to have hypersensitivity to any of the product components. Cultural issues related to source. Advanced skill required for patient selection for this therapy.

Appendix R: Implementation Tools

A) Toolkit

Toolkit: Implementation of Clinical Practice Guidelines

Best practice guidelines can only be successfully implemented if there are: adequate planning, resources, organizational and administrative support as well as appropriate facilitation. In this light, RNAO, through a panel of nurses, researchers and administrators has developed the *Toolkit: Implementation of clinical practice guidelines* based on available evidence, theoretical perspectives and consensus. The *Toolkit* is recommended for guiding the implementation of any clinical practice guideline in a health care organization.

The *Toolkit* provides step-by-step directions to individuals and groups involved in planning, coordinating, and facilitating the guideline implementation. Specifically, the *Toolkit* addresses the following key steps:

1. Identifying a well-developed, evidence-based clinical practice guideline.
2. Identification, assessment and engagement of stakeholders.
3. Assessment of environmental readiness for guideline implementation.
4. Identifying and planning evidence-based implementation strategies.
5. Planning and implementing evaluation.
6. Identifying and securing required resources for implementation.

Implementing guidelines in practice that result in successful practice changes and positive clinical impact is a complex undertaking. The *Toolkit* is one key resource for managing this process.

The *Toolkit* is available through the Registered Nurses' Association of Ontario. The document is available in a bound format for a nominal fee, and is also available free of charge from the RNAO website. For more information, an order form or to download the *Toolkit*, please visit the RNAO website at www.rnao.org/bestpractices.

B) Example of Implementation Tools

i) Response to Patient Pressure Ulcer Risk Assessment
ii) Wound/ Wound Care Discharge Transfer Tool

For the complete library of RNAO online implementation tools, visit the RNAO website at www.rnao.org/bestpractices.

Sample i) RESPONSE TO PATIENT PRESSURE ULCER RISK ASSESSMENT

Source: Leamington District Memorial Hospital, (2006). Reprinted with permission.

Risk Factor / **DATE**									
Sensory Perception									
Moisture									
Activity									
Mobility									
Nutrition									
Friction & shear									
Total Score									
Intials									

Client is *Automatically At Risk* if answering yes to any one of the following questions:

- ❑ Is the Braden Scale Score 18/23? Or Less?
- ❑ Is the client non-compliant with changing position?
- ❑ Does the client present with an existing pressure ulcer?
  If client presents with a pressure ulcer – circle ulcer severity: Stage I, Stage II, Stage III or Stage IV
- ❑ Does the client present with uncontrolled pain? (Pain 4/5 or 5/5 – c/o 3 times in 12 hrs)
- ❑ Does the client present with Paraplegia, Hemiplegia or Quadriplegia?
- ❑ Does the client present with extreme lethargy or weakness**?**

Clients *Most Likely* At Risk *if answers yes to any one of the following questions*:

- ❑ Does the client have a history of previous pressure ulcers?
  If client history includes pressure ulcer – circle ulcer severity: **Full Thickness (with scar) or Partial Thickness?**
- ❑ Does the client have a diagnosis of Diabetes with peripheral neuropathy?
- ❑ Is the client Morbidly Obese or Cachexia **plus** have strength, mobility or activity?
- ❑ Does the client require the HOB to be elevated **plus** have strength, mobility or activity?

Review nursing interventions & determine if appropriate for patient. Consider Co-morbidities. Intervention Planned	**Date Intervention Planned**	**Initials**	**Date Intervention Initiated**	**Initials**
NO INTERVENTION NECESSARY				
Written q2h repositioning schedule – see Kardex				
Head of Bed (HOB) Default Flat or < 30 (***Unless Contraindicated***)				
Where Client Controlled HOB – Encourage HOB flat, use pillows for head elevation & assist to chair PRN for reading, meals etc.				
Pain Management				
Seizure Management				
Incontinence Management				
Prevent Contractures				
Maintain Maximum ROM – see Kardex				
Physician Referral: Occupational Tx – Bed/Seating Assessment				
Physician Referral: Physiotherapy – ROM/Mobility				
Referral: Enterostomal Tx – Bed/Wound Assessment				
Referral: Dietitian				
Specialty Mattress Replacement per MD, OT or ET				
Report 1) CCAC For Home Equipment Needs				
2) LTC/Rest Home For Equipment Needs				

Reference: Bauer, Bushey & Amaro, 2002; RNAO, 2002

Sample ii) Wound/Wound Care Discharge Transfer Tool

Developed by N. Bauer and R. Kohr. Published with permission.

PATIENT INFORMATION

Discharge/Transfer Date: _____ Discharge Unit: _____ Unit Ext #: _____

Nurse Signature & Professional Designation: _____

WOUND/SKIN INFORMATION

❑ Skin Intact ❑ Altered Skin Integrity ❑ Skin Intact & Risk for Skin Breakdown

Wound Type(s): ❑ Pressure (Please Stage) ❑ I ❑ II ❑ III ❑ IV ❑ X ❑ Healed

❑ Abrasion/Skin Tear ❑ Laceration ❑ Surgical ❑ Burn ❑ Venous Ulcer

❑ Arterial Ulcer ❑ Diabetic Ulcer ❑ Other _____

❑ Wound Size & Location – See Page 2 For Diagrams & Measurements

Wound Condition (Check all that apply): ❑ Improving ❑ Stable Non-Healing

❑ Stable At-Risk ❑ Palliative ❑ Deteriorating ❑ Infected

Pressure Reduction Equipment Needed (Check all that apply)

❑ Low Air Loss Mattress

❑ Pressure Reduction Foam Mattress

❑ Pressure Reduction Seating

❑ Pressure Relief – Heels

❑ Other _____

Current Treatment Frequency (Check all that apply)

❑ PRN

❑ Every Other Day

❑ Daily ❑ BID ❑ TID ❑ QID

❑ Other _____

Peri-Wound Skin Treatment: ❑ None Needed ❑ Vaseline ❑ Zinc Oxide

❑ Barrier Cream/Ointment (e.g., Cavalon) ❑ Other

Cleaning Agent Currently Used (Check all that apply)

❑ Normal Saline ❑ Wound Cleanser

❑ Sterile Water

❑ Other _____

Gels/Cream/Ointments Currently Used

(Check all that apply)

❑ Hydrogel (e.g., Intrasite Gel®) ❑ Calmoseptine®

❑ Bactroban ❑ Fucidine ❑ Flamazine

❑ Other _____

Dressing Products Currently Used (Check all that apply)

Commonly Used Dressings

❑ Gauze Dressings

❑ 2x2s ❑ 4x4s ❑ ABDs ❑ Kling ❑ Nugauze®

❑ Film (e.g., Tegaderm®)

❑ Liquid film (e.g., 3M No-Sting®)

❑ Hydrocolloid (e.g., Duoderm®/Tegasorb®)

❑ Calcium Alginate (e.g., Kaltostat®)

Wound Contact Materials

❑ Mepitel®

❑ Mepilex Border®

❑ Tegapore®

Compression Dressing (Identify) _____

Impregnated Dressings

❑ Cadexomer Iodine (Iodosorb®)

❑ Charcoal Dressing (Actisorb Plus®) ❑ Mesalt®

❑ Silver Dressing (e.g., Aquacel **Ag**®)

❑ Other _____

Super Absorbent Dressing Materials

❑ Hydrofibre (e.g., Aquacel®)

❑ Sponge/Foam (e.g., Allevyn /Mepilex®)

❑ Wound Drainage Collector (e.g., Ostomy System)

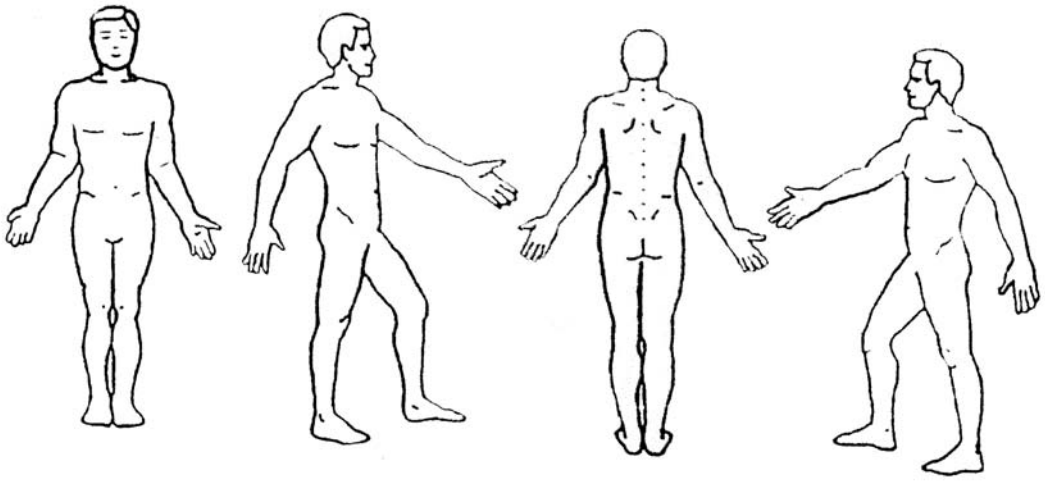
❑ Combination Dressing (e.g., Mepilex Border®)

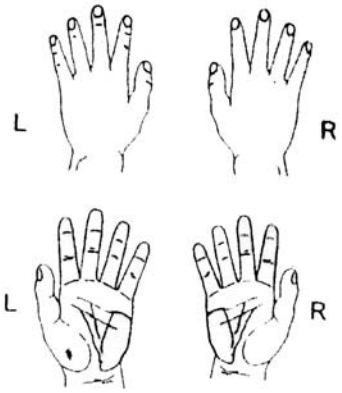
❑ Negative Pressure Therapy (e.g., VAC®)

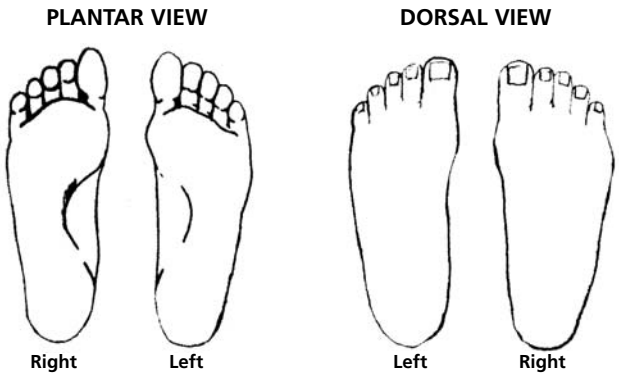
❑ Other _____

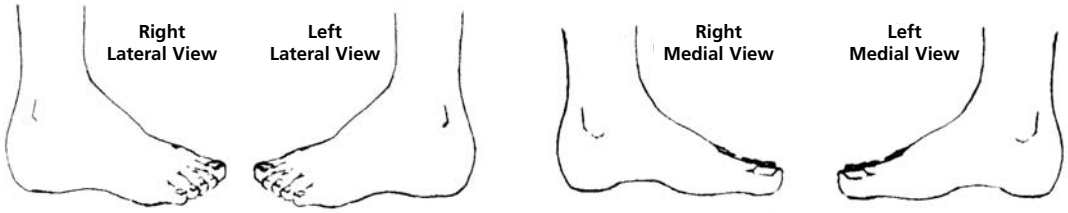
Comments on past problems and products used: _____

Sample ii) Wound/Wound Care Discharge Transfer Tool









Appendix S: Educational Resources

Clinicians and educators will find the following resources useful on various levels.
Users are encouraged to review and critique these resources based on their specific needs.

Wound Related Journals:

Advances in Skin & Wound Care – Lippincott Williams & Wilkins
Journal of Wound Care – Tower Publishing
Journal of the World Council of Enterostomal Therapists – Cambridge Printing
Journal of Wound, Ostomy and Continence Nursing – Lippincott Williams & Wilkins
Ostomy/Wound Management – HMP Communications

Wound Related Websites:

The development panel recommends the websites listed below as appropriate starting points for wound care information. These sites have links to a variety of web-based resources related to pressure ulcer prevention, assessment and management.

Agency for Healthcare Research and Quality (AHRQ previously AHCPR)
http://www.ahrq.gov
Canadian Association for Enterostomal Therapy
http://www.caet.ca
Canadian Association of Wound Care
http://www.cawc.net
European Pressure Ulcer Advisory Panel
http://www.epuap.org
National Pressure Ulcer Advisory Panel
http://www.npuap.org
Wound, Ostomy and Continence Nurses Society
http://www.wocn.org
World Council of Enterostomal Therapists
http://www.wcetn.org
World Wide Wounds
http://www.worldwidewounds.com

Wound Care Products:

Companies manufacturing wound care products often have educational resource material specific to product use. Many also have educational programs about wound care in general, and pressure ulcer assessment and management specifically. When selecting educational resources, filter out promotional aspects of the material. Contact your company-specific representatives to determine educational resources that may be appropriate for your specific needs and clinical setting.

Notes:

Notes:

Notes:

Notes:

Revised March 2007

Nursing Best Practice Guideline

Assessment & Management of Stage I to IV Pressure Ulcers

This program is funded by the Government of Ontario

0-920166-84-9

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NURSING BEST PRACTICE GUIDELINES PROGRAM