Risk Assessment & Prevention of Pressure Ulcers
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!

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Risk Assessment & Prevention of Pressure Ulcers

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VHA Home Healthcare

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Risk Assessment & Prevention of Pressure Ulcers

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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/environment, 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 healthcare professionals and administrators who are leading and facilitating practice changes will find this document valuable for the development of policies, procedures, protocols, educational programs, assessments and documentation tools. 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/environments adapt these guidelines in formats that would be user-friendly for daily use. This guideline has some suggested formats for such local adaptation and tailoring.

Organizations wishing to use the guideline may decide to do so in a number of ways:
- Assess current nursing and healthcare practices using the recommendations in the guideline.
- Identify recommendations that will address identified needs or gaps in services.
- Systematically develop a plan to implement the recommendations using associated tools and resources.

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

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<tr>
<td><strong>Practice Recommendations</strong></td>
<td></td>
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<tr>
<td><strong>Assessment</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 A head-to-toe skin assessment should be carried out with all clients at admission, and daily thereafter for those identified at risk for skin breakdown. Particular attention should be paid to vulnerable areas, especially over bony prominences.</td>
<td>IV</td>
</tr>
<tr>
<td>1.2 The client's risk for pressure ulcer development is determined by the combination of clinical judgment and the use of a reliable risk assessment tool. The use of a tool that has been tested for validity and reliability, such as the Braden Scale for Predicting Pressure Sore Risk, is recommended. Interventions should be based on identified intrinsic and extrinsic risk factors and those identified by a risk assessment tool, such as Braden's categories of sensory perception, mobility, activity, moisture, nutrition, friction and shear. Risk assessment tools are useful as an aid to structure assessment.</td>
<td>IV</td>
</tr>
<tr>
<td>1.3 Clients who are restricted to bed and/or chair, or those experiencing surgical intervention, should be assessed for pressure, friction and shear in all positions and during lifting, turning and repositioning.</td>
<td>IV</td>
</tr>
<tr>
<td>1.4a All pressure ulcers are identified and staged using the National Pressure Ulcer Advisory Panel (NPUAP) criteria.</td>
<td>IV</td>
</tr>
<tr>
<td>1.4b If pressure ulcers are identified, utilization of the RNAO best practice guideline Assessment and Management of Stage I to IV Pressure Ulcers is recommended.</td>
<td>IV</td>
</tr>
<tr>
<td>1.5 All data should be documented at the time of assessment and reassessment.</td>
<td>IV</td>
</tr>
<tr>
<td><strong>Planning</strong></td>
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<tr>
<td>2.1 An individualized plan of care is based on assessment data, identified risk factors and the client's goals. The plan is developed in collaboration with the client, significant others and health care professionals.</td>
<td>IV</td>
</tr>
<tr>
<td>2.2 The nurse uses clinical judgment to interpret risk in the context of the entire client profile, including the client's goals.</td>
<td>IV</td>
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<tr>
<td><strong>Interventions</strong></td>
<td></td>
</tr>
<tr>
<td>3.1 For clients with an identified risk for pressure ulcer development, minimize pressure through the immediate use of a positioning schedule.</td>
<td>IV</td>
</tr>
<tr>
<td>3.2 Use proper positioning, transferring, and turning techniques. Consult Occupational Therapy/Physiotherapy (OT/PT) regarding transfer and positioning techniques and devices to reduce friction and shear and to optimize client independence.</td>
<td>IV</td>
</tr>
<tr>
<td>3.3a Consider the impact of pain. Pain may decrease mobility and activity. Pain control measures may include effective medication, therapeutic positioning, support surfaces, and other non-pharmacological interventions. Monitor level of pain on an on-going basis, using a valid pain assessment tool.</td>
<td>IV</td>
</tr>
<tr>
<td>3.3b Consider the client's risk for skin breakdown related to the loss of protective sensation or the ability to perceive pain and to respond in an effective manner (e.g., impact of analgesics, sedatives, neuropathy, etc.).</td>
<td>IV</td>
</tr>
<tr>
<td>3.3c Consider the impact of pain on local tissue perfusion.</td>
<td>IV</td>
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</tbody>
</table>

*See page 14 for an Interpretation of Evidence.*
### Risk Assessment & Prevention of Pressure Ulcers

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
<th>LEVEL OF EVIDENCE</th>
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<tbody>
<tr>
<td>3.4 Avoid massage over bony prominences.</td>
<td>IIb</td>
</tr>
<tr>
<td>3.5 Clients at risk of developing a pressure ulcer should not remain on a standard mattress. A replacement mattress with low interface pressure, such as high-density foam, should be used.</td>
<td>Ia</td>
</tr>
<tr>
<td>3.6 For high risk clients experiencing surgical intervention, the use of pressure-relieving surfaces intraoperatively should be considered.</td>
<td>Ia</td>
</tr>
<tr>
<td>3.7 For individuals restricted to bed:</td>
<td>IV</td>
</tr>
<tr>
<td>■ Utilize an interdisciplinary approach to plan care.</td>
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<tr>
<td>■ Use devices to enable independent positioning, lifting and transfers (e.g., trapeze, transfer board, bed rails).</td>
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<tr>
<td>■ Reposition at least every 2 hours or sooner if at high risk.</td>
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<tr>
<td>■ Use pillows or foam wedges to avoid contact between bony prominences.</td>
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</tr>
<tr>
<td>■ Use devices to totally relieve pressure on the heels and bony prominences of the feet.</td>
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<tr>
<td>■ A 30° turn to either side is recommended to avoid positioning directly on the trochanter.</td>
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</tr>
<tr>
<td>■ Reduce shearing forces by maintaining the head of the bed at the lowest elevation consistent with medical conditions and restrictions. A 30° elevation or lower is recommended.</td>
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<tr>
<td>■ Use lifting devices to avoid dragging clients during transfer and position changes.</td>
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<tr>
<td>■ Do not use donut type devices or products that localize pressure to other areas.</td>
<td></td>
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<tr>
<td>3.8 For individuals restricted to chair:</td>
<td>IV</td>
</tr>
<tr>
<td>■ Utilize an interdisciplinary approach to plan care.</td>
<td></td>
</tr>
<tr>
<td>■ Have the client shift weight every 15 minutes, if able.</td>
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</tr>
<tr>
<td>■ Reposition at least every hour if unable to shift weight.</td>
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</tr>
<tr>
<td>■ Use pressure-reducing devices for seating surfaces.</td>
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</tr>
<tr>
<td>■ Do not use donut type devices or products that localize pressure to other areas.</td>
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</tr>
<tr>
<td>■ Consider postural alignment, distribution of weight, balance, stability, support of feet and pressure reduction when positioning individuals in chairs or wheelchairs.</td>
<td></td>
</tr>
<tr>
<td>■ Refer to Occupational Therapy/Physiotherapy (OT/PT) for seating assessment and adaptations for special needs.</td>
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<tr>
<td>3.9 Protect and promote skin integrity:</td>
<td>IV</td>
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<tr>
<td>■ Ensure hydration through adequate fluid intake.</td>
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<tr>
<td>■ Individualize the bathing schedule.</td>
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<tr>
<td>■ Avoid hot water and use a pH balanced, non-sensitizing skin cleanser.</td>
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<tr>
<td>■ Minimize force and friction on the skin during cleansing.</td>
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<tr>
<td>■ Maintain skin hydration by applying non-sensitizing, pH balanced, lubricating moisturizers and creams with minimal alcohol content.</td>
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<tr>
<td>■ Use protective barriers (e.g., liquid barrier films, transparent films, hydrocolloids) or protective padding to reduce friction injuries.</td>
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### RECOMMENDATION LEVEL OF EVIDENCE

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
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</table>
| 3.10 Protect skin from excessive moisture and incontinence:  
  - Assess and manage excessive moisture related to body fluids (e.g., urine, feces, perspiration, wound exudate, saliva, etc.).  
  - Gently cleanse skin at time of soiling. Avoid friction during care with the use of a spray perineal cleanser or soft wipe.  
  - Minimize skin exposure to excess moisture. When moisture cannot be controlled, use absorbent pads, dressings or briefs that wick moisture away from the skin. Replace pads and linens when damp.  
  - Use topical agents that provide protective barriers to moisture.  
  - If unresolved skin irritation exists in a moist area, consult with the physician for evaluation and topical treatment.  
  - Establish a bowel and bladder program. | IV |
| 3.11 A nutritional assessment with appropriate interventions should be implemented on entry to any new health care environment and when the client’s condition changes. If a nutritional deficit is suspected:  
  - Consult with a registered dietitian. – Level IV  
  - Investigate factors that compromise an apparently well nourished individual’s dietary intake (especially protein or calories) and offer him or her support with eating. – Level IV  
  - Plan and implement a nutritional support and/or supplementation program for nutritionally compromised individuals. – Level IV  
  - If dietary intake remains inadequate, consider alternative nutritional interventions. – Level IV  
  - Nutritional supplementation for critically ill older clients should be considered. – Level Ib | |
| 3.12 Institute a rehabilitation program, if consistent with the overall goals of care and the potential exists for improving the individual’s mobility and activity status. Consult the care team regarding a rehabilitation program. | IV |
| 4.1 Advance notice should be given when transferring a client between settings (e.g., hospital to home/long-term care facility/hospice/residential care) if pressure reducing/relieving equipment is required to be in place at time of transfer (e.g., pressure relieving mattresses, seating, special transfer equipment). Transfer to another setting may require a site visit, client/family conference, and/or assessment for funding of resources to prevent the development of pressure ulcers. | IV |
| 4.2 Clients moving between care settings should have the following information provided:  
  - Risk factors identified;  
  - Details of pressure points and skin condition prior to discharge;  
  - Type of bed/mattress the client requires;  
  - Type of seating the client requires;  
  - Details of healed ulcers;  
  - Stage, site and size of existing ulcers;  
  - History of ulcers, previous treatments and products used;  
  - Type of dressing currently used and frequency of change;  
  - Adverse reactions to wound care products;  
  - Summary of relevant laboratory results; and  
  - Need for on-going nutritional support. | IV |
## Education Recommendations

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
<th>LEVEL OF EVIDENCE</th>
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<tr>
<td><strong>5.1</strong> Educational programs for the prevention of pressure ulcers should be structured, organized, and comprehensive and should be updated on a regular basis to incorporate new evidence and technologies. Programs should be directed at all levels of health care providers including clients, family or caregivers.</td>
<td>III</td>
</tr>
</tbody>
</table>
| **5.2** The educational program for prevention of pressure ulcers should be based on the principles of adult learning, the level of information provided and the mode of delivery. Programs must be evaluated for their effectiveness in preventing pressure ulcers through such mechanisms as quality assurance standards and audits. Information on the following areas should be included:  
  - The etiology and risk factors predisposing to pressure ulcer development.  
  - Use of risk assessment tools, such as the Braden Scale for Predicting Pressure Sore Risk. Categories of the risk assessment should also be utilized to identify specific risks and ensure effective care planning.  
  - Skin assessment.  
  - Staging of pressure ulcers.  
  - Selection and/or use of support surfaces.  
  - Development and implementation of an individualized skin care program.  
  - Demonstration of positioning/transferring techniques to decrease risk of tissue breakdown.  
  - Instruction on accurate documentation of pertinent data.  
  - Roles and responsibilities of team members in relation to pressure ulcer risk assessment and prevention. | III |

## Organization & Policy Recommendations

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<tr>
<th>RECOMMENDATION</th>
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<tr>
<td><strong>6.1</strong> Organizations need a policy with respect to providing and requesting advance notice when transferring or admitting clients between practice settings when special needs (e.g., surfaces) are required.</td>
<td>IV</td>
</tr>
<tr>
<td><strong>6.2</strong> Guidelines are more likely to be effective if they take into account local circumstances and are disseminated by ongoing educational and training programs.</td>
<td>IV</td>
</tr>
<tr>
<td>RECOMMENDATION</td>
<td>LEVEL OF EVIDENCE</td>
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</table>
| 6.3 Nursing best practice guidelines can be successfully implemented only when there is adequate planning, resources, organizational and administrative support, as well as appropriate facilitation. Organizations may wish to develop a plan for implementation that includes:  
■ An assessment of organizational readiness and barriers to education.  
■ 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.  
In this regard, 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 the RNAO guideline *Risk Assessment and Prevention of Pressure Ulcers*. | IV |
| 6.4 Organizations need to ensure that resources are available to clients and staff. These resources include, but are not limited to, appropriate moisturizers, skin barriers, access to equipment (therapeutic surfaces) and relevant consultants (OT, PT, ET, wound specialists, etc.). | IV |
| 6.5 Interventions and outcomes should be monitored and documented using prevalence and incidence studies, surveys and focused audits. | IV |
# Interpretation of Evidence

## Levels of Evidence

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>Ia</td>
<td>Evidence obtained from meta-analysis or systematic review of randomized controlled trials.</td>
</tr>
<tr>
<td>Ib</td>
<td>Evidence obtained from at least one randomized controlled trial.</td>
</tr>
<tr>
<td>IIa</td>
<td>Evidence obtained from at least one well-designed controlled study without randomization.</td>
</tr>
<tr>
<td>IIb</td>
<td>Evidence obtained from at least one other type of well-designed quasi-experimental study without randomization.</td>
</tr>
<tr>
<td>III</td>
<td>Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.</td>
</tr>
<tr>
<td>IV</td>
<td>Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.</td>
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</tbody>
</table>
Responsibility for 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 risk assessment and prevention 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 & Scope

Best practice guidelines are systematically developed statements to assist practitioners’ and clients’ decisions about appropriate health care (Field & Lohr, 1990). This best practice guideline assists nurses who work in diverse practice settings to identify adults who are at risk of pressure ulcers. This guideline further provides direction to nurses in defining early interventions for pressure ulcer prevention, and to manage Stage I pressure ulcers.

This guideline focuses its recommendations on: Practice Recommendations including assessment, planning, intervention and discharge/transfer of care; Educational Recommendations for supporting the skills required for nurses working with adults at risk for pressure ulcers; and Organization & Policy Recommendations addressing the importance of a supportive practice environment as an enabling factor for providing high quality nursing care, which includes ongoing evaluation of guideline implementation.

The RNAO panels strongly acknowledge that successful pressure ulcer prevention requires an interdisciplinary team effort. The purpose of this guideline is to assist nurses with the provision of evidence-based quality care to those adults at risk for developing pressure ulcers. Nurses, working in partnership with the interdisciplinary health care team and individuals at risk for pressure ulcers, have an important role in risk assessment and prevention. The panel recognizes however that prevention and management of pressure ulcers are intertwined in practice, and therefore recommends the use of the RNAO nursing best practice guideline Assessment and Management of Stage I to IV Pressure Ulcers (2002b) in conjunction with this guideline.

The guideline contains recommendations for Registered Nurses (RNs) and Registered Practical Nurses (RPNs) on best nursing practices in the area of pressure ulcer risk identification and prevention. It is acknowledged that the individual competencies of nurses vary between nurses and across categories of nursing professionals (RPNs and RNs) and are based on knowledge, skills, attitudes, critical analysis and decision making which are enhanced over time by experience and education. It is expected that individual nurses will perform only those aspects of risk assessment and prevention interventions for which they have appropriate education and experience.

It is expected that nurses, both RPNs and RNs, will seek appropriate consultation in instances where the client’s care needs surpass the professional’s ability to act independently. Effective health care depends on a coordinated interdisciplinary approach with ongoing communication between health care professionals and clients, ever mindful of the personal preferences and unique needs of each individual client.
Original Development Process – 2000

In January 2000, a panel of clinicians, educators and researchers with expertise in the practice and research of pressure ulcer prevention from institutional, community and academic settings was convened under the auspices of the RNAO. The panel identified a set of five existing guidelines for the prevention of pressure ulcers. The five guidelines were then evaluated using the Appraisal Instrument for Canadian Clinical Practice Guidelines which is an adapted tool from Cluzeau, Littlejohns, Grimshaw, Feder & Moran (1997). The panel subsequently selected the following two guidelines to adapt and modify:


An additional review of systematic review articles and pertinent literature was conducted to update the existing guidelines. The scope of this guideline and the focus on risk assessment and prevention of pressure ulcers in adults was established. Through a process of discussion and consensus, recommendations for nursing care were developed. The final draft was submitted to a set of external stakeholders for review and feedback. The completed nursing best practice guideline was further refined after a pilot implementation phase in selected practice settings in Ontario (see Acknowledgement for a listing of stakeholders and implementation sites). Pilot implementation practice settings were identified through a “request for proposal” process conducted by the RNAO. The pilot implementation comprised of an eight month systematic implementation and evaluation of the best practice guideline.

Revision Process – 2005

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 pressure ulcer prevention, focusing on systematic reviews, RCTs and recently published clinical practice guidelines on a quarterly basis since the nursing best practice guideline Risk Assessment and Prevention of Pressure Ulcers was originally published. The purpose of this review 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 latter case, an “action alert” would be issued, or 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 September of 2004, a panel of nurses with expertise in pressure ulcer prevention 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 *Risk Assessment and Prevention of Pressure Ulcers* guideline that was originally published in January 2002. This panel was comprised of members of the original development panel, as well as other recommended specialists, including representation from the pilot implementation site.

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 with input from the panel team leader for each recommendation 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. See *Appendix A* for a detailed description of the search strategy.
- Studies/guidelines 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 pressure ulcer prevention were critically appraised by the revision panel with the AGREE Instrument (AGREE Collaboration, 2001).

**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.
- The revised guideline was reviewed with the AGREE Instrument (2001) prior to publication.
# Definition of Terms

**Clinical Practice Guidelines or Best Practice Guidelines** are 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).

**Consensus** is a process for making policy decisions, not a scientific method for creating new knowledge. At its best, consensus development merely makes the best use of available information, be that scientific data or the collective wisdom of the participants (Black et al., 1999).

**Education Recommendations** are statements of educational requirements and educational approaches/strategies for the introduction, implementation and sustainability of the best practice guideline.

**Family** is whomever the person defines as being family. Family members can include: parents, children, siblings, neighbours, and significant people in the community.

**Interdisciplinary** is a process where health care professionals representing expertise from various health care disciplines participate in the support of clients and their families in health care delivery.

**Meta-analysis** is the use of statistical methods to summarize the results of independent studies, therefore providing more precise estimates of the effects of health care than those derived from the individual studies included in a review (Alderson, Green & Higgins, 2004).

**Organization & Policy Recommendations** are 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** are statements of best practice directed at the practice of health care professionals that are ideally evidence-based.

**Pressure (Interface Pressure)** is the force per unit area that acts perpendicularly between the body and the support surface. It is affected by the stiffness and thickness of the support surface, the composition of the body tissue, and the geometry of the body being supported (AHCPR, 1994).

**Pressure Redistribution:**

- **Pressure Reducing Surfaces** are surfaces that lower the interface pressure as compared to a standard hospital mattress or chair surface, but do not consistently reduce pressure to less than capillary closing pressure (Wound, Ostomy and Continence Nurses Society, 1987).
- **Pressure Relieving Surfaces** are surfaces that consistently lower interface pressure below capillary closing pressure (WOCN, 1987). Capillary closing pressure is the amount of pressure required to close capillaries, impairing blood flow to tissue and resulting in tissue anoxia and eventual cell death. It is often measured to be between 28-32 mmHg in healthy individuals. The amount of pressure required decreases to 12 or lower in compromised individuals.
Pressure Ulcers are any lesions 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.

Randomized Controlled Trials are clinical trials that involve at least one test treatment and one control treatment, concurrent enrollment and follow-up of the test- and control-treated groups, and in which the treatments to be administered are selected by a random process.

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 et al., 1999). Stakeholders include all individuals or groups who will be directly or indirectly affected by the change or solution to the problem.

Standard Mattresses are ones that do not provide reduced interface pressure, therefore they are not considered preventative of tissue breakdown. Fleck (2001) describes the properties of mattress replacements in lieu of standard mattresses.

Systematic Review is an 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 health care 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 (Alderson, Green & Higgins, 2004).


### Background Context

**Pressure ulcers**, also known as pressure sores, bedsores and decubitus ulcers, are areas of localized damage to the skin and underlying tissue. This damage is generally a result of external forces – pressure, shear and/or friction. Pressure ulcer development occurs in institutional and community settings, and is most often seen in elderly, debilitated and immobile (e.g., orthopaedic) clients, those with severe acute illness (e.g., those in intensive care units) and in individuals with neurological deficits (e.g., spinal cord injuries) (NHS Centre for Reviews and Dissemination, 1995).

The high prevalence of pressure ulcers is a significant health care concern. A recent study reported by Woodbury & Houghton (2004) reviewed data that surveyed over 14,000 patients from 45 health care institutions across Canada, and estimated the prevalence of pressure ulcers as follows:

- **Acute Care Hospitals:** 25.1%
- **Non-Acute Facilities (Long-term care, Nursing Homes, etc)**: 29.9%
- **Mixed Health Care Facilities (acute and non-acute)**: 22.1%
- **Community Care**: 15.1%

Overall, the estimate of the prevalence of pressure ulcers in all health care institutions across Canada was 26.2%. This data suggests that pressure ulcers are a significant concern in all health care settings in Canada (Woodbury & Houghton, 2004).

Estimates have indicated that up to 10% of those admitted to hospital develop a pressure ulcer, the elderly being at the highest risk with approximately 70% of all pressure ulcers occurring in elders (Lyder, 2002). In those individuals who develop pressure ulcers, approximately 60% occur in the acute care setting – usually within the first two weeks of hospitalization (Langemo et al., 1989). With the increased acuity of those admitted to hospital, it is estimated that 15% of elderly patients will develop pressure ulcers within the first week of hospitalization (Lyder, 2002). In the long term care setting, pressure ulcers are most likely to develop within the first four weeks of admission (Bergstrom & Braden, 1992). Malnutrition is a significant problem for the elderly, and is a risk factor for the development of pressure ulcers. Rates of malnutrition in the institutionalized elderly are estimated to affect 23-85% of the population, while the rate for those being admitted to hospital is estimated to range from 20-50%. Pressure ulcer risk increases by 74% with the combination of immobility, stress to the immune system and loss of lean body mass (muscle) (Harris & Fraser, 2004).

Mortality is associated with pressure ulcers – several studies have reported mortality rates as high as 60% for elders with a pressure ulcer within one year of discharge from hospital. The pressure ulcer is not generally the cause of death, but rather it develops after a decline in the health status of the older person (Lyder, 2002).
The burden of pressure ulcers and their treatment impacts on quality of life for the client and family, but also creates significant financial strain for those living with a pressure ulcer, their families, and the health care system. Costs associated with the treatment of pressure ulcers in the United States have been conservatively estimated to be $500 to $50,000 (US) per ulcer, with more severe wounds being significantly more expensive to manage than less severe ulcers (Pompeo, 2001). AHCPR (1992) estimated that the total national cost (United States) for pressure ulcer treatment was at that time $1.3 billion dollars (U.S.) annually and rising. Although there is no comparable Canadian data related to national costs, the Canadian Association of Wound Care (2004) reported on a study conducted in the late 1990s that estimated the cost of treating an individual with a pressure ulcer within a long term care facility to be an average of $24,050 for three months of treatment. Similarly, a recent case study (Allen & Houghton, 2004) estimated the total cost for 12 weeks of treatment in the community, including electrical stimulation, to be $27,632. These costs, however, do not address the burden of pain and suffering and the impact on the individual’s quality of life.

Early intervention is essential for those at risk of developing pressure ulcers. The principle components of early intervention are (National Pressure Ulcer Advisory Panel, 1992):

- Identification of at-risk individuals who need preventive interventions and of the specific factors that place them at risk;
- Protection and promotion of skin integrity;
- Protection against the forces of pressure, friction and shear; and
- Reduction of the incidence of pressure ulcers through educational programs for health professionals and clients.
Practice Recommendations

Assessment

Recommendation 1.1
A head-to-toe skin assessment should be carried out with all clients at admission, and daily thereafter for those identified at risk for skin breakdown. Particular attention should be paid to vulnerable areas, especially over bony prominences.  

Discussion of Evidence:
As pressure ulcers usually develop over bony prominences, it is recommended that these areas be the focus for assessment (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000; Royal College of Nursing, 2000; Weir, 2001). Skin inspection should be based on a head-to-toe assessment of those areas known to be vulnerable for each patient. These areas typically include the temporal region and occiput of the skull, ears, scapulae, spinous processes, shoulders, elbows, sacrum, coccyx, ischial tuberosities, trochanters, knees, malleoli, metatarsal areas, heels, and the toes. In addition, areas of the body covered by anti-embolic stockings or restrictive clothing, areas where pressure, friction and shear are exerted during activities of daily living, and parts of the body in contact with equipment are also considered vulnerable. Additional areas should be inspected as determined by the individual's condition (National Institute for Clinical Excellence, 2001; Weir, 2001). Refer to Appendix B for additional details regarding skin inspection and assessment.

The Royal College of Nursing (2000) and the National Institute for Clinical Excellence (2001) describe a thorough skin assessment for sites of non-blanchable erythema. This assessment should involve a comprehensive visual and tactile inspection. The first indication of a developing ulcer is usually a change in the colour, texture and sensation of the skin surface, however, it is recognized that it may not be possible to observe redness/erythema associated with tissue damage in people with darkly pigmented skin (Consortium for Spinal Cord Medicine, 2000; RCN, 2000). The following signs may indicate incipient pressure ulcer development in individuals with darkly pigmented skin: persistent erythema; non-blanching hyperemia; blisters and discoloration (purplish/bluish localized areas); localized heat, which if tissue becomes damaged is replaced by coolness; localized edema and localized induration.

Those individuals who are able to participate in the inspection of their own skin should be encouraged to do so, following appropriate education. Wheelchair users should be instructed to use a mirror to visualize areas that they cannot see easily, or alternatively, to get assistance from others (NICE, 2001).

Recommendation 1.2
The client’s risk for pressure ulcer development is determined by the combination of clinical judgment and the use of a reliable risk assessment tool. The use of a tool that has been tested for validity and reliability, such as the Braden Scale for Predicting Pressure Sore Risk, is recommended. Interventions should be based on identified intrinsic and extrinsic risk factors and those identified by a risk assessment tool, such as Braden’s categories of sensory perception, mobility, activity, moisture, nutrition, friction and shear. Risk assessment tools are useful as an aid to structure assessment.

Level of Evidence – IV
Risk Assessment Tools
In order to determine the client’s level of risk, the AHCPR guideline (1992) recommends the use of a standard risk assessment tool. The Braden Scale and the Norton Scale have been tested sufficiently for reliability and validity to be useful adjuncts to nursing assessments and care planning. The Braden Scale has good sensitivity (83-100%) and specificity (64-77%), while the Norton Scale has a sensitivity of 73-92% and specificity of 61-94%. Positive predictive values are documented as: Braden – approximately 40%; Norton – approximately 20% (Lyder, 2002). Refer to Appendix C for a sample of the Braden Scale for Predicting Pressure Sore Risk.

Frequency of Risk Assessment
Although the optimum frequency of risk assessment has not been substantiated in the literature, there are clinical standards that are widely accepted and reported. It has been noted that the majority of pressure ulcers develop within the first two weeks after admission to a facility (Maklebust & Sieggreen, 1996). One prospective study of new admissions to a nursing home over three months showed that of those who developed pressure ulcers, 80% did so within the first two weeks and 96% did so within three weeks (Bergstrom & Braden, 1992). These results support the need to identify those clients “at risk” for developing pressure ulcers early in their care, preferably on admission. The literature also supports reassessments for “at risk” individuals ranging from daily to weekly, however, many sources agree that whenever a client’s condition changes, reassessments should be conducted (Consortium for Spinal Cord Medicine, 2000; Ferguson, Cook, Rimmash, Bender & Voss, 2000; Maklebust & Sieggreen, 1996; NICE, 2001; RCN, 2000).

The Consortium for Spinal Cord Medicine (2000) supports the view that regular assessment should be incorporated into the overall assessment of all individuals with spinal cord injuries. Documentation may vary from every shift, to daily or weekly, to variable intervals in the community, depending on client need and clinical presentation. The trigger for reassessment should be based on deterioration or improvement in the individual’s health status.

Braden (2001) suggests that the frequency of risk assessments should be based on the findings of the initial admission assessment and the rapidity of the client’s change in health status. Ideally, the client should be assessed for risk on admission, again in 48 hours and as often as the level of morbidity indicates. In addition, Braden (2001) makes recommendations for assessment of specific populations according to the following schedules:

SITE OF CARE RISK ASSESSMENT SCHEDULE
- Long-term care facilities – At admission, then every week for four weeks and quarterly thereafter
- Intensive Care Units – Daily
- General medical/surgical units – Every other day
- Community – Every home visit
Intrinsic/Extrinsic Risk Factors

The determination of risk for pressure ulcer development is established by the combination of the use of a reliable risk assessment tool and clinical judgment (refer to Recommendation 2.2). There is discussion in the literature regarding the need to look beyond assessment tools in considering risk, as the development of pressure ulcers may be influenced by factors not addressed within these tools. The potential to develop pressure ulcers may be influenced by intrinsic risk factors that relate to aspects of the client's physical, psychosocial or medical condition. These factors should be considered when performing a risk assessment, and include nutritional status (malnutrition and dehydration), reduced mobility or immobility, repetitive stress syndrome (involuntary movements), posture/contractures, neurological/sensory impairment, incontinence (urinary and fecal), extremes of age, level of consciousness, acute illness, history of previous pressure damage, vascular disease, and severe chronic or terminal illness (CREST, 1998; Gould et al., 2000; Lyder, 2002; NICE, 2001; RCN, 2000). In addition, it is the consensus of the review panel that pain as a risk factor should also be assessed. Refer to Recommendation 3.3.

Extrinsic factors derived from the environment can also influence the development of pressure ulcers. These include factors such as hygiene, living conditions, medication, pressure, shearing, friction, garments, transfer slings, restraint use and the support systems used to relieve pressure (CREST, 1998; Gould et al., 2000; Lyder, 2001; NICE, 2001; RCN, 2000). Clinical assessment of all factors that increase the client's risk for skin breakdown must be considered to facilitate early identification of those at risk.

An additional category of risk factors discussed in the literature is specific to surgical interventions. Recommendation 1.3 reviews surgical risk factors.

Recommendation 1.3

Clients who are restricted to bed and/or chair, or those experiencing surgical intervention, should be assessed for pressure, friction and shear in all positions and during lifting, turning and repositioning.

Level of Evidence – IV

Discussion of Evidence

An understanding of mechanical loads (pressure, friction and shear) and the risk of pressure ulcer development is essential in the assessment of clients, particularly those restricted to bed and/or chair (Cuddigan & Frantz, 1998). Fleck (2001) identifies extrinsic mechanical forces and factors that contribute to pressure ulcers. They are pressure, shear, friction and moisture. All contribute to soft tissue damage impacting on blood flow, tissue necrosis and pressure ulcer development, especially in the immobile patient. Physical movements associated with improper turning and transfer techniques and prolonged, unrelieved pressure can result in the development of pressure ulcers (Consortium for Spinal Cord Medicine, 2000).

External pressure over the tissue causes compression and distortion of underlying structures – if the pressure is higher than the capillary closing pressure, occlusion of the blood vessels, decreased tissue perfusion and tissue death may result (CREST, 1998). Deep tissue damage and necrosis can occur when the shearing between two layers of tissue leads to stretching, kinking and tearing of vessels at the subcutaneous level. The resulting disruption of the local blood supply produces ischemia. Prolonged ischemia is the precursor to endothelial damage and cell death (Consortium for Spinal Cord Medicine, 2000; CREST,
Nursing Best Practice Guideline

Shearing forces should not be considered separately from pressure as they are an integral component of the effect of pressure on the client (RCN, 2000). The majority of shear injuries can be eliminated with proper positioning (AHCPR, 1992), as most shearing occurs when individuals slide down, or are dragged up in bed or chair (RCN, 2000).

Friction (a third mechanical force) occurs when two surfaces move across each other, and often results in the removal of superficial layers of skin. Friction damage often occurs as a result of poor lifting techniques (RCN, 2000). In addition, voluntary and involuntary movements by the client can lead to friction injuries, particularly on elbows and heels. Any agent that eliminates this contact or decreases the friction that occurs between the skin and the bed surface (including linens) will reduce the potential for injury (AHCPR, 1992).

Risk factors associated with the surgical experience include (Armstrong & Bortz, 2001): length of surgery (time); position during surgery; use of a standard foam mattress; positioning devices; warming devices; anesthetic agents; sedation; vasoactive medications; hemodynamics; retractors; operating room personnel; and the nature of the surgery. More specifically, intraoperative risks can be summarized as pooled moisture from prep solutions, skin shearing and friction during positioning, patient’s position and use of positioning devices, negativity (layering of materials between the patient and the pressure-reducing surface), intraoperative hypotension, alteration in hemodynamic and circulatory status related to position and blood loss (Armstrong & Bortz, 2001).

Recommendation 1.4a

All pressure ulcers are identified and staged using the National Pressure Ulcer Advisory Panel (NPUAP) criteria.

Level of Evidence – IV

Recommendation 1.4b

If pressure ulcers are identified, utilization of the RNAO best practice guideline Assessment and Management of Stage I to IV Pressure Ulcers is recommended.

Level of Evidence – IV

Discussion of Evidence:

Several classification systems exist to describe pressure ulcers in terms of observed tissue damage. The use of a classification tool allows for universal assessment and consistent communication of the severity of tissue damage among health care professionals (Armstrong & Bortz, 2001). The four-stage National Pressure Ulcer Advisory Panel system is the framework most widely accepted (Consortium for Spinal Cord Medicine, 2000; CREST, 1998; Ferguson et al., 2000; Ferrell, Josephson, Norvid & Alcorn, 2000). It was accepted by the AHCPR panel in 1994 and has since become a clinical standard (Weir, 2001). Indeed, the development panel, through a consensus building process, recognized the universality of the defining criteria, as they are understood and utilized by clinicians in a wide range of practice settings.
Risk Assessment & Prevention of Pressure Ulcers

The National Pressure Ulcer Advisory Panel (1989) definitions include:

<table>
<thead>
<tr>
<th>STAGE</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>Pressure ulcer is an observable pressure-related alteration of intact skin whose indicators as compared to an adjacent or opposite area on the body may include changes in one or more of the following: skin temperature (warmth or coolness), tissue consistency (firm or boggy feel), and/or sensation (pain, itching). The ulcer appears as a defined area of persistent redness in lightly pigmented skin, whereas in darker skin tones, the ulcer may appear with persistent red, blue, or purple hues (1998).</td>
</tr>
<tr>
<td>Stage II</td>
<td>Partial thickness skin loss involving epidermis, dermis, or both. The ulcer is usually superficial and presents clinically as an abrasion, blister, or shallow crater.</td>
</tr>
<tr>
<td>Stage III</td>
<td>Full thickness skin loss involving damage to, or necrosis of, subcutaneous tissue that may extend down to, but not through, underlying fascia. The ulcer presents clinically as a deep crater with or without undermining of adjacent tissue.</td>
</tr>
<tr>
<td>Stage IV</td>
<td>Full thickness skin loss with extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures (e.g., tendon, joint, capsule). Undermining and sinus tracts also may be associated with Stage IV pressure ulcers.</td>
</tr>
</tbody>
</table>

Refer to Appendix E for additional details regarding the NPUAP pressure ulcer classification system. For additional information regarding the assessment and management of pressure ulcers, refer to the RNAO best practice guideline Assessment and Management of Stage I to IV Pressure Ulcers (2002b).

**Recommendation 1.5**

All data should be documented at the time of assessment and reassessment.

*Level of Evidence – IV*

**Discussion of Evidence:**

Documentation is essentially communication that reflects the client’s perspective on his/her health, the care provided, the effect of the care and the continuity of care. This record allows nurses and other members of the health care team to assist clients in making future care decisions (College of Nurses of Ontario, 2004; RCN, 2000). Proper documentation provides an accurate record of a client’s progress and risk status. Any skin changes should be documented immediately, including a detailed description of what was observed and what actions were taken (RCN, 2000) and should be made accessible to all members of the health care team (NICE, 2001).
Planning

**Recommendation 2.1**

An individualized plan of care is based on assessment data, identified risk factors and the client's goals. The plan is developed in collaboration with the client, significant others and health care professionals.

*Level of Evidence – IV*

Discussion of Evidence:

The risk factors identified in the assessment phase provide the framework for the development of the plan of care. Including the client and family in the development of the plan of care is essential for the establishment of mutual goals and adherence to the plan.

Gage (1994) reports on the development of a client-driven interdisciplinary care plan that provides a shared vision for the client, health care professionals and family members involved in the individual's care. The client's concerns become outcomes that can be evaluated, to ensure that the plan of care is meaningful to the individual. Client and family involvement and partnership in care are central to client-centred care delivery. Individuals at risk for pressure ulcers should be involved in all aspects of pressure ulcer risk assessment and prevention, from involvement in assessment to shared decision-making about planning care (Consortium for Spinal Cord Medicine, 2000; RCN, 2000).

Braden (2001) describes a care planning protocol by level of risk, based on the results of the *Braden Scale for Predicting Pressure Sore Risk*:

- For individuals at **risk** (15-18), the plan of care should include a turning schedule, maximum remobilization, heel protection, the management of moisture, nutrition, friction and shear as well as the use of pressure-reduction support surfaces if bed or chair-bound. Braden suggests that if other major risk factors are present, care should advance to the next level.
- At **moderate risk** (13-14), the interventions for mild risk are to continue, with the addition of a turning schedule with the 30° rule.
- For individuals at **high risk** (10-12), the frequency of turning and the use of foam wedges to facilitate 30° lateral turns should be supplemented with small shifts in weight. All the interventions for moderate risk are to continue.
- For **very high risk** individuals (<9), the plan needs to continue with the previous risk interventions, plus the possibility of static air overlay if adequate monitoring is possible. Consider the use of a low-air-loss bed if the individual at very high risk has additional risk factors ameliorated by a low air-loss bed, or uncontrolled pain, or severe pain exacerbated by turning. Braden (2001) cautions that the use of low air-loss beds does not substitute for an appropriate turning schedule, and that positioning should be a component of the plan of care.

Refer to *Appendix D* for a summary of level of risk and prevention interventions.
**Recommendation 2.2**

The nurse uses clinical judgment to interpret risk in the context of the entire client profile, including the client's goals.

*Level of Evidence – IV*

**Discussion of Evidence**

The literature addresses the need for the use of clinical judgment, in conjunction with a recognized risk assessment tool, in the identification of risk (Consortium for Spinal Cord Medicine, 2000; CREST, 1998; RCN, 2000). Research evidence indicates that there is insufficient evidence to recommend a particular risk assessment scale that is appropriate in all settings, and that clinical judgment continues to play a critical role in the care of clients at risk for pressure ulcers.

Both the development and revision panel strongly support the need for clinical nursing judgment in conjunction with the overall client profile as a basis for determining risk and planning of appropriate care. This recommendation is based on current practice, clinical experience and opinion. The Royal College of Nursing (2000) supports this approach, stating that “risk assessment scales should only be used as an aide memoire and should not replace clinical judgment” (pg. 12).

**Interventions**

**Recommendation 3.1**

For clients with an identified risk for pressure ulcer development, minimize pressure through the immediate use of a positioning schedule.

*Level of Evidence – IV*

**Discussion of Evidence**

Interventions related to the prevention of pressure ulcers should be based on clinical assessment and an established plan of care. When developing the care plan, the need for pressure reducing/relieving equipment should be determined by the overall assessment of the client, and not based on risk assessment scores alone (RCN, 2000). A review of several guidelines on pressure ulcer prevention establishes consensus on the need for the immediate use of preventative intervention in the form of pressure reducing/relieving equipment and/or repositioning schedules for those identified at risk (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000; CREST, 1998; NICE, 2001; RCN, 2000; WOCN, 2003).

Little research exists to provide nurses with guidelines on optimum turning schedules (Cullum, Deeks, Fletcher, Sheldon & Song, 1995). However, current clinical practice recommendations support the use of repositioning schedules for clients identified at risk for pressure ulcer development (AHCPR, 1992; NHS Centre for Reviews & Dissemination, 1995; Consortium for Spinal Cord Medicine, 2000; CREST, 1998; RCN, 2000; WOCN, 2003). Researchers have recommended every two hours for turns, however, alternatives have not been evaluated (Cullum et al., 1995; NHS Centre for Reviews & Dissemination, 1995). A systematic review reported by Cullum et al. (1995) found that only one small randomized controlled trial (RCT) evaluated routine manual repositioning compared with the standard routine, however only ten clients received the intervention, and the repositioning schedule
was found difficult to implement. This same review identified two randomized controlled trials that evaluated unscheduled turning, but in both cases the sample sizes were small and the results were not statistically significant.

In the absence of strong evidence, the Royal College of Nursing (2000) supports a written repositioning schedule that is determined by the results of a skin inspection and individual needs and not by a predetermined schedule.

**Recommendation 3.2**

Use proper positioning, transferring, and turning techniques. Consult Occupational Therapy/Physiotherapy (OT/PT) regarding transfer and positioning techniques and devices to reduce friction and shear and to optimize client independence.

*Level of Evidence – IV*

**Discussion of Evidence**

The techniques involved in positioning, turning or transferring are an important component in the implementation of care. Individuals should never be dragged across surfaces as this increases the risk of friction and shear damage. Most friction injuries can be avoided with appropriate techniques.

Voluntary and involuntary movements by individuals themselves can lead to friction injuries, especially on elbows and heels. The use of products to minimize contact with surfaces (including bed linens) can reduce the potential for injury (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000; WOCN, 2003). Use turning devices such as sheets, trapezes, or manual or electric lifts that will decrease the risk of skin damage (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000). After using turning equipment, slings, sleeves or other components of the device should not be left underneath the individual after repositioning (NICE, 2001).

Turning and repositioning devices should be used appropriately in order to minimize shear and friction damage (NICE, 2001). All staff should be trained in the correct moving and handling of clients (CREST, 1998).

**Recommendation 3.3a**

Consider the impact of pain. Pain may decrease mobility and activity. Pain control measures may include effective medication, therapeutic positioning, support surfaces, and other non-pharmacological interventions. Monitor level of pain on an on-going basis, using a valid pain assessment tool.

*Level of Evidence – IV*

**Recommendation 3.3b**

Consider the client’s risk for skin breakdown related to the loss of protective sensation or the ability to perceive pain and to respond in an effective manner (e.g., impact of analgesics, sedatives, neuropathy, etc.).

*Level of Evidence – IV*
**Recommendation 3.3c**
Consider the impact of pain on local tissue perfusion.
*Level of Evidence – IV*

**Discussion of Evidence**
Pain is a factor that may result in decreased mobility in clients who are dealing with chronic conditions such as arthritis, multiple sclerosis, cancer, and musculoskeletal injuries. Any decrease in mobility as a result of such pain may increase the risk for the development of pressure ulcers. At the same time, however, analgesia and sedatives may depress the central nervous system. This may result in reduced mental alertness, activity and mobility, thereby altering the individual's ability to respond effectively to ischemic pain (Lindquist et al., 2003).

In general, clinical guidelines on prevention of pressure ulcers do not address the assessment of pain, however the revision panel reached consensus on the importance of addressing pain issues within the context of pressure ulcer prevention. A recent study comparing pain assessment tools for use in the leg ulcer population (Nemeth et al., 2003) found that of the five tools that met the inclusion criteria (pain ruler, numerical rating, visual analogue, verbal descriptor, short-form McGill Pain Questionnaire), none had been studied for validity or reliability in this population. It was concluded that the current evidence was insufficient to recommend any one pain assessment tool for individuals with leg ulcers, however they did suggest that a two-step pain assessment process might be useful in practice. Initially, the assessment should include a self-report related to the presence and level of pain, and in situations where pain is present, a more comprehensive assessment of the quality of the pain should be conducted. More research is needed in the area of pain and its impact as a risk factor for pressure ulcer development. For details regarding comprehensive pain assessment and management, refer to the RNAO nursing best practice guideline *Assessment and Management of Pain* (2002a).

**Recommendation 3.4**
Avoid massage over bony prominences.
*Level of Evidence – IIb*

**Discussion of Evidence**
The AHCPR (1992) reports on studies by Ek, Gustavsson & Lewis (1985) and Dyson (1978) which provide evidence to suggest that massage over bony prominences may be harmful. Lower blood flow to the skin after massage, significant decreases in skin temperature, and tissue degeneration were noted in those studied. Several clinical practice guidelines support this recommendation (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000; CREST, 1998; WOCN, 2003).

**Recommendation 3.5**
Clients at risk of developing a pressure ulcer should not remain on a standard mattress. A replacement mattress with low interface pressure, such as high-density foam, should be used.
*Level of Evidence – Ia*
Discussion of Evidence
A systematic review conducted by Cullum et al. (2004) examined to what extent pressure-relieving surfaces reduced the incidence of pressure ulcers compared with standard support surfaces, and reviewed how effective different pressure-relieving surfaces were in preventing pressure ulcers, compared to one another. It was concluded, from the 41 randomized controlled trials included in the review, that in those at high risk of pressure ulcers, the use of a higher specification foam mattress (low interface pressure) should be considered rather than the standard hospital foam mattress. Standard hospital mattresses have been consistently outperformed 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 ulcers.

Clients at very high risk of developing pressure ulcers may benefit from an alternating pressure mattress or other high-tech pressure redistributing systems (Consortium for Spinal Cord Medicine, 2000; RCN, 2000). Alternating pressure devices generate alternating high and low interface pressures between the body and support surface (bed), usually by alternate inflation and deflation of air-filled cells. These devices are available as mattress overlays, and single or multi-layer mattress replacements. The systematic review conducted by Cullum et al. (2004) indicates that the relative merits of higher-tech constant low pressure and alternating pressure for prevention are unclear.

Fleck (2001) outlines criteria and selection modalities for the use of support surfaces in the prevention of pressure ulcers. Regardless of the type of surfaces used for high-risk clients, thorough and frequent skin assessments should be conducted for evidence of tissue damage (Cullum et al., 2004; WOCN, 2003).

Refer to Appendix F for a further discussion of pressure reducing and pressure relieving surfaces.

Recommendation 3.6
For high risk clients experiencing surgical intervention, the use of pressure-relieving surfaces intraoperatively should be considered.
Level of Evidence – Ia

Discussion of Evidence
Clients experiencing surgery are at risk for development of pressure ulcers because of factors that cannot be controlled – length of procedure (Schoonhoven et al., 2002), hemodynamic state and the use of vasoactive medications during surgery. There are, however, many risk factors that can be controlled to reduce the incidence of pressure ulcer development, including pooled prep solutions, negativity, shearing, friction and the use of warming blankets beneath the client. Another factor that can be controlled in order to decrease pressure ulcers is the surface on which the person is placed during the surgical procedure (Armstrong & Bortz, 2001; WOCN, 2003).
Cullum et al. (2004) included four RCTs in a systematic review that evaluated different methods of pressure relief on the operating table. The results of three of the four trials suggest that pressure-relieving overlays are beneficial in reducing subsequent pressure ulcer incidence in high risk surgical patients. Nixon McElvenny, Mason, Brown & Bond (1998), one of the trials included in this review, found that the use of a dry visco-elastic polymer pad during the intra-operative period reduced the probability of pressure sore development by half. Cullum et al. (2004) concluded that "organizations might consider the use of pressure relief for high risk patients in the operating theatre, as this is associated with a reduction in post-operative incidence of pressure ulcers". Currently, the most effective means of pressure relief on the operating table is unclear, and further research in this area is recommended.

**Recommendation 3.7**

For individuals restricted to bed:
- Utilize an interdisciplinary approach to plan care.
- Use devices to enable independent positioning, lifting and transfers (e.g., trapeze, transfer board, bed rails).
- Reposition at least every 2 hours or sooner if at high risk.
- Use pillows or foam wedges to avoid contact between bony prominences.
- Use devices to totally relieve pressure on the heels and bony prominences of the feet.
- A 30º turn to either side is recommended to avoid positioning directly on the trochanter.
- Reduce shearing forces by maintaining the head of the bed at the lowest elevation consistent with medical conditions and restrictions. A 30º elevation or lower is recommended.
- Use lifting devices to avoid dragging clients during transfer and position changes.
- Do not use donut type devices or products that localize pressure to other areas.

*Level of Evidence – IV*

**Recommendation 3.8**

For individuals restricted to chair:
- Use an interdisciplinary approach to plan care.
- Have the client shift weight every 15 minutes, if able.
- Reposition at least every hour if unable to shift weight.
- Use pressure-reducing devices for seating surfaces.
- Do not use donut type devices or products that localize pressure to other areas.
- Consider postural alignment, distribution of weight, balance, stability, support of feet and pressure reduction when positioning individuals in chairs or wheelchairs.
- Refer to Occupational Therapy/Physiotherapy (OT/PT) for seating assessment and adaptations for special needs.

*Level of Evidence – IV*
Discussion of Evidence
Appropriate positioning of individuals restricted to bed and/or chair is aimed at reducing pressure and allowing for adequate tissue perfusion. Current clinical practice guidelines and other literature reviewed all support the need to position clients confined to bed/chair in such a way as to provide optimum pressure reduction (AHCPR, 1992; Braden, 2001; Consortium for Spinal Cord Medicine, 2000; CREST 1998; Folkedahl, Frantz & Goode, 2002; NICE, 2001; RCN, 2000; WOCN, 2003). In addition, it has been noted that equipment used for the provision of care and transfer of clients (slings, sleeves, or other equipment accessories) should not be left under individuals as these objects act as a source of pressure (NICE, 2001; RCN, 2000).

Careful attention must be paid to effective chair positioning, as very high interface pressure and shearing forces can develop with poor posture or inappropriate seating surfaces (Braden, 2001; Consortium for Spinal Cord Medicine, 2000). For clients at high risk, avoid prolonged sitting – less than two hours (NICE, 2001) – and provide them with pressure reduction/relief chair and bed surfaces (NICE, 2001; WOCN, 2003). In addition, if able, chair-bound individuals should use a mirror to inspect areas that they cannot see, or get others to inspect for them (Consortium for Spinal Cord Medicine, 2000; NICE, 2001; RCN, 2000). The recommended seating position includes a chair that is slightly tilted back with foot support (feet should never be left dangling), and arm rests (Braden, 2001).

It is important to consult with the interdisciplinary team, particularly the occupational therapist or physiotherapist, for seating assessments and necessary adaptations (AHCPR, 1992; CREST, 1998; RCN, 2000). Seating assessments for aids and equipment should be carried out by trained assessors who have acquired specific knowledge and expertise, such as Physiotherapists and Occupational Therapists (NICE, 2001; WOCN, 2003).

Recommendation 3.9

Protect and promote skin integrity:
- Ensure hydration through adequate fluid intake.
- Individualize the bathing schedule.
- Avoid hot water and use a pH balanced, non-sensitizing skin cleanser.
- Minimize force and friction on the skin during cleansing.
- Maintain skin hydration by applying non-sensitizing, pH balanced, lubricating moisturizers and creams with minimal alcohol content.
- Use protective barriers (e.g., liquid barrier films, transparent films, hydrocolloids) or protective padding to reduce friction injuries.

Level of Evidence – IV

Discussion of Evidence
Adequate hydration of the stratum corneum protects against mechanical injury of the skin. Decreased hydration of the skin results in reduced pliability and severely dried skin is at risk for the development of fissures and cracks. Moisturizers should be applied to areas of dry skin, while care is taken not to rub or massage over areas of bony prominence. Maintenance of environmental conditions such as relative humidity and temperature minimize the incidence of dry skin (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000).
Hygienic practices to remove foreign material has been studied in relation to cleansing pressure ulcers, but not as a preventative measure (Consortium for Spinal Cord Medicine, 2000). However, it is noted in practice that frequent removal of metabolic wastes such as urine and feces is necessary to prevent chemical irritation of the skin (AHCPR, 1992). Skin may be exposed to a variety of moist substances such as urine, feces, perspiration, wound drainage and saliva all increasing susceptibility to injury (Braden, 2001; NICE, 2001; RCN, 2000). During routine cleansing of the skin, and at times of soiling, use of mild cleansing agents (pH balanced, non-sensitizing) and warm (rather than hot) water is recommended to minimize drying and irritation (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000; RCN, 2000; WOCN, 2003).

**Recommendation 3.10**

Protect skin from excessive moisture and incontinence:

- Assess and manage excessive moisture related to body fluids (e.g., urine, feces, perspiration, wound exudate, saliva, etc.).
- Gently cleanse skin at time of soiling. Avoid friction during care with the use of a spray perineal cleanser or soft wipe.
- Minimize skin exposure to excess moisture. When moisture cannot be controlled, use absorbent pads, dressings or briefs that wick moisture away from the skin. Replace pads and linens when damp.
- Use topical agents that provide protective barriers to moisture.
- If unresolved skin irritation exists in a moist area, consult with the physician for evaluation and topical treatment.
- Establish a bowel and bladder program. *Level of Evidence – IV*

**Discussion of Evidence**

Wet skin is fragile and more susceptible to friction and tearing injuries, especially during cleansing. Moist skin also has a tendency to adhere to bed linens, potentially leading to damage when linen is removed. In addition, it is more susceptible to irritation, rashes and infections, such as candida. When the source of moisture cannot be controlled, use of protective barriers and moisture absorbing products are recommended. Absorbent pads, dressings or briefs should be changed as they become saturated, rather than delaying until they reach their absorptive capacity. These products should not interfere with any pressure-redistributing surface an individual may be placed on (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000; RCN, 2000). When skin is moist from perspiration, cotton linens are recommended to promote evaporation, skin aeration and faster drying. Frequent changing of moist linens is recommended to maintain dry intact skin.

Effective continence management is an essential component of skin care. An RCT examining skin health outcomes of an exercise and incontinence intervention found that intervention subjects were significantly better in urinary and fecal incontinence, physical activity and skin wetness outcome measures than the control group, but despite these improvements, skin health improvements were limited to specific areas of the body (back, distal perineal area) and there was no difference between groups in the incidence rates of pressure ulcers (Bates-Jensen, Alessi, Al Samarrai & Schnelle, 2003). To manage incontinence, consider use of a collection device (i.e., condoms) or a pouching system to contain urine or stool and to protect the skin. When urinary incontinence has contributed or may contribute to a pressure ulcer, a urinary catheter may
be necessary for a short period of time (WOCN, 2003). A referral to a continence advisor or enterostomal therapist should be considered on an individual basis. Refer to the RNAO nursing best practice guideline Promoting Continence Using Prompted Voiding (2005) for further information regarding continence management.

### Recommendation 3.11
A nutritional assessment with appropriate interventions should be implemented on entry to any new health care environment and when the client’s condition changes. If a nutritional deficit is suspected:

- Consult with a registered dietitian. – Level IV
- Investigate factors that compromise an apparently well nourished individual’s dietary intake (especially protein or calories) and offer him or her support with eating. – Level IV
- Plan and implement a nutritional support and/or supplementation program for nutritionally compromised individuals. – Level IV
- If dietary intake remains inadequate, consider alternative nutritional interventions. – Level IV
- Nutritional supplementation for critically ill older clients should be considered. – Level Ib

### Discussion of Evidence
There is a strong relationship between nutritional status (including hydration) and pressure ulcer development. Nutrition plays an important role in pressure ulcer prevention and healing, and is critical in maintaining tissue integrity (Consortium for Spinal Cord Medicine, 2000; Ferguson et al., 2000; RCN, 2000). Specific factors that are significantly associated with the development and prolonged healing of pressure ulcers are impaired nutrition and reduced nutritional intake. Nutritional status influences the integrity of the skin and support structures (WOCN, 2003). Lack of vitamins and trace elements may predispose the patient to an increased risk of pressure damage (RCN, 2000).

Ferguson et al. (2000) indicate that nutritional intervention begins with nutrition screening and assessment; the goal is to ensure that dietary intake contains adequate nutrients to maintain or improve nutritional status. Nutritional assessment should be performed on entry to a new health care setting and whenever there is a change in an individual’s condition that may increase the risk of malnutrition. Detailed screening and assessment may be beneficial, and referral to a registered dietitian is encouraged (Ferguson et al., 2000; RCN, 2000). This assessment should include (WOCN, 2003): current and usual weight; history of involuntary weight gain/loss; nutritional intake versus needs (including protein, calorie and fluid needs); appetite; dental health; chewing/swallowing difficulties; person’s ability to feed him/herself; medical/surgical history that may impact on nutrient absorption; drug/nutrient interaction; psychosocial factors (finances, food preferences, availability of food preparation facilities) and cultural/lifestyle influences. It is essential to ensure that the individual can tolerate and/or manage the recommended diet. A referral to a speech-language pathologist should be made for a swallowing assessment in situations where the nutritional screen indicates chewing or swallowing difficulties.

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
Risk Assessment & Prevention of Pressure Ulcers

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).

Two cohort prospective studies document the role that deficiencies of calories, protein and iron play in the development of pressure ulcers (AHCPR, 1992). The National Pressure Ulcer Advisory Panel recommends that patients with pressure ulcers who are underweight or losing weight receive enhanced caloric and protein supplementation. Recommendations for calorie and protein requirements in those with pressure ulcers are 35-40 kcal/kg of body weight/day for total calories, and 1.0-1.5 g protein/kg of body weight/day for total protein (WOCN, 2003). There is no evidence to support the practice of vitamin C and zinc supplementation for pressure ulcer prevention (WOCN, 2003). Langer et al (2004) concluded in a systematic review that it was not possible to reach a conclusion on the effect of enteral and parenteral nutrition on the prevention and treatment of pressure ulcers.

Bourdel-Marchasson et al. (2000) conducted a multi-centre RCT of 622 patients to assess the effect of nutritional supplementation on dietary intake and on pressure ulcer development in critically ill older patients. A nutritional intervention group received two oral supplements per day in addition to the normal diet. It was found that nutritional supplement intervention was associated with a decreased risk of pressure ulcer incidence.

**Recommendation 3.12**

Institute a rehabilitation program, if consistent with the overall goals of care and the potential exists for improving the individual's mobility and activity status. Consult the care team regarding a rehabilitation program.

*Level of Evidence – IV*

**Discussion of Evidence**

Immobility and inactivity has been associated with larger ulcers, and bed and chair-bound persons are at higher risk for pressure ulcer development. Researchers have reported that the use of active and passive range of motion exercises promotes activity and reduces the effects of pressure on tissue. Exercise, ambulation, proper positioning, strengthening and increased range of motion all assist in the prevention process (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000).
Discharge/Transfer of Care Arrangements

**Recommendation 4.1**

Advance notice should be given when transferring a client between settings (e.g., hospital to home/long-term care facility/hospice/residential care) if pressure reducing/relieving equipment is required to be in place at time of transfer (e.g., pressure relieving mattresses, seating, special transfer equipment). Transfer to another setting may require a site visit, client/family conference, and/or assessment for funding of resources to prevent the development of pressure ulcers.

*Level of Evidence – IV*

**Recommendation 4.2**

Clients moving between care settings should have the following information provided:
- Risk factors identified;
- Details of pressure points and skin condition prior to discharge;
- Type of bed/mattress the client requires;
- Type of seating the client requires;
- Details of healed ulcers;
- Stage, site and size of existing ulcers;
- History of ulcers, previous treatments and products used;
- Type of dressing currently used and frequency of change;
- Adverse reactions to wound care products;
- Summary of relevant laboratory results; and
- Need for on-going nutritional support.

*Level of Evidence – IV*

**Discussion of Evidence**

In order to ensure a smooth transfer of clients who have been identified at risk for developing pressure ulcers between practice settings, and to provide consistency of care, it is essential to ensure that funding and equipment is in place to prevent an interruption in the plan of care. The Royal College of Nursing (2000) recommends that there should be policies and procedures for the transfer of individuals between care settings in order to enhance continuity of care. 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).
# Education Recommendations

## Recommendation 5.1

Educational programs for the prevention of pressure ulcers should be structured, organized, and comprehensive and should be updated on a regular basis to incorporate new evidence and technologies. Programs should be directed at all levels of health care providers including clients, family or caregivers.

*Level of Evidence – III*

## Discussion of Evidence

All health care providers should receive relevant education in pressure ulcer risk assessment and prevention (NICE, 2001). The Royal College of Nursing (2000) identified several studies (Bergstrom Braden, Boynton & Bruch, 1995; Moody et al, 1988) reported in a systematic review by McGough (as cited in RCN, 2000) that support the concept that education programs may reduce the incidence and prevalence of pressure ulcer development. They state that “a continuous quality assurance approach would advocate that increasing people's awareness about pressure ulcer risk assessment and prevention via a coordinated and structured educational program, is more likely to result in benefits for patients than providing no program” (pg. 34). In addition, several clinical practice guidelines support educational intervention for improvement of pressure ulcer prevention (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000; NICE, 2001; RCN, 2000; WOCN, 2003).

In our current health care environment, individuals experience significantly shorter hospital stays. Frequently, the focus of care is on maximizing functional gains in activities of daily living and mobility, and education is informal or minimal. It is essential, however, that individuals be provided with the basic knowledge necessary to return them to home and their communities (Consortium for Spinal Cord Medicine, 2000), and have this knowledge provided in a way that is meaningful and useful to the client and caregiver. Boyd (1987) in a systematic review indicates that the majority of people in the United States have a reading comprehension level at or below the eighth grade. This has implications for the development of patient education programs and patient teaching materials. There is extensive discussion in the literature that supports the need to ensure education programs are directed at all levels of clinicians, patients and other caregivers (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000; RCN, 2000; Wiechula, 1997).

Individuals at risk for pressure ulcers should be informed and educated about risk assessment and prevention strategies, and this education should include family and other caregivers, where appropriate. NICE (2001) indicate that patient/caregiver education should provide information regarding personal risk factors for pressure ulcer development, sites that are of the greatest personal risk for ulcer development, how to inspect for skin damage and recognize changes in the skin, how to care for the skin (including methods for pressure relief/reduction), and where the individual or family can get assistance and advice when required, with an emphasis on the need for immediate assessment by a health care professional should signs of deterioration be noted.
**Recommendation 5.2**

The educational program for prevention of pressure ulcers should be based on the principles of adult learning, the level of information provided and the mode of delivery. Programs must be evaluated for their effectiveness in preventing pressure ulcers through such mechanisms as quality assurance standards and audits. Information on the following areas should be included:

- The etiology and risk factors predisposing to pressure ulcer development.
- Use of risk assessment tools, such as the *Braden Scale for Predicting Pressure Sore Risk*. Categories of the risk assessment should also be utilized to identify specific risks and ensure effective care planning.
- Skin assessment.
- Staging of pressure ulcers.
- Selection and/or use of support surfaces.
- Development and implementation of an individualized skin care program.
- Demonstration of positioning/transferring techniques to decrease risk of tissue breakdown.
- Instruction on accurate documentation of pertinent data.
- Roles and responsibilities of team members in relation to pressure ulcer risk assessment and prevention.

*Level of Evidence – III*

**Discussion of Evidence**

Principles of adult learning should guide the development of educational programs, and a variety of educational methods, including lectures (didactic presentations), demonstrations, and written guides with illustrations are recommended (AHCPR, 1992). In order to ensure that education programs are effective, they need to be monitored for outcomes, for example the reduction of prevalence and incidence of ulcers (AHCPR, 1992; RCN, 2000).

The AHCPR (1992) reviewed many educational programs in various clinical settings – spinal cord injury, rehabilitation centres, long-term care and hospitals – in order to identify the essential information for effective pressure ulcer prevention programs. NICE (2001) suggest that education programs should include a focus on the limitations and potential applications of risk assessment tools. The Royal College of Nursing (2000) confirms and further defines the content areas to be included. Specifically, they expand the focus on selection, use and maintenance of pressure redistributing equipment, and the roles and responsibilities of the interdisciplinary team members in pressure ulcer prevention and management as well as the inclusion of patient education.

Effective intervention strategies require the communication of the roles and responsibilities of the interdisciplinary team members (CREST, 1998). Enhanced continuity of care occurs when a team approach is used and each team member's roles and responsibilities are identified (AHCPR, 1992; Consortium for Spinal Cord Medicine, 2000; RCN, 2000). In addition, adopting a team approach requires each team member to take responsibility for facilitating and improving communication, sharing care and responsibility for care. This approach requires that health professionals and clients understand and respect each others roles in the delivery of care (RCN, 2000). The articulation of these roles can be addressed in educational programming aimed at various audiences.

Refer to *Appendix G* for selected educational resources.
### Recommendation 6.1
Organizations need a policy with respect to providing and requesting advance notice when transferring or admitting clients between practice settings when special needs (e.g., surfaces) are required.

*Level of Evidence – IV*

### Recommendation 6.2
Guidelines are more likely to be effective if they take into account local circumstances and are disseminated by ongoing educational and training programs.

*Level of Evidence – IV*

### Recommendation 6.3
Nursing best practice guidelines can be successfully implemented only when there is adequate planning, resources, organizational and administrative support, as well as appropriate facilitation. Organizations may wish to develop a plan for implementation that includes:

- An assessment of organizational readiness and barriers to education.
- 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.

In this regard, 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 the RNAO guideline *Risk Assessment and Prevention of Pressure Ulcers*. *Level of Evidence – IV*

### Recommendation 6.4
Organizations need to ensure that resources are available to clients and staff. These resources include, but are not limited to, appropriate moisturizers, skin barriers, access to equipment (therapeutic surfaces) and relevant consultants (OT, PT, ET, wound specialists, etc.).

*Level of Evidence – IV*

### Recommendation 6.5
Interventions and outcomes should be monitored and documented using prevalence and incidence studies, surveys and focused audits. *Level of Evidence – IV*
Discussion of Evidence

Organizational Commitment
A critical initial step in the implementation of guidelines must be the formal adoption of the guidelines. For example, the organization may consider formally incorporating 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. The role of the project leader (facilitator) is to enable the implementation of the recommendations by assessing, interpreting and acting on the organizational context (RCN, 2003). It is suggested that the RNAO Toolkit (2002c) and opportunities for leadership development in facilitating change be considered to assist organizations to develop the leadership required for successful implementation. Appendix H provides a description of the Toolkit.

Implementation Strategies
Organizations must consider ensuring the acquisition of the resources needed not only to implement, but also to sustain practice that is based on the guideline recommendations. Partridge and Hill (2000) suggest the following key findings from systematic reviews that address guideline implementation in clinical areas other than pressure ulcer prevention:

- Application of the guideline to the characteristics of the local community and setting;
- An initial, specific educationally based strategy to implement the guideline;
- Consideration to amending commonly utilized education and documentation tools to include cues that assist in implementation of the recommendations;
- Outreach by an expert or implementation leader directly to practicing clinicians to impact the success of implementation and maintenance;
- Multiple strategies for implementation are more likely to produce the desired change in clinical practice, including continuing education, ongoing feedback about benchmarks achieved and/or quality indicators monitored; and
- Target barriers to adapting the guideline, including work load and administrative support for change.

Quality Indicator Monitoring
The presence or absence of pressure ulcers is often seen as an indicator of the quality of care and these numbers are often used to make policy and funding decisions (RCN, 2000). Prevalence and incidence measures are defined as follows:

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 is calculated by determining the number of individuals with pressure ulcers divided by the total population at a fixed period of time. This rate provides a snapshot of the distribution of pressure ulcers, however, the rate is effected by factors such as admission of new patients, healing rates, effectiveness of treatment, discharge practices, etc. (CREST, 1998; RCN, 2000).
**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 (1 month). A definition for quality improvement purposes may take into account all new occurrences, even if it is a multiple occurrence during the timeframe for an individual. For example, if five of the ten 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. Incidence measures how many clients develop pressure ulcers during their hospital admission/community care (CREST, 1998; RCN, 2000).

Prevalence rates are difficult to compare between and within care settings and are challenging to interpret because they are affected by incidence, healing rates, admission and discharge practices and policies (RCN, 2000). Incidence rates give an increasingly accurate picture of the effectiveness of risk assessment and preventative interventions as it identifies those who have developed ulcers over time in a specific place of care. However, the measures of incidence need to be considered in conjunction with the type and number of at risk patients admitted into the care setting (RCN, 2000). Evaluation and audits should form an integral component of the quality assurance activities of practice settings (CREST, 1998; RCN, 2000). CREST (1998) suggests that the audit of prevention of pressure ulcers could be divided into two components:  

a) **Client Audit** (CREST, 1998)  
   - Has a risk assessment been carried out with the client?  
   - Is this client identified as being at risk for pressure ulcer development?  
   - If this client is at risk for developing pressure ulcers, has a plan of care been instigated which highlights the following:  
     - Strategies to reduce identified risks (type of bed surface, frequency of position changes)?  
     - Involvement of other disciplines?  

b) **Facility Audit** (CREST, 1998)  
   - Is there a policy for prevention of pressure ulcers?  
   - Is there a mattress replacement policy for the unit?  
   - Is there guidance provided on allocation of pressure relieving equipment?  
   - Does the facility advocate the use of a single risk assessment tool?  
   - Is there guidance provided on the use of staging criteria?  
   - Do staff know about the existing policies?  

The development panel, through a consensus building approach, identified the need to include an evaluation of care being provided in the community by professionals, family and other care providers.  

c) **Community Audit**  
   - Is there a provision to educate clients, family and health care professionals?  
   - Are adequate resources in place to assist care providers?  

Documentation of ongoing monitoring of outcome indicators is essential in order to monitor the success of guideline implementation. Tools that facilitate the monitoring of client outcomes and the quality of care need to be integrated into the organization's quality management process. Sample tools developed for this purpose can be found in *Appendix I*.  

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Research Gaps & Future Implications

The revision panel, in reviewing the evidence for the updating of this guideline, has identified several gaps in the research literature related to pressure ulcer prevention. In considering these gaps, they have identified the following priority research areas:

- The optimum frequency and effectiveness of positioning schedules.
- The effectiveness of positioning schedules for those individuals receiving care on pressure relieving surfaces.
- The effectiveness of pressure relieving interventions for pressure-related ulcers to the heels.
- The most effective surface for prevention of pressure ulcers during the intra-operative period.
- The impact of pain on pressure ulcer development and healing.

The above list, although in no way exhaustive, is an attempt to identify and prioritize the research gaps in this area. Some of the recommendations in this guideline are based on evidence gained from qualitative or quantitative research, while others are based on consensus or expert opinion. Further substantive research is required in some areas to validate the expert opinion and impact knowledge that will lead to improved practice and outcomes for those at risk of developing pressure ulcers.
**Evaluation/Monitoring of Guideline**

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

<table>
<thead>
<tr>
<th>Structure</th>
<th>Process</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>To evaluate the supports available in the organization that allow nurses to assess risk of and prevent pressure ulcers.</td>
<td>To evaluate changes in practice that lead towards improved risk assessment and prevention of pressure ulcers.</td>
<td>To evaluate the impact of implementing the recommendations.</td>
</tr>
<tr>
<td>Organization</td>
<td>Review of best practice guideline recommendations by organizational committee(s) responsible for policies/procedures. Availability of products for prevention, including pressure reducing/relieving support surfaces for use by clients identified at risk for pressure ulcer development. Availability of, and access to, health care professionals with expertise in pressure ulcer prevention.</td>
<td>A risk assessment tool, such as the Braden Scale, is used to assess pressure ulcer risk.</td>
</tr>
<tr>
<td>Nurse</td>
<td>Availability of educational opportunities re: pressure ulcer risk assessment and prevention within the organization. Number of nurses attending educational sessions re: pressure ulcer risk assessment and prevention. Availability of ongoing support for clinical application of educational content related to pressure ulcer prevention.</td>
<td>Pressure ulcer risk assessment is conducted, including: - Skin inspection; and - Risk assessment score. Pressure ulcer prevention strategies are implemented, including: - Skin care; - Turning schedules; - Pressure reducing/relieving surfaces; - Nutritional interventions. Nurses' self-assessed knowledge of: - The etiology and risk factors for pressure ulcer development; - Use of risk assessment tools, such as the Braden Scale – assessment and analysis of result;</td>
</tr>
<tr>
<td>Structure</td>
<td>Process</td>
<td>Outcome</td>
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<td></td>
<td>■ Skin assessment including pressure ulcer staging (NPUAP); ■ Support surfaces; and ■ Positioning techniques. Nurses' self-reported awareness of communication needs when transferring a client within and between care settings.</td>
<td></td>
</tr>
<tr>
<td>Client</td>
<td>Percentage of clients reporting an assessment of their pressure ulcer risk. Percentage of clients reporting a review of their prevention plan with the nurse. Percentage of clients reporting discharge teaching appropriate to his/her care needs and setting of care. Percentage of clients assessed to need nutritional interventions, a turning schedule and pressure reduction/relief, etc. who actually receive it.</td>
<td>Absence of Stage I pressure ulcers or breakdown caused by friction and shear (prevention). Appropriate use of pressure reducing/relieving surfaces. Appropriate pain relief allowing acceptable positioning schedule. Appropriate guideline interventions are provided.</td>
</tr>
<tr>
<td>Financial Costs</td>
<td>Provision of adequate financial resources for the level of staffing necessary to implement the guideline recommendations.</td>
<td>Cost related to implementing guideline: ■ Staff education; ■ Documentation systems; ■ Pressure relieving/reducing equipment. Overall resource utilization.</td>
</tr>
</tbody>
</table>
Implementation Strategies

The Registered Nurses’ Association of Ontario and the guideline revision panel have compiled a list of implementation strategies to assist health care organizations or health care disciplines who are interested in implementing this guideline. A summary of these strategies follows:

- Have at least one dedicated person such as an advanced practice nurse or a clinical resource nurse who will provide support, clinical expertise and leadership. The individual should also have good interpersonal, facilitation and project management skills.
- Conduct an organizational needs assessment related to prevention of pressure ulcers to identify current knowledge base and further educational requirements.
- Initial needs assessment may include an analysis approach, survey and questionnaire, group format approaches (e.g., focus groups), and critical incidents.
- Establish a steering committee comprised of key stakeholders and interdisciplinary members committed to lead the change initiative. Identify short term and long term goals. Keep a work plan to track activities, responsibilities and timelines.
- Create a vision to help direct the change effort and develop strategies for achieving and sustaining the vision.
- Program design should include:
  - Target population;
  - Goals and objectives;
  - Outcome measures;
  - Required resources (human resources, facilities, equipment); and
  - Evaluation activities.
- Design educational sessions and ongoing support for implementation. The education sessions may consist of presentations, facilitator’s guide, handouts, and case studies. Binders, posters and pocket cards may be used as ongoing reminders of the training. Plan education sessions that are interactive, include problem solving, address issues of immediate concern and offer opportunities to practice new skills (Davies & Edwards, 2004).
- Provide organizational support such as having the structures in place to facilitate the implementation. For example, hiring replacement staff so participants will not be distracted by concerns about work and having an organizational philosophy that reflects the value of best practices through policies and procedures. Develop new assessment and documentation tools (Davies & Edwards, 2004).
- Identify and support designated best practice champions on each unit to promote and support implementation. Celebrate milestones and achievements, acknowledging work well done (Davies & Edwards, 2004).
- Organizations implementing this guideline should adopt a range of self-learning, group learning, mentorship and reinforcement strategies that will over time, build the knowledge and confidence of nurses in implementing this guideline.
- Beyond skilled nurses, the infrastructure required to implement this guideline includes access to specialized equipment and treatment materials. Orientation of the staff to the use of specific products and technologies must be provided and regular refresher training planned.
- Teamwork, collaborative assessment and treatment planning with the client and family and interdisciplinary team are beneficial in implementing guidelines successfully. Referral should be made as necessary to services or resources in the community or within the organization.
In addition to the strategies mentioned above, the RNAO has developed resources that are available on the website. A *Toolkit* for implementing guidelines can be helpful if used appropriately. A brief description about this *Toolkit* can be found in *Appendix H*. A full version of the document in pdf format is also available at the RNAO website, [www.rnao.org/bestpractices](http://www.rnao.org/bestpractices).

**Process for Update/Review of Guideline**

The Registered Nurses’ Association of Ontario proposes to update this best practice guideline as follows:

1. 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 Guidelines program staff will regularly monitor relevant literature in the field.

3. Based on the results of the monitor, program staff may recommend an earlier revision period. Appropriate consultation with a team of members comprised of 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, program staff will commence the planning of the review process by:
   a. Inviting 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. Compiling feedback received, questions encountered during the dissemination phase as well as other comments and experiences of implementation sites.
   c. Compiling new clinical practice guidelines in the field, systematic reviews, meta-analysis papers, technical reviews, randomized controlled trial research, and other relevant literature.
   d. Developing detailed work plan with target dates and deliverables.

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


Folkedahl, B.A., Frantz, R.A. & Goode, C. (2002). Prevention of pressure ulcers evidence-based protocol. In M.G. Titler (Series Ed.), Series on Evidence-Based Practice for Older Adults, Iowa City, IA: The University of Iowa College of Nursing Gerontological Nursing Interventions Research Center, Research Translation and Dissemination Core.


Risk Assessment & Prevention of Pressure Ulcers


Bibliography


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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 pressure ulcer risk assessment and prevention 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 2004.

STEP 1 – DATABASE Search
A database search for existing literature 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 2004 was conducted in August 2004. This search was structured to answer the following questions:

1. What are the risk factors/contributing factors or predictors for the development of pressure ulcers in the adult population?
2. What is the evidence for pressure ulcer prevention?
3. What interventions do nurses need to initiate to prevent pressure ulcers?
4. How effective are the following in the prevention of pressure ulcers:
   - Assessment of risk factors;
   - Pressure relief; and
   - Pressure reduction?
5. What education do nurses need around strategies for the prevention of pressure ulcers?
6. What support does the organization need to provide to ensure nurses have the knowledge and skills for pressure ulcer prevention?
7. What supports are needed for successful implementation of a pressure ulcer prevention program?

Detailed search strings developed to address these questions are available on the RNAO web site at www.rnao.org/bestpractices.

STEP 2 – Structured Web Site Search
One individual searched an established list of web sites for content related to the topic area in July 2004. This list of sites, reviewed and updated in May 2004, was compiled based on existing knowledge of evidence-based practice web sites, 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 web sites at times did not house a guideline but directed to another web site or source for guideline retrieval. Guidelines were either downloaded if full versions were available or were ordered by phone/email.

- Alberta Heritage Foundation for Medical Research – Health Technology Assessment: http://www.ahfmr.ab.ca/hta
- Alberta Medical Association – Clinical Practice Guidelines: http://www.albertadoctors.org
- American College of Chest Physicians: http://www.chestnet.org/guidelines
- American Medical Association: http://www.ama-assn.org
Nursing Best Practice Guideline

- Bandolier Journal: http://www.jr2.ox.ac.uk/bandolier
- Canadian Centre for Health Evidence: http://www.cche.net/che/home.asp
- Canadian Cochrane Network and Centre: http://cochrane.mcmaster.ca
- 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
- Centre for Evidence-Based Nursing: http://www.york.ac.uk/healthsciences/centres/evidence/cebn.htm
- Centre for Evidence-Based Pharmacotherapy: http://www.aston.ac.uk/lhs/teaching/pharmacy/cebp
- Centre for Health Evidence: http://www.cche.net/che/home.asp
- Centre for Health Services and Policy Research: http://www.chspr.ubc.ca
- Clinical Resource Efficiency Support Team (CREST): http://www.crestni.org.uk
- Cochrane Database of Systematic Reviews: http://www.update-software.com/cochrane
- Database of Abstracts of Reviews of Effectiveness (DARE): http://www.york.ac.uk/inst/crd/darehp.htm
- Evidence-based On-Call: http://www.eboncall.org
- Guidelines Advisory Committee: http://gacguidelines.ca
- Institute for Clinical Evaluative Sciences: http://www.ices.on.ca
- Institute for Clinical Systems Improvement: http://www.icsi.org/index.asp
- Institute of Child Health: http://www.ich.ucl.ac.uk/ich
- Joanna Briggs Institute: http://www.joannabriggs.edu.au
- Medscape Women's Health: http://www.medscape.com/womenshealthhome
- National Institute for Clinical Excellence (NICE): http://www.nice.org.uk
- Netting the Evidence: A SchARR Introduction to Evidence-Based Practice on the Internet: http://www.shef.ac.uk/scharrr/Netting
- NHS Centre for Reviews and Dissemination: http://www.york.ac.uk/inst/crd
- NHS Nursing & Midwifery Practice Development Unit: http://www.nmpdu.org
- NIH Consensus Development Program: http://consensus.nih.gov/about/about.htm
- Queen's University at Kingston: http://post.queensu.ca/~bhc/qim/cpgs.html
- Royal College of General Practitioners: http://www.rcgp.org.uk
- Royal College of Nursing: http://www.rcn.org.uk/index.php
- Royal College of Physicians: http://www.rcplondon.ac.uk
- Sarah Cole Hirsh Institute – Online Journal of Issues in Nursing: http://fpb.cwru.edu/HirshInstitute
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- Scottish Intercollegiate Guidelines Network: http://www.sign.ac.uk
- SUMSearch: http://sumsearch.uthscsa.edu
- The Qualitative Report: http://www.nova.edu/sss/QR
- Trent Research Information Access Gateway: http://www.shef.ac.uk/scharr/triage/TRIAGEindex.htm
- TRIP Database: http://www.tripdatabase.com
- University of California, San Francisco: http://medicine.ucsf.edu/resources/guidelines/index.html
- University of Laval – Directory of Clinical Information Websites: http://132.203.128.28/medecine

STEP 3 – Search Engine Web Search
A web site 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 web sites 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.

SEARCH RESULTS:
The search strategy described above resulted in the retrieval of 1,818 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 106 abstracts were identified for article retrieval and quality appraisal. The quality appraisal was conducted by a Masters prepared nurse with expertise in critical appraisal. The tool used to conduct this work was one developed by the Effective Public Health Practice Project (EPHPP) for appraising quantitative studies.

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 guidelines included:

Folkedahl, B.A., Frantz, R.A. & Goode, C. (2002). Prevention of pressure ulcers evidence-based protocol. In M.G. Titler (Series Ed.), Series on Evidence-Based Practice for Older Adults, Iowa City, IA: The University of Iowa College of Nursing Gerontological Nursing Interventions Research Center, Research Translation and Dissemination Core.


Appendix B: Skin Assessment

Skin inspection should be based on a head-to-toe assessment of those areas known to be vulnerable for each client (see illustrations for at risk areas). This assessment is best conducted when dressing or undressing in order to better visualize vulnerable areas. Any aids (braces, anti-embolic stockings, etc.) should be removed prior to this inspection.

Vulnerable areas typically include:
- temporal region and occiput of the skull;
- ears;
- scapulae;
- spinous processes;
- shoulders;
- elbows;
- sacrum;
- coccyx;
- ischial tuberosities;
- femoral trochanters;
- knees;
- malleoli;
- metatarsals;
- heels;
- toes;
- areas of the body covered by anti-embolic stockings or restrictive clothing;
- areas where pressure, friction and shear are exerted during activities of daily living; and
- parts of the body in contact with equipment.

Additional areas should be inspected as determined by the individual's condition (NICE, 2001; Weir, 2001).

A comprehensive skin assessment for sites of non-blanching erythema requires both visual and tactile inspection. Early indications of a developing ulcer include:
- Change in colour (redness/erythema), texture and sensation of the skin surface.
- In individuals with darkly pigmented skin, observe for persistent erythema, non-blanching hyperemia, blisters and discolouration (purple/blue localized areas), localized heat (replaced by coolness as tissue is damaged), localized edema and localized induration.
PRESSURE POINTS IN VARIOUS POSITIONS

Client Education – Enabler for Client or Family/Caregiver to Assess Skin for Changes

CHECKING SKIN FOR CHANGES

1. Check the whole body, make sure you pay special attention to bony areas.
   - By inspecting skin regularly, you can spot a problem at the very beginning. Checking the skin is the way to spot the warning signals of a problem.
   - Use prevention products on those areas that may be affected by pressure.

2. What should you look for?
   - Redness, blisters, opening in skin, rashes, etc. Feel for heat in red areas with the back of your fingers.

3. Check any areas that may have been previously broken and have since healed over – scar tissue breaks easily.

4. How often should a skin inspection occur?
   - At least twice daily: Morning and evening when dressing or undressing is recommended.
   - Check more frequently if there is an increase in sitting or lying times.
   - It is recommended that you check whenever changing positions.

5. Your caregiver can check your skin, or you can check your skin using a long-handled mirror.

If you have been lying on your back, observe these areas for changes.

If you have been resting on your side, observe these areas for changes.
6. Which parts to check?
   - Check the front, back, and sides of the body.
   - Also check the areas where there may have been pressure.

7. What to do if you notice a change:
   - Apply creams to areas of redness (your nurse will have shown you the barrier creams to use).
   - Show your nurse or doctor as soon as possible (especially if redness does not go away after the pressure has been removed for longer than 15 minutes).
   - Do not massage area.
   - Avoid lying or sitting on reddened area, if possible.

Adapted with permission of Linda Simmons, RN, BScN, Oshawa, Ontario

Illustrated by:
Nancy A. Bauer, BA, Bus Admin, RN, ET
### Appendix C: Braden Scale for Predicting Pressure Sore Risk

|--------------------|-----------------------|-----------------|
| Ability to respond meaningfully to pressure-related discomfort | 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. | 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. |

<table>
<thead>
<tr>
<th>Moisture</th>
<th>1. Constantly Moist</th>
<th>2. Very Moist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree to which skin is exposed to moisture</td>
<td>Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.</td>
<td>Skin is often, but not always, moist. Linen must be changed at least once a shift.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity</th>
<th>1. Bedfast</th>
<th>2. Chairfast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of physical activity</td>
<td>Confined to bed.</td>
<td>Ability to walk severely limited or nonexistent. Cannot bear own weight and/or must be assisted into chair or wheelchair.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mobility</th>
<th>1. Completely Immobile</th>
<th>2. Very Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to change and control body position</td>
<td>Does not make even slight changes in body or extremity position without assistance.</td>
<td>Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nutrition</th>
<th>1. Very Poor</th>
<th>2. Probably Inadequate</th>
</tr>
</thead>
</table>
| Usual food intake pattern | 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. | 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. |

<table>
<thead>
<tr>
<th>Friction and Shear</th>
<th>1. Problem</th>
<th>2. Potential Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Date of Assessment</th>
</tr>
</thead>
</table>
| 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
Interventions by Level of Risk

**AT RISK (15-18)**
- Turn, turn, turn
- Maximal remobilization
- Protect heels
- Manage moisture, nutrition, friction and shear
- Pressure reduction support surface if bed – or chair-bound

*If other major risk factors are present (advanced age, fever, poor dietary intake of protein, diastolic pressure below 60, hemodynamic instability) advance to next level of risk.

**MODERATE RISK (13-14)**
- Turning schedule with 30° rule
- Pressure reduction support surface
- Maximal remobilization
- Protect heels
- Manage moisture, nutrition, friction and shear

*If other major risk factors present, advance to next level of risk.

**HIGH RISK (10-12)**
- Pressure reduction support surface
- Increase frequency of turning, 30° with foam wedges, supplement with small shifts
- Maximal remobilization
- Protect heels
- Manage moisture, nutrition, friction and shear

**LOW AIR-LOSS BEDS AND PREVENTION**

- High risk
  - + uncontrolled pain
  - or
  - severe pain exacerbated by turning
  - or
  - Braden scale score \( \leq 9 \) (severe risk)
  - + Additional risk factors

**Please Note:** low air loss beds do not substitute for turning schedules
MANAGE MOISTURE
- Use commercial moisture barrier
- Use absorbent pads or diapers that wick and hold moisture
- Address cause, if possible
- Offer bedpan/urinal and glass of water in conjunction with turning schedules

MANAGE NUTRITION
- Increase protein intake
- Increase calorie intake to spare proteins
- Supplement with multi-vitamin (should have Vitamin A, C & E)
- Act quickly to alleviate deficits
- Consult dietitian

MANAGE FRICTION AND SHEAR
- Elevate head of bed no more than 30°
- Use trapeze when indicated
- Use lift sheet to move patient
- Protect elbows and heels if being exposed to friction

OTHER GENERAL CARE ISSUES
- No massage of reddened bony prominences
- No “donut” type devices
- Maintain good hydration
- Avoid drying the skin
Appendix E: Staging of Pressure Ulcers

National Pressure Ulcer Advisory Panel (1989)

Stage I: A Stage I pressure ulcer is an observable pressure related alteration of intact skin whose indicators as compared to the adjacent or opposite area on the body may include changes in one or more of the following: skin temperature (warmth or coolness), tissue consistency (firm or boggy feel), and/or sensation (pain, itching). The ulcer appears as a defined area of persistent redness in lightly pigmented skin, whereas in darker skin tones, the ulcer may appear with persistent red, blue, or purple hues (NPUAP, 1998).

Stage II: Partial thickness skin loss involving epidermis, dermis or both. The ulcer is usually superficial and presents clinically as an abrasion, blister or shallow crater.

Stage III: Full thickness skin loss involving damage to, or necrosis of, subcutaneous tissue that may extend down to, but not through, underlying fascia. The ulcer presents clinically as a deep crater with or without undermining of adjacent tissue.

Stage IV: Full thickness skin loss with extensive destruction, tissue necrosis, or damage to muscle, bone or supporting structures (e.g., tendon, joint, capsule). Undermining and sinus tracts also may be associated with Stage IV pressure ulcers.

Pictures courtesy of KCI Medical Canada, Inc.
Appendix F: Pressure Reduction and Pressure Relief

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

Pressure Reducing Surface: A surface that reduces the 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, 1991; WOCN, 1987).

Pressure Relieving Surface: A surface that consistently reduces the interface pressure between the body surface and resting surface below capillary closing pressure (AHCPR, 1994; Mulder et al., 1991; WOCN, 1987).

Indications:
1. To prevent skin breakdown, or further skin breakdown.
2. To promote healing in the patient who already has skin breakdown involving multiple surfaces (Bryant, 1992).

There are seven basic requirements that a support surface must meet in order to prevent pressure and shear. The surface must:
1. Conform to bony prominences without resistance;
2. Not have significant memory;
3. Allow patient immersion;
4. Not “bottom out”;
5. Relieve shear caused by patient movement;
6. Prevent skin maceration; and

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.

Overlay mattresses are devices that are applied over the surface of the hospital mattress. Most overlays provide pressure reduction. Overlays may be static (foam, gel, water, air filled) or dynamic (low air loss, alternating air).
**Risk Assessment & Prevention of Pressure Ulcers**

**Static Devices**
These support surfaces 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).

When selecting a static support surface made of foam, consider the following characteristics of foam: stiffness, density and thickness. Indentation load deflection (ILD) is a measure of stiffness. Typical values for foam mattress overlays would be a 25% ILD of 30 lbs., a density of 1.3 pounds per cubic foot, and thickness of 3 to 4 inches (Kemp & Krouskop, 1994).

Use a static support surface if a patient can assume a variety of positions without bearing weight on a pressure ulcer and without “bottoming out” (AHCPR, 1994).

**Dynamic Devices**
Use a dynamic support surface if the patient cannot assume a variety of positions without bearing weight on a pressure ulcer, if the patient fully compresses the static support surface, or if the pressure ulcer does not show evidence of healing (AHCPR, 1994).

Dynamic devices have moving parts and are attached to an electrical power source. These devices compensate for the motionless or compromised body movement by shifting the weight or load from areas with bony prominences to areas under lower pressure. If a patient has large Stage III or IV pressure ulcers on multiple turning surfaces, a low-air loss bed or an air-fluidized bed may be indicated (AHCPR, 1994).

When excess moisture on intact skin is a potential source of maceration and skin breakdown, a support surface that provides airflow can be important in drying the skin and preventing pressure ulcers (AHCPR, 1994). Moist skin is more likely to abrade and blister.
Summary of Pressure Redistributing Surfaces:

<table>
<thead>
<tr>
<th>Surface</th>
<th>Description</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STATIC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thick foam mattress</td>
<td>Overlay or mattress replacement</td>
<td>Inexpensive and portable</td>
<td>May be difficult to clean, may be single use</td>
<td>Patient is able to shift weight, no pressure ulcers</td>
</tr>
<tr>
<td>Water mattress</td>
<td>Waterfilled mattress or overlay</td>
<td>Re-distribution of pressure secondary to emersion into water surface</td>
<td>Difficult to maintain, heavy, difficult to transport</td>
<td>Patient is able to shift weight, free of pressure ulcers</td>
</tr>
<tr>
<td>Air flotation mattress</td>
<td>Inflatable plastic or nylon mattress overlay</td>
<td>Inexpensive, portable, easy to store, moderate emersion into surface</td>
<td>Air leaks, risk of bottoming out, require regular monitoring</td>
<td>Patient is able to shift weight, no pressure ulcers or low stage pressure ulcer</td>
</tr>
<tr>
<td>Low air loss mattress/bed</td>
<td>Multiple inflated fabric pillows, may be attached to a bed frame</td>
<td>Lightweight, re-distribute peak pressures via emersion into air surface</td>
<td>Expensive, warm, risk of bottoming out</td>
<td>Functionally dependent patients with large, deep or multiple ulcers</td>
</tr>
<tr>
<td>Alternating air pressure mattress</td>
<td>Multiple air filled compartments, air pressure levels fluctuate within and between compartments</td>
<td>Light weight, re-distribute pressure via emersion into air compartments and by alternating pressure levels within and between compartments</td>
<td>Expensive, noisy, complex to setup, risk of bottoming out, warm</td>
<td>Functionally dependent patients with large, deep or multiple ulcers</td>
</tr>
<tr>
<td><strong>DYNAMIC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air fluidized mattress/bed</td>
<td>Contains beads which are fluidized by a flow of warm pressurized air, covered in polyester</td>
<td>Feces and urine pass through the sheet into the beads. Frequent turning unnecessary</td>
<td>Very expensive and heavy, generate heat, causes insensible water loss, decreases patient mobility, noisy</td>
<td>Functionally dependent patients with large, deep or multiple ulcers</td>
</tr>
<tr>
<td>Bariatric bed</td>
<td>For clients over 250 lbs. May be static or dynamic</td>
<td>Designed to fit body shape and weight of bariatric population</td>
<td>Expense and availability</td>
<td>For patients over 250 lbs and up to 850 lbs</td>
</tr>
</tbody>
</table>

Appendix G: Educational Resources

The following resources for nurses are intended to assist in supporting pressure ulcer risk assessment and prevention education. These are examples of resources only, and are not intended to be a comprehensive listing.

The Joanna Briggs Institute was established to address the need for a collaborative approach to the evaluation of evidence derived from a diverse range of sources, including experience, expertise and all forms of rigorous research and the translation, transfer and utilization of the “best available” evidence into health care practice.

Registered Nurses’ Association of Ontario: [www.rnao.org](http://www.rnao.org)
The Registered Nurses’ Association of Ontario (RNAO) is the professional association representing registered nurses in Ontario. It is the strong, credible voice leading the nursing profession to influence and promote healthy public policy. The Nursing Best Practice Guidelines Program was launched in November 1999 with funding from the Government of Ontario. The purpose of this multi-year program is to support Ontario nurses by providing them with best practice guidelines for client care.

Royal College of Nursing: [www.rcn.org.uk](http://www.rcn.org.uk)
The Royal College of Nursing (RCN) represents nurses and nursing, promotes excellence in practice and shapes health policies.

Wound Care Associations:

**Canadian Association of Enterostomal Therapists (CAET):** [www.caet.ca](http://www.caet.ca)
The Canadian Association for Enterostomal Therapy (C.A.E.T.) is a professional organization founded to represent Enterostomal Therapy nursing. The C.A.E.T. believes that all persons with the following conditions are entitled to the comprehensive services of an Enterostomal Therapy nurse: abdominal stomata (opening), fistulae, draining wounds, and selected disorders of the integumentary (skin), gastrointestinal, and genitourinary systems.

**Canadian Association of Wound Care (CAWC):** [www.cawc.net](http://www.cawc.net)
The CAWC is a non-profit organization of health care professionals, industry participants, patients and caregivers dedicated to the advancement of wound care in Canada.

**Cochrane Wounds Group:**
[www.york.ac.uk/healthsciences/gsp/themes/woundcare/Wounds](http://www.york.ac.uk/healthsciences/gsp/themes/woundcare/Wounds)
The Cochrane Collaboration is an international not-for-profit organization. Its aim is to make up-to-date, accurate information about the effects of health care readily available world-wide. The Cochrane Wounds Group uses evidence from trials to conduct systematic reviews to establish the effectiveness of:

- interventions for the prevention and treatment of wounds
- interventions for the prevention and treatment of wound complications.
European Pressure Ulcer Advisory Panel (EPUAP): [www.epuap.org](http://www.epuap.org)
The European Pressure Ulcer Advisory Panel leads and supports all European countries in the efforts to prevent and treat pressure ulcers.

National Pressure Ulcer Advisory Panel: [www.npuap.org](http://www.npuap.org)
The National Pressure Ulcer Advisory Panel (NPUAP) provides multidisciplinary leadership for improved patient outcomes in pressure ulcer prevention and management through education, public policy and research.

The WOCN Society is a professional nursing society which supports its members by promoting educational, clinical and research opportunities to advance the practice and guide the delivery of expert health care to individuals with wounds, ostomies and incontinence.

Wound Care Sites:

Ostomy/Wound Management: [www.o-wm.com/owm](http://www.o-wm.com/owm)
Ostomy/Wound Management is an online resource for clinical, practical, and professional information about skin, wound, ostomy and incontinence care. This peer reviewed journal is published eleven times per year.

Prevention Plus: [www.bradenscale.com](http://www.bradenscale.com)
The mission of Prevention Plus is to provide health care professionals with a simple way to obtain information related to the *Braden Scale for Predicting Pressure Sore Risk* and its appropriate use in a program of prevention of pressure ulcers. They provide accurate, evidence-based information and practical tools to the many health professionals who are striving to improve the quality of care in their facilities or agencies.

World Wide Wounds: [www.worldwidewounds.com](http://www.worldwidewounds.com)
The mission of World Wide Wounds is to be the premier online resource for peer-reviewed information on dressing materials providing practical guidance on all aspects of wound management to health professionals worldwide.

Other Resources:

Industry Resources
Companies manufacturing pressure ulcer products often have educational resource material specific to product use. Many also have educational programs about wound care in general, and risk assessment and prevention/treatment of pressure ulcers specifically. Consult your vendor company representative to determine educational resources that may be appropriate for your specific needs and clinical setting.
Appendix H: Description of the Toolkit

Best practice guidelines can only be successfully implemented if there are: adequate planning, resources, organizational and administrative support as well as appropriate facilitation. 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 in implementing a guideline:

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.
Appendix I: Monitoring Tools

Tools that facilitate the monitoring of client outcomes and the quality of care need to be integrated into quality management processes. The following samples of monitoring tools have not been extensively tested, however they are provided as examples for organizations to consider in their implementation process.

Sample 1: Pressure Ulcers Management Monitor

Reproduced with permission.
Folkedahl, B. A., Frantz, R. A. & Goode, C. (2002). Prevention of pressure ulcers evidence-based protocol. In M.G. Titler (Series Ed.), Series on Evidence-Based Practice for Older Adults, Iowa City, IA: The University of Iowa College of Nursing Gerontological Nursing Interventions Research Center, Research Translation and Dissemination Core.
www.nursing.uiowa.edu/centers/gnirc/disseminatecore.htm

For each patient receiving the prevention of pressure ulcer protocol, please complete the chart below. This chart should be completed at least weekly for each patient who is receiving the pressure ulcers management program. For each patient receiving the management intervention, please keep a record of the changes observed in his or her patient records.

Please make a copy of the chart on the next page and place it in the chart of each patient who is receiving the prevention of pressure ulcers protocol. The outcomes on this chart should be assessed and recorded for each patient on a weekly basis. Add any outcomes that are suited to individual patient needs.

To use the chart: Place the appropriate key criteria next to each separate outcome for each patient assessment.

The example below is for the first outcome (Patient Interview) and displays the various criteria keys:

EXAMPLE

<table>
<thead>
<tr>
<th>Criteria Key</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Y</strong> = Yes/met criteria</td>
</tr>
<tr>
<td><strong>N</strong> = No/criteria not met</td>
</tr>
<tr>
<td><strong>J</strong> = Justified variation/patient not included in the monitor (Note why patient is not included)</td>
</tr>
</tbody>
</table>

Please place the appropriate key next to the outcomes for each assessment period.

<table>
<thead>
<tr>
<th>Outcome 1: Patient Interview/Observation</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
<th>Week 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient observation reveals intact skin</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>
Risk Assessment & Prevention of Pressure Ulcers

Criteria Key

Y = Yes/met criteria
N = No/criteria not met
J = Justified variation/patient not included in the monitor (Note why patient is not included)

Please place the appropriate key next to the outcomes for each assessment period.

<table>
<thead>
<tr>
<th>Outcome 1: Patient Interview/Observation</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
<th>Week 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient observation reveals intact skin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome 2: Patient Record</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation reveals that skin integrity has been maintained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braden Score Documented</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8
The Royal College of Nursing (2003) has developed a series of audit forms to evaluate the implementation of guideline recommendations related to pressure ulcer prevention. These audits include a ward/nursing home/caseload audit, a patient audit, and knowledge test. A summary of the details of the patient audit tool follows, however the full protocol *Pressure Ulcer Risk Assessment and Prevention: Implementation Guide and Audit Protocol 2003* is available at [www.rcn.org.uk](http://www.rcn.org.uk).

**Patient Audit Form:**
- **Patient information** – gender, age, reason for admission, date of initial nursing assessment following admission.
- **Pressure ulcer risk** – date of initial assessment, assessment tool used, score. Evidence of other factors being taken into account in identifying risk should be included. Evidence of reassessments and their frequency should be included.
- **Skin inspection** – requires information from the client’s chart and skin inspection by the reviewer. This requires identification of the pressure ulcer scoring tool used, the presence of any pressure ulcers and grading (documented and actual) based on skin inspection.
- **Equipment** – review of equipment provided, including whether it is in use, requested and not received, or not available.
- **Other aids** – pressure relieving/redistributing devices.
- **Repositioning/moving and handling** – planning, implementing and reviewing repositioning schedules and movement and handling procedures.
- **Seating** – seating assessment documentation, length of time recommended for patients to be seated, and information on implementation and review.
Notes:
Notes:
Notes:
Notes:
Nursing Best Practice Guideline

Risk Assessment & Prevention of Pressure Ulcers

This program is funded by the Government of Ontario