Question: “What is the quality of the evidence concerning pressure ulcer (PU) prevention in the critical care environment?”

Based on the reviewed evidence, the following recommendations are offered for consideration:

- **Staff Nurses**
  - Regard PU Prevention as a high priority in providing quality patient care (19).
  - PU assessment is the responsibility of the staff nurse and should not be delegated to unlicensed assistive personnel (12).
  - Combine nursing judgment with PU assessment tools and interventions in order to individualize care for patients at risk of developing PUs (14).
  - Utilize Braden Scale subscales (nutritional status, moisture, skin assessment) to target specific PU prevention interventions, rather than relying on a turning regime (3, 5, 17, 20, 21).
  - Start PU prevention earlier in patients who are at risk of developing PU (5).
  - Apply intensive PU prevention measures on patients for whom turning protocols are not effective (5).
  - Attend regular PU educational offerings (19).

- **Nurse Educators**
  - Reframe evidence-based PU programs from a leadership and management viewpoint, rather than from a staff nurse viewpoint (8).
  - Present comprehensive evidence-based PU programs on a regular and ongoing basis to all staff nurses, with incorporation of assessment, prevention, and intervention strategies (19).
  - Involve patients and their caregivers in PU prevention by designing PU educational programs and materials geared to their unique needs (7).
  - Encourage staff nurses to voice their attitudes and beliefs surrounding PU assessment, prevention, and interventions (19).

- **Nurse Managers**
  - Heighten the awareness of PU risk assessment and prevention in the critical care and surgical environment (6, 20).
  - Provide staff nurses with educational resources, checklists, guidelines, and risk assessment scales as weapons for PU prevention (7, 19).
  - Create opportunities for positive PU experiences for staff nurses, in order to encourage a permanent change in clinical practice (10, 19).
  - Daily rounding of patient’s Braden Scale Scores as an effective method of identifying patients at high risk of PU development (20).

- **Nurse Executives**
  - Give practice changes time to become embedded within the organization structure, as well as within the nursing culture (11).
  - Operationalize the role of nursing management and leadership in supporting an evidence-based PU program (8).
  - Create a system to monitor both PU Prevalence and PU Incidence in order to determine PU problems and associated root causes (20).
  - Hire additional Wound/Ostomy Nurses as the experts in PU assessment, prevention, and treatment, as well as supporting the bedside nurse (12).
Key Summary of the Evidence:

- **Pressure Ulcer Assessment, Prevention, and Interventions**
  - PU prevention needs a multidisciplinary team effort to achieve the best outcome (19).
  - Positive attitudes may not be enough to ensure practice change takes place (19).
  - The Braden Scale, not nursing judgment, ensures a systematic evaluation of PU risk factors (1, 17).
    - Moisture and sensory perception subscales are difficult to score (15).
  - There is insufficient evidence to recommend specific turning regimes (4, 21).
  - Origin of 2-hour turning schedule is anecdotally linked to the time Florence Nightingale took to reposition every injured soldier on a ward during the Crimean war (7).
  - Also attributed to a 2-hour turning schedule in a 1961 study by Koziak (7).
  - More frequent repositioning on a pressure-reducing mattress does not necessarily lead to fewer PU and cannot be considered as a more effective preventive measure (5).
- **Appropriate strategies to prevent PU include (4, 13):**
  - Use static or dynamic support surfaces, rather than standard surfaces.
  - Reposition the patient, optimize nutritional status, moisturize sacral skin.

- **Critical Care**
  - Research data specific to PU in the ICU is difficult to find (20).
  - No single risk factor for PU development that is valid or discriminatory in a general or specific critically ill population can be identified.
  - Use daily Braden scores for skin care interventions from admission to discharge (20).
  - Sedative effects on patient mobility may have an impact on PU development (20).
  - Rotational beds do not reduce PU, as compared to standard hospital or ICU beds (4).
  - Higher-specification foam mattresses are preferred to standard hospital foam mattresses (21).
  - Cushioned surface facemasks may prevent facial PU in patients receiving non-invasive ventilation (21).
  - A Bowel Management System, with an aggressive PU prevention program, may reduce the moisture to which an incontinent patient's skin is exposed, with a decrease in PU risk (22).

- **Surgical Environment**
  - All surgical patients should be considered to be at risk of PU development because of uncontrollable factors (OR time, hemodynamic state, use of vasoactive meds, etc.) (6).
  - Delayed PU development in surgical patients may add to high PU rates seen in M/S areas (16).
  - Mattress overlays on operating tables are an effective PU prevention strategy (4, 13).
  - Use a risk assessment scale to identify surgical patients at risk for PU development (16).
  - Increased education is needed for perioperative staff nurses regarding PU risk factors, body alignment, pressure reduction strategies, shear and friction, warming blankets, and skin assessment (6, 18).

- **Pediatric**
  - Use a scale demonstrating high sensitivity/specificity to identify pediatric infants/children at risk for PU (9).

- **Long Term Care/Rehabilitation/Nursing Homes**
  - Risk factors most predictive of PU development are moisture, nutrition, friction & shear (3).
  - Patients who developed PU after admission had multiple medical diagnoses (3).
Appendix A - Quality Of The Evidence

<table>
<thead>
<tr>
<th>Key Web Search Terms (1992 – 2006)</th>
<th>Search Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braden Scale, operating room, pressure ulcer prevention</td>
<td>Cochrane Central Registers of Controlled Trials</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Web Search Terms (2002– 2007)</th>
<th>Search Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>critical care, intensive care AND pressure ulcer, pressure ulcer prevention</td>
<td>Cochrane Reviews (CINAHL, MEDLINE, Nursing &amp; Allied Health Collection)</td>
</tr>
<tr>
<td></td>
<td>49</td>
</tr>
</tbody>
</table>

2006 articles eliminated from 2008 review (included in Systematic Reviews, Abstracts only, Replaced by stronger evidence): 4

<table>
<thead>
<tr>
<th>SCORE</th>
<th>LEVELS OF STUDIES</th>
<th>RELEVANT ARTICLES</th>
<th>ARTICLE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Systematic Reviews/Meta-Analysis of Randomized Controlled Trials</td>
<td>4</td>
<td>#4, 13, 17, 21</td>
</tr>
<tr>
<td>9</td>
<td>Large Sample Randomized Controlled Trials</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Small Sample Randomized Controlled Trials</td>
<td>1</td>
<td>#5</td>
</tr>
<tr>
<td>7</td>
<td>Non-random, Controlled Prospective Studies</td>
<td>2</td>
<td>#8, 14</td>
</tr>
<tr>
<td>6</td>
<td>Non-random, Controlled Retrospective Studies</td>
<td>1</td>
<td>#3</td>
</tr>
<tr>
<td>5</td>
<td>Cohort Studies</td>
<td>1</td>
<td>#9</td>
</tr>
<tr>
<td>4</td>
<td>Case-Controlled Studies</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Non-Controlled, Clinical, Descriptive Studies</td>
<td>1</td>
<td>#2</td>
</tr>
<tr>
<td>2</td>
<td>Case Studies</td>
<td>3</td>
<td>#11, 15, 20</td>
</tr>
<tr>
<td>1</td>
<td>Expert Consensus, Manufacturers Recommendations (Literature Reviews)</td>
<td>6</td>
<td>#1, 6, 7, 16, 18, 22</td>
</tr>
<tr>
<td>0</td>
<td>Anecdotes</td>
<td>3</td>
<td>#10*, 12*, 19*</td>
</tr>
</tbody>
</table>

Total Articles 22

(* 10 = qualitative study; *12, *19 = survey questionnaire)
Pressure Ulcers – An Integrative Review
Recommendations & Summary of the Evidence

Appendix B – 2008 Bibliography


Pressure Ulcers – An Integrative Review

Recommendations & Summary of the Evidence


Appendix C – 2006 Deleted Articles


Purpose/intended Audience

Because we want everyone in our communities to have the healthiest lives possible, we are making our evidence reviews available to the communities we serve to help Californians and others lead healthier lives.

Integrative reviews and evidence summaries are provided as a community service for reference purposes only, and must be used only as specified in this disclaimer. These documents are intended for use by clinicians. If you are not a clinician and are reading these documents, you should understand that the information presented is intended and designed for use by those with experience and training in managing healthcare conditions. If you have questions about them, you should seek assistance from your clinician. The information contained in the evidence reviews is not intended to constitute the practice of medicine or nursing, including telemedicine or advice nursing.

Limitations On Use

These documents have been developed to assist clinicians by providing an analytical framework for the effective evaluation and treatment of selected common problems encountered in patients. These documents are not intended to establish a protocol for all patients with a particular condition. While evidence reviews provide one approach to evaluating a problem, clinical conditions may vary significantly from individual to individual. Therefore, clinicians must exercise independent professional judgment and make decisions based upon the situation presented.

Kaiser Permanente's documents were created using an evidence-based process; however, the strength of the evidence supporting these documents differs. Because there may be differing yet reasonable interpretations of the same evidence, it is likely that more than one viewpoint on any given healthcare condition exists. Many reviews will include a range of recommendations consistent with the existing state of the evidence.

All of the Kaiser Permanente integrative reviews and evidence summaries were developed from published research and non-research evidence and do not necessarily represent the views of all clinicians in Kaiser Permanente. These documents may also include recommendations that differ from certain federal or state health care mandates.

Intellectual Property Rights

Unless stated otherwise, all of these materials are protected by copyright and should not be reproduced or altered without express written permission from Kaiser Permanente. Permission is granted to view and use these documents on single personal computers for private use within your hospital or hospital system. No portion of these materials in any form may be distributed, licensed, sold or otherwise transferred to others.

The organizations within Kaiser Permanente retain all worldwide rights, title and interest in and to the documents provided (including, but not limited to, ownership of all copyrights and other intellectual property rights therein), as well as all rights, title and interest in and to their trademarks, service marks and trade names worldwide, including any goodwill associated therewith.

2013 Kaiser Permanente Southern California Regional Nursing Research Program
Nursing.Research@kp.org
No Endorsement or Promotional Use

Any reference in these documents to a specific commercial product, process, or service by trade name, trademark, or manufacturer, does not constitute or imply an endorsement or recommendation by Kaiser Permanente. The views and opinions expressed in these documents may not be used for any advertising, promotional, or product endorsement purposes.

Disclaimer of All Warranties and Liabilities

Finally, although Kaiser Permanente believes that all of the information provided in its documents is accurate, specific recommendations derive from combining the best available evidence. Although we have sought to ensure that the documents accurately and fully reflect our view of the appropriate combination of evidence at the time of initial publication, we cannot anticipate changes and take no responsibility or assume any legal liability for the continued currency of the information or for the manner in which any person who references them may apply them to any particular patient. Kaiser Permanente does not assume any legal liability or responsibility for the completeness, clinical efficacy or value of any apparatus, product, or process described or referenced in the documents. We make no warranties regarding errors or omissions and assume no responsibility or liability for loss or damage resulting from the use of these documents.