The Cost of Pressure Ulcers for Adult Patients in the Acute Care Hospital Setting

A Literature Review Update

**Question:** What is the current literature for hospital acquired pressure ulcer (HAPU) cost for adult patients in the intensive care and acute care setting?

**Introduction:** HAPU development in the adult acute care patient is often measured in dollars, prevalence, and incidence rates, which in turn impact hospital length of stay (LOS), nursing time, and equipment use. While some advances have been made, most notably in the ability to identify at-risk patients, HAPU rates remain at unacceptable levels in the acute care hospital setting in general and for the adult critical care setting in particular. A 2010 review was conducted to determine the current literature for HAPU cost, prevalence, and incidence for hospitalized adult patients in the critical care/intensive care environment. This review was updated in November 2011 to capture the current literature for HAPU cost.

**Literature Search Strategies:** The literature review update on the selected clinical topic was conducted in November 2011, with a focus on HAPU cost for adults in the acute care setting. A review of the literature from 2009 to 2011 was conducted via electronic databases (PubMed, PubMed Central, Medline, Proquest, Ovid, Cochrane Library, Agency for Healthcare Research & Quality) using the search terms “pressure ulcer” and “cost”. The database search yielded 430 hits and 12 articles were selected as relevant for review inclusion. 2 additional articles were located via contextual links, for 14 total articles. 5 articles were eliminated, as they were from the 2009 literature review or were database duplicates. The remaining 8 articles pertained to the clinical area of inquiry, were reviewed in detail, and added to the 2009 body of literature for a total of 14 citations (Appendices A, B, and C). Result limitations include inadequate research on the costs of HAPU for adults in the intensive care and acute care setting.

**Literature Search Results:** HAPU treatment costs continue to increase and impact healthcare resources. PU development during an ICU stay has been previously associated with extended hospital LOS and has stretched the healthcare dollar to the breaking point (Burritt et al., 2007; Lyder & Ayello, 2008). The cost of a secondary HAPU diagnosis can cost $1600 per day, much more than the $1200 associated with a primary PU diagnosis with a longer LOS. Mean acute care hospital LOS have increased from 12.7-13 days to 13-14 days, as compared to the overall average hospital LOS of 5 days. Medicare remains the most common payer of adult hospital stays related to HAPUs, which is billed 3 out of 4 days. From 2005 to 2007, 32 per 1000 Medicare patients developed a HAPU. HAPU cost estimates vary by sources and what was included or excluded from financial and statistical models.

National and international HAPU costs have risen, from $20,400 to $38,000 per PU to upwards of $40,000 to $70,000 per PU, depending on the PU stage and LOS. Stage I, II, and III HAPU cost estimates range from $2000 to $30,000 per hospital stay, with Stage IV estimated as high as $70,000. Stage IV HAPUs are particularly costly, averaging $129,248 for one admission; these patient-care related expenses are much greater than earlier estimates.

Classified as a medical error, the average individual medical cost of a HAPU in 2008 was estimated to be $8730. Excluding the pain, suffering, social, and morbidity considerations, HAPU costs have risen to between 2.41 billion and 3.6 billion dollars in excess healthcare costs.

**Conclusions:** The true cost of a HAPU remains elusive, as cost estimates vary according to statistical/economical models, healthcare settings, and national versus international data analysis. Current statistical data continue to group HAPU costs for ICU into aggregate hospital data, without isolating specific HAPU costs in the ICU environment. Statistical data for Medicare patients documents that 445,028 HAPUs developed in approximately 14 million Medicare patients from 2005 to 2007. In 2006, the mean cost per hospitalization for a patient hospitalized with a secondary diagnosis of PU was $20,400 for a mean 12 day LOS. However, new data suggests both mean HAPU costs and mean LOS days are increasing. The final snapshot for this literature review update suggests that total HAPU costs are increasing; however, the exact costs of a HAPU for both individual patients and healthcare institutions remain difficult to determine.

November 18, 2011 by Cecelia L. Crawford, RN, MSN, DNP(c), Kaiser Permanente SCAL Nursing Research Program
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*A Literature Review Update*

Electronic Database Search Methodology 2009 - Appendix A

<table>
<thead>
<tr>
<th>Key Search Terms (2007 to 2010)</th>
<th>Ovid</th>
<th>PubMed</th>
<th>Medline</th>
<th>Cochrane Library</th>
<th>Proquest (Includes Joann Briggs Institute)</th>
<th>AHRQ</th>
<th>Total</th>
<th>Relevant Articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure ulcer, costs, cost per patient</td>
<td>64</td>
<td>34</td>
<td>1</td>
<td>54</td>
<td>381 (many duplicates)</td>
<td>534</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>534</td>
<td></td>
<td>17</td>
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</tbody>
</table>
## The Cost of Pressure Ulcers for Adult Patients in the Acute Care Hospital Setting

*An Literature Review Update*

### Electronic Database Search Methodology – Appendix B

Date(s): November 2011

<table>
<thead>
<tr>
<th>Database</th>
<th>Key Word(s) Used</th>
<th>Total References Identified (hits)</th>
<th>Relevant References</th>
<th>Total Duplicates</th>
<th>Articles Selected for Review</th>
<th>Articles Excluded</th>
<th>Final Total Relevant References</th>
</tr>
</thead>
</table>
| **Name:** Pubmed  
**Years:** 2009-2011 | Pressure Ulcer + Cost + Cost Per Patient | 3 | 0 | 0 | 0 | 0 | 0 |
| **Name:** Pubmed  
**Years:** 2009-2011 | Pressure Ulcer + Cost | 32 | 1 | 0 | 1 | 0 | 1 |
| **Name:** Proquest  
**Years:** 2009-2011 | Pressure Ulcer + Cost | 48 | 3 | 1 from 2009 UPU ROL | 2 | 0 | 2 |
| **Name:** Ovid  
**Years:** 2009-2011 | Pressure Ulcer + Cost | 58 | 5 | 1 Pubmed  
1 Proquest  
1 from 2009 UPU ROL | 2 | 0 | 2 |
| **Name:** AHRQ  
**Years:** Open | Pressure Ulcer + Cost | 285 | 3 | 2 from 2009 UPU ROL | 1 | 1 | 0 |
| **Name:** Cochrane Library  
**Years:** Open | Pressure Ulcer + Cost | 4 | 0 | 0 | 0 | 0 | 0 |

<table>
<thead>
<tr>
<th><strong>TOTALS</strong></th>
<th>Total References Identified (hits)</th>
<th>Relevant References</th>
<th>Total Duplicates</th>
<th>Articles Selected for Review</th>
<th>Articles Excluded</th>
<th>Final Total Relevant References</th>
</tr>
</thead>
</table>
|            | 430 | 12 | 3 from 2009 ROL  
2 Pubmed  
1 Proquest | 6 | 0 | 6 |
The Cost of Pressure Ulcers for Adult Patients in the Acute Care Hospital Setting

A Literature Review Update

Contextual Links #1


Contextual Links #2


Total New Articles Included in Literature Review: Database (6) + Contextual Links (2) = 8

Inclusion Criteria: Adults; acute care hospital setting; pressure ulcers; cost(s) per patient/day/hospital length of stay

Exclusion Criteria: Pediatric patients; health care settings other than acute care (long term care facility, skilled nursing facility, home environment, convalescent home); wounds other than pressure ulcers; costs associated with conditions other than pressure ulcers

Total Articles Included in 2009 Review: 5

Total Articles Included in 2011 Review (See next page): 8

Total Relevant Articles Included in Final 2011 Review: 14
## Appendix C

<table>
<thead>
<tr>
<th>SCORE</th>
<th>LEVELS OF STUDIES</th>
<th>RELEVANT ARTICLES</th>
<th>ARTICLE NUMBER</th>
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<tr>
<td>10</td>
<td>Systematic Review or Meta-Analysis of Randomized Controlled Trials</td>
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<td>9</td>
<td>Large Sample Randomized Controlled Trials</td>
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<td>8</td>
<td>Small Sample Randomized Controlled Trials</td>
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<td>7</td>
<td>Non-random, Controlled Prospective Studies</td>
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<tr>
<td>6</td>
<td>Non-random, Controlled Retrospective Studies</td>
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<td>5</td>
<td>Cohort Studies</td>
<td>1</td>
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<tr>
<td>4</td>
<td>Case-Controlled Studies</td>
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<td>11</td>
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<tr>
<td>3</td>
<td>Non-Controlled, Clinical, Descriptive Studies</td>
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<tr>
<td>2</td>
<td>Case Studies</td>
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<td>3</td>
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<td>1</td>
<td>Expert Consensus, Manufacturers Recommendations (Literature/Integrative Reviews)</td>
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<tr>
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<tr>
<td></td>
<td>Total</td>
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</tr>
</tbody>
</table>
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