

# Financial and Clinical Risk Evaluation of Pressure Injuries in US Hospitals: A Business Case for Initiating Quality Improvement

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This study evaluates the cost of treatment, impact of reimbursement policies, and clinical consequences of PIs for US hospitals.

## Abstract

**Introduction.** Pressure injuries (PIs) are a serious, avoidable condition that affect many patients during hospital stays. Yet, to date, there is no comprehensive assessment of the financial and clinical risks of PIs. **Objective.** This study evaluates the cost of treatment, impact of reimbursement policies, and clinical consequences of PIs for US hospitals. **Methods.** A financial and clinical calculator was created to estimate the impact of PI prevention using a traditional literature review to drive assumptions. **Results.** Two drivers of hospital revenue loss resulting from PIs were identified: nonpayment for PI treatment by health insurance providers and personal injury litigation. Increased hospital length of stay (LOS) and patient mortality associated with PIs further contributed to negative consequences. For an average 160-bed hospital, the authors estimated an annual total financial risk of \$5.97 million, 911 days added to LOS, and 16.4 deaths related to avoidable PIs. **Conclusions.** Results of this analysis will be useful for health care organizations implementing quality improvement initiatives and new technologies, such as digital wound care management systems, to reduce the prevalence of PIs, thereby protecting patients and mitigating financial and clinical risks.

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## Introduction

Pressure injuries (PIs), also known as pressure ulcers (PUs),<sup>1</sup> typically result from prolonged periods of uninterrupted pressure on the skin and underlying tissue. While mostly preventable,<sup>2</sup> PIs severely impair patient quality of life and often lead to increased morbidity, mortality, and costs. In the United States, 2.5 million cases of PIs are treated annually at a cost of \$11.6 billion to the health care system.<sup>3</sup> The risk of acquiring a PU within the first 2 weeks of hospitalization is 9%,<sup>4</sup> and patients with a PU have a 4-day longer median length of stay (LOS), a 5-fold higher mortality rate, and an average of \$17 000 in additional incremental charges for a hospital admission.<sup>5</sup>

To encourage hospital quality improvement (QI), the Centers for Medicare & Medicaid Services (CMS) and US health insurers have enacted nonpayment policies for hospital-acquired conditions (HACs), including PIs, placing financial responsibility solely on hospitals.<sup>6–8</sup> As a requirement of the 2005 Deficit Reduction Act to eliminate payments for treating high-cost and high-volume preventable adverse events during a hospital stay, the Hospital-Acquired Conditions Present on Admission (HAC POA) provision was mandated in 2008.<sup>9</sup> With 257 412 cases of preventable PIs reported by the CMS in 2007, hospital-acquired PIs (HAPIs), regardless of stage and whether hospital-acquired or POA, were identified among conditions for which the CMS would no longer provide payment.<sup>10</sup>

In a separate measure that strives to tie payment to performance, the Affordable Care Act established the Hospital-Acquired Condition Reduction Program (HACRP). Beginning in 2015, the HACRP requires the CMS to lower inpatient reimbursement by 1% for the lowest quartile of hospitals with highest HAPI rates as measured by HAC scores,<sup>11</sup> a policy projected to save Medicare \$350 million annually.<sup>12</sup> The HAC score is calculated based on data in 2 domains, with the first domain consisting of the CMS Recalibrated Patient Safety Indicator (PSI) 90 (CMS PSI 90) with PU rate accounting for 5% of the PSI 90 composite.<sup>11</sup> The second domain is comprised of the National Healthcare Safety Network health care-associated infections measures. For domain 1 and domain 2, the CMS applies a weight of 15% and 85%, respectively, to determine the Total HAC Score.<sup>11</sup> To put this into perspective, 1384 of the 5534 US hospitals will have had a Medicare payment reduction as part of the HACRP in 2018.<sup>13</sup>

In addition, PIs have legal implications. The passage of the Omnibus Budget Reconciliation Act in 1987 (OBRA-87) saw an increased risk of malpractice lawsuits in the United States, with more than 17 000 lawsuits related to PIs annually.<sup>3</sup> The OBRA-87 set federal standards of care for health care providers, making it easier for claimants to prove negligence in the handling of PIs.<sup>14</sup> In 2005, the verdict in a PI lawsuit favored plaintiffs in 87% of cases with a median settlement of \$1.06 million.<sup>15</sup>

Thus, when considering the impact of PIs on hospital revenue, not only should the costs of treatment be considered but also the loss of reimbursement, risk of litigation, and increased patient mortality that would impact hospital performance metrics. The calculator herein was developed to assess the current financial burden of PIs and the potential cost avoidance and savings derived through the implementation of QI initiatives (including the use of a digital wound management system) in helping reduce PIs.

## Methods

A PI calculator was developed to determine the total cost of PIs for the average US hospital, assumed to be a 160-bed facility. The calculator includes direct costs of treatment, penalties from payers, litigation, and burden associated with additional LOS and mortality (**Figure**).

### Cost of PI treatment

The total annual cost of PI treatments is calculated by multiplying the total number of PIs by the incremental cost per PI. The number of PIs is determined by multiplying the number of patients discharged by the rate of PIs, with the number of discharges calculated by multiplying the hospital bed occupancy rate by the number of hospital beds available for 365 days in a year before dividing by the average LOS (**Formula**).

### HACRP

To calculate the loss of revenue from the HACRP 1% penalty, the average hospital revenue was multiplied by the average Medicare reimbursement. The contribution to revenue loss specifically from PIs was determined by multiplying the 1% HACRP risk by 15% weight for domain 1 and 5% weight for the PI component.

### Litigation

The potential cost of PI litigation was calculated by multiplying the median settlement value in a PI case by the rate of verdicts favoring plaintiffs and the number of PIs per year. To determine the lowest cost of litigation, a minimum 1% risk of a malpractice lawsuit was assumed.

### LOS and mortality

The additional hospital LOS due to a PI was determined by multiplying the number of additional days spent in admission by the annual number of PI cases. To arrive at the number of patients missed, the additional LOS due to PI was divided by the average LOS. Deaths from PIs were calculated by multiplying the estimated inpatient mortality rate per PI by the number of PIs.

## Results

The hypothetical case of an average 160-bed hospital shows the main drivers of PI risk are loss of reimbursement from nonpayment of treatment costs resulting from HAC policy and litigation, amounting to \$3.87 million and \$2.10 million, respectively. Pressure injury risk associated with the HACRP constitutes a relatively small risk of \$5434. This PI risk, totaling nearly \$6 million annually, may be a conservative estimate considering the assumptions of the calculator. Further, PIs are a serious clinical risk with an estimated 911 days of additional hospital stay, during which time 149 new patients could be admitted and 16.4 deaths could be attributed to PIs. Each calculator assumption and input values are summarized in the **Table**.<sup>10,15–21</sup>

## Discussion

These findings present an opportunity for the introduction of QI initiatives to achieve better patient outcomes and optimize hospital revenue. By preventing PIs, hospitals will not only mitigate the loss of direct treatment costs and litigation risk but also gain bonuses from incentive programs such as those instituted by the CMS and private payer value-based purchasing systems that reward HAC reduction. In a QI study examining the consequences of implementing a digital skin and wound management system on the prevalence of PIs in a 128-bed skilled nursing facility, a 77% reduction in PIs was observed for long-stay residents, while the short-stay PI prevalence was maintained at zero.<sup>22</sup> While it has been stated that not all PIs are avoidable,<sup>2</sup> the total financial risk, with a base case assumption, is important to quantify in order to motivate health care organizations to invest in preventative measures.

## Limitations

This study is based on available assumptions (eg, LOS, occupancy rates, PI prevalence, cost per episode, etc), hence specific values used in the calculation are subject to modification to better reflect an individual hospital's circumstances. Indirect costs such as out-of-pocket patient and caregiver costs were not included in the calculation.

## Conclusions

This study provides a compelling business case justification for health care organization staff responsible for QI to reduce their prevalence of PIs. The cost of initiating QI initiatives, including tactics such as deploying digital wound care management solutions,<sup>22</sup> would be greatly offset by the reduction in financial and clinical risk realized from HAC reduction policies and avoidance of PI litigation.

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