A Comprehensive Program to Reduce Rates of Hospital-Acquired Pressure Ulcers in a System of Community Hospitals

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Objectives: The prevention of hospital-acquired pressure ulcers (PrUs) has significant consequences for patient outcomes and the cost of care. Providers are challenged with evaluating available evidence and best practices, then implementing programs and motivating change in various facility environments.

Methods: In a large system of community hospitals, the Reducing Hospital Acquired–PrUs Program was developed to provide a toolkit of best practices, timely and appropriate data for focusing efforts, and continuous implementation support. Baseline data on PrU rates helped focus efforts on the most vulnerable patients and care situations. Facilities were empowered to use and adapt available resources to meet local needs and to share best practices for implementation across the system. Outcomes were measured by the rate of hospital-acquired PrUs, as gathered from patient discharge records.

Results: The rate of hospital-acquired stage III and IV PrUs decreased 66.3% between 2011 and 2013. Of the 149 participating facilities, 40 (27%) had zero hospital-acquired stage III and IV PrUs and 77 (52%) had a reduction in their PrU rate. Rates of all PrUs documented as present on admission did not change during this period. A comparison of different strategies used by the most successful facilities illustrated the necessity of facility-level flexibility and recognition of local workflows and patient demographics.

Conclusions: Driven by the combination of a repository of evidence-based tools and best practices, readily available data on PrU rates, and local flexibility with processes, the Reducing Hospital Acquired–PrUs Program represents the successful operationalization of improvement in a wide variety of facilities.

Key Words: pressure ulcer, process improvement, patient safety, quality improvement, best practices

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Pressure ulcers (PrUs) remain a significant burden for patients and providers in the United States. An estimated 2.5 million people in the United States develop PrUs each year, resulting in approximately 60,000 deaths.[1] Estimates from the Centers for Medicare and Medicaid Services (CMS) indicate that each PrU adds approximately $43,000 in costs to a hospital stay, for a total burden of $9.1 to $11.6 billion in the United States each year.[2] In 2008, in an effort to increase attention and improvement efforts for the prevention of PrU, the CMS implemented new payment rules related to PrUs. Pressure ulcers were added to the list of "never events," which ended reimbursement of the extra cost of care for stage III and IV PrUs documented during a patient's hospital stay when no PrU of any stage or severity was present on admission (POA).[2,3] Additional emphasis on preventing patient harm has come from institutions such as the National Quality Forum and The Joint Commission, which include PrUs as indicators for patient safety and the quality of care.[4,5]

Accordingly, various toolkits and programs for the prevention of PrUs have been proposed, such as those recommended by the Institute for Healthcare Improvement and the Agency for Healthcare Quality and Research.[6,7] Although systematic studies have evaluated the effectiveness of individual practices, such as the use of special support surfaces or PrU risk assessment tools,[8,9] many facilities have chosen to implement these toolkits and other best practices as a part of multifaceted programs to prevent PrUs. These approaches have had varying levels of success,[10] but support is growing for this type of evidence-based, multifaceted program.[11–14] However, additional study is still needed regarding the ability of these programs to reduce PrU prevalence or incidence rates in a variety of acute care environments.

This article describes a successful strategy to prevent PrUs in a large system of community hospitals, referred to as the "Reducing Hospital Acquired (HA)–PrUs Program." Collective recognition of the need to reduce hospital-acquired PrUs allowed this health care system to mobilize and develop a set of evidence-based tools and best practices to help facilities move toward zero hospital-acquired PrUs. Implementation was decentralized; facilities were allowed the flexibility to use and adapt tools and processes to meet local needs. In addition, facilities were also provided baseline data on PrU rates to focus attention on high-risk patients and care environments. As the program progressed, individual implementation efforts were refined at the facility level on the basis of lessons learned and best practices throughout the system as well as empirical evidence. It was proposed that these efforts could drive reductions in rates of hospital-acquired stage III and IV PrUs in a large number of distinct acute care facilities across the United States. The experience of this large, diverse system provides valuable information about strategies to reduce PrUs in various facility types. The components of the Reducing HA-PrUs Program, lessons learned, and examples from select facilities are presented to help providers design and implement similar programs.

METHODS

Setting

The Hospital Corporation of America (HCA) health care system includes 166 acute care hospitals in 23 states and England. These facilities are primarily urban and suburban general community hospitals; additional facility types include academic health centers and tertiary-referral hospitals. HCA-affiliated facilities (collectively, "HCA") provide approximately 5% of the major hospital services in the United States, with more than 20 million patient encounters per year. Most HCA-affiliated facilities have

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between 100 and 400 staffed beds. Approximately 6% of facilities have fewer than 99 staffed beds, and 13% have greater than 400. In addition, HCA-affiliated facilities serve highly diverse patient populations; many HCA primary service areas are located in states that have experienced recent growth in minority populations.[15,16]

The structure of this organization is as follows: setting of organizational goals and clinical priorities, enterprise financial operations, and supply chain management are centralized from Nashville, TN. Market strategy and clinical operations are largely decentralized to 15 regional divisions that provide daily operating leadership for facilities. Division leadership directs and assists local leadership in facility operations, including coordination and assistance with enterprise program implementations. Facility leadership is responsible for the facility's clinical and operational performance, including all tasks associated with the implementation and monitoring of programs and initiatives.

Development of the Reducing HA-PrUs Program began in December 2010. A multidisciplinary team, coordinated at the enterprise level, was tasked with evaluating the existing literature and developing tools and resources as well as assisting in implementation and monitoring organizational performance. Because implementation would be driven at the local level, facilities were encouraged to form a program-specific team. Suggested team members included a designated team leader, the facility chief nursing officer, a wound care specialist, a physician champion, intensive care unit and medical-surgical nursing leaders, a dietician, an educator, a director of quality and patient safety, as well as additional ad hoc members including representatives from pharmacy and materials management.

Components

Major program components included (1) a toolkit of recommended evidence-based best practices and (2) a dashboard of baseline of PrU rates by diagnosis-related group (DRG). These components were complemented by implementation support and facility-directed assessment to maximize applicability at the local level.

The toolkit had 3 main areas of focus: identification of PrU risk, best clinical practices, and documentation aids (Table 1). The identification of skin alterations POA was encouraged through the establishment of an assessment process in which deviations noted by 1 clinician are verified by another and documented in the medical record. The NE1 Wound Assessment Tool was recommended for this process; this bedside tool uses photographic representation and descriptive text to aid providers in the identification, description, and staging of skin alterations, wounds, and PrUs as well as facilitate more effective communication and documentation.[17,18] Evidence-based clinical care was supported through clinician education, operative care recommendations, the establishment of practice norms, and guidelines for surface selection. These included emphasizing early and sustained intervention to manage moisture, immobility, nutritional deficiencies, and surgical risks, with the expectation that interdisciplinary care should be triggered automatically by key electronic patient data (e.g., nutritional deficits, length of stay, operating room time). Finally, clinical review processes and skin assessment documentation audit tools were provided to facilities to improve the accuracy of documentation.

To assist in focusing improvement efforts, a baseline survey of PrU rates by DRG was conducted. All payor-coded data between the second quarter of 2010 and the first quarter of 2011 were surveyed for stage III and IV hospital-acquired PrUs. The resulting data revealed that there were 335 stage III and IV hospital-acquired PrUs within the HCA enterprise. These were categorized by DRG to help determine where improvement efforts may have the greatest impact. Forty percent of stage III and IV hospital-acquired PrUs were attributable to 5 DRGs. These DRGs, with the associated definitions and geometric mean length of stay (GLOS), are presented in Table 2. For each of these DRGs, a patient presentation hypothesis was developed to highlight conditions that could lead to PrUs. Facilities were provided these results, in conjunction with guidance in interpreting these results in regard to their local workflows and patient populations, as a tool for focusing improvement efforts.

Implementation

Implementation of the PrU reduction program occurred in 2 phases that were focused on empowering facilities to use the toolkit and other available resources. Phase 1 was a 16-week program that began in the first quarter of 2011. A kickoff teleconference between enterprise leaders and facility participants introduced program rationale and the available toolkit components, project checklists, and other resources, which were hosted on the enterprise intranet. Additional weekly coaching calls discussed key components in more detail and allowed for facilities to ask questions and share learning opportunities. Best practice examples and data presentations encouraged the sharing of knowledge and the internal comparison of performance. Facilities could

TABLE 1. Toolkit of Evidence-Based Best Practices

Focus Area	Summary of Recommended Practices
Identification	Use of NE1 Wound Assessment Tool[17,18]
	Assess, photograph, and document irregularities in skin condition on admission
	Verification of assessment by a second clinician
Clinical care	Clinical education
	Includes online courses, posters, and printable pocket guide
	Operative care recommendations
	Use of evidence-based recommendations and special surfaces for at-risk populations as identified in the survey of top-presenting DRGs (Table 2)
	Adherence to recommended practice norms
	Includes interventions to manage immobility, moisture, nutritional deficiencies, surgical risks, and algorithms for key processes and behaviors
	Surface selection guidelines
	Four-tiered approach based on goal, condition differentiators, surface, and typical patient population
Documentation	Clinical review processes to improve accuracy

TABLE 2. Top 5 Coded DRGs for Stage III and IV PrUs, Second Quarter of 2010 to First Quarter of 2011

MS-DRG	PrU Count (% of Total*)	MS-DRG Definition and GLOS	Patient Presentation Hypothesis
003	65 (19%)	Extracorporeal membrane oxygenation (39.65) or tracheostomy (31.21, 31.29, 31.1) with mechanical ventilation ≥96 h (96.72) or principal diagnosis except, face, mouth, and neck with major operating room procedure (GLOS 30.1 d)	Typically long LOS after a major surgery with respiratory complications resulting in mechanical ventilation with inability to wean from ventilator with subsequent tracheostomy.
853	20 (6%)	Infectious and parasitic disease with operating room procedure and major complication/ comorbidity (GLOS 12 d)	Typically debilitated patients admitted with sepsis/septicemia who have multiple complicating and comorbid conditions. Could also be considered that this patient population represents admission from skilled nursing facilities.
871	19 (6%)	Septicemia or severe sepsis without mechanical ventilation ≥96 h (96.72) with major complication/comorbidity (GLOS 5.4 d)	Typically debilitated patients admitted with sepsis/septicemia who have multiple complicating and comorbid conditions. Could also be considered that this patient population represents admission from skilled nursing facilities and associated with long LOS.
004	17 (5%)	Tracheostomy (31.21, 31.29, 31.1) with mechanical ventilation ≥96 h (96.72) or principal diagnosis except face, mouth, and neck without major operating room procedure (GLOS 22.2 d)	Typically debilitated patients who have multiple complicating and comorbid conditions. Could also be considered that this patient population represents admission from skilled nursing facilities. The tracheostomy and the mechanical ventilation drive this DRG.
329	12 (4%)	Major small and large bowel procedures with a major complication/comorbidity (GLOS 12.5 d)	Typically debilitated patients who have multiple complicating and comorbid conditions. Could also be considered that this patient population represents admission from skilled nursing facilities. The operating room procedure is driving this DRG.

*N = 335.

MS-DRG, medical severity–DRG.

query PrU prevalence and incidence at any time using a newly created report that captured all patient, all payor PrUs stage II and greater using DRG-coded data.

Phase 2 began in the third quarter of 2012. This phase focused on facility-specific interventions. Facilities with successful implementations were invited to share their experiences and best practices in a series of online presentations. Facilities that were struggling with implementation were invited to participate in these discussions.

Measurement and Evaluation

Data were analyzed from all HCA facilities in the United States that report POA indicators. Only those facilities that had complete data from all periods for each analysis were included. Rates of PrUs were gathered from final billed and coded data from patient discharge records. Hospital-acquired stage III and IV PrUs were identified and defined per their respective *International Classification of Diseases, Ninth Revision* (*ICD-9*) codes. Stage III PrUs (ICD-9 code 707.23) were defined as PrUs with full-thickness skin loss involving damage or necrosis of subcutaneous tissue. Stage IV PrUs (ICD-9 code 707.24) were defined as PrUs with necrosis of soft tissues through to the underlying muscle, tendon, or bone. To be considered hospital-acquired PrUs in accordance with CMS guidelines, a POA indicator of "N" or "U," per the *UB-04 Data Specifications Manual*, had to be coded on the patient record.[19,20]

RESULTS

Before the first quarter of 2011, baseline rates of hospital-acquired stage III and IV PrUs were variable; previous improvement efforts had not resulted in sustained reductions in PrU rates. Implementation of the Reducing HA-PrUs Program began the first quarter of 2011. The rate of hospital-acquired stage III and IV PrUs decreased 66.3% between program initiation in the first quarter of 2011 and the fourth quarter of 2013, after both phase 1 and phase 2 of implementation (Fig. 1). Between 2011 and 2013, a total of 40 (27%) of the 149 reporting facilities reported zero hospital-acquired stage III and IV PrUs. During this same period, 77 hospitals (52%) had a reduction in their PrU rate.

Between the first quarter of 2011 and the second quarter of 2013, overall rates of all stages of hospital-acquired PrUs, including unstagable and stage not specified, decreased 47.1% (Fig. 1). Although hospital-acquired PrUs decreased, rates of all PrUs documented as POA did not change during this period.

The tools, resources, and implementation support of this program were provided to facilities for adaptation to meet local needs. Accordingly, there was some variation in strategies used by different facilities; however, these variations in strategies resulted in similar reductions in PrU rates. A comparison of the strategies used and results achieved by 3 facilities are presented in Table 3.

DISCUSSION

The Reducing HA-PrUs Program was a comprehensive improvement effort that began with collective identification of a problem and evaluation of baseline data that encouraged program buy-in. The combination of an evidence-based repository of tools and best practices, readily available data on PrU rates, and local flexibility with process resulted in widespread reductions in hospital-acquired PrUs across the system. Robust implementation support, including individualized assistance and best practices presentations, helped increase adherence to clinical practices and evidence-based guidelines. In total, this program represents the

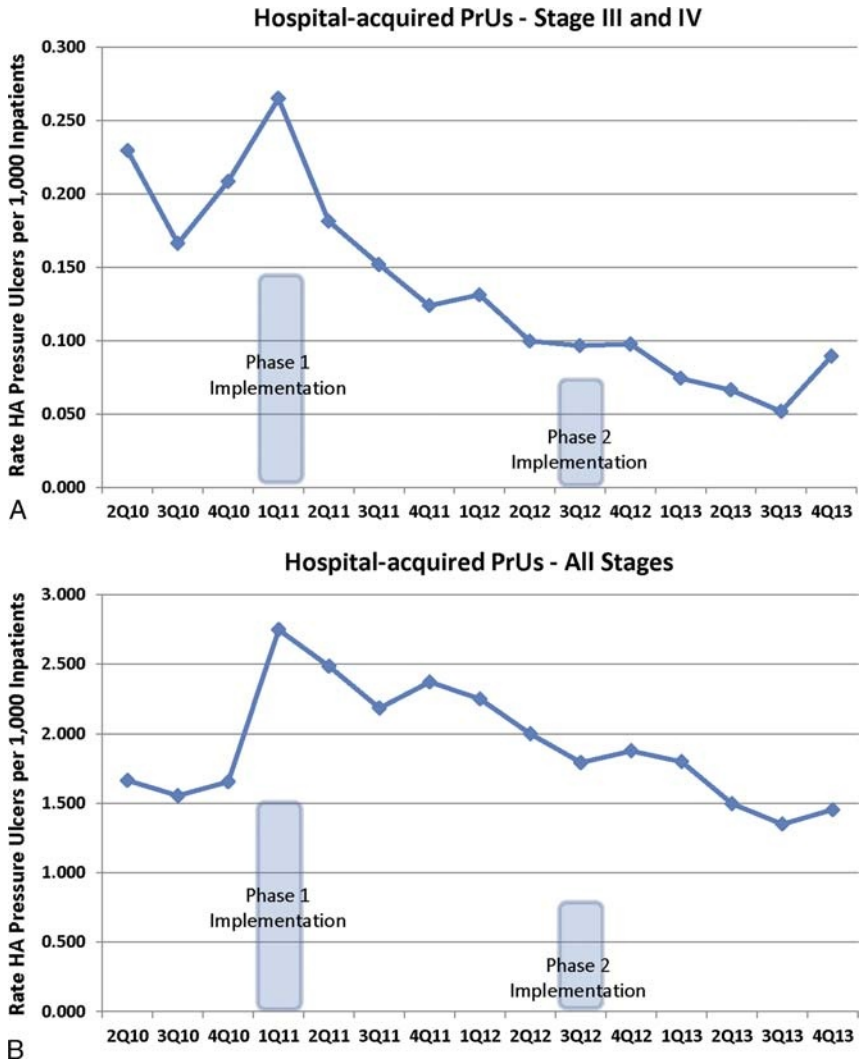

FIGURE 1. Rate of hospital-acquired PrUs. Rate of stage III/IV (A) and all (B) hospital-acquired PrUs per 1000 inpatients. Data from discharge records, expressed per quarter. Number of facilities = 149.

successful operationalization of improvement in a wide variety of facilities.

This program focused attention on stage III and IV hospital-acquired PrUs. This mirrors a focus from CMS on the documentation of these PrUs. Accordingly, this program was able to target the documentation, prevention, and care of the most serious PrUs. The resulting reductions in stage III and IV hospital-acquired PrUs were accompanied by reductions in all PrUs, regardless of stage. This suggests that this program increased adherence to clinical practices and evidence-based guidelines that prevented both the development and progression of PrUs. No increase in POA PrUs was observed, suggesting that the observed reductions in hospital-acquired PrUs were not attributable to improvements in documentation alone.

The 2-phase design of this program may have contributed to its success. The first phase, consisting of evidence-based tools and regular guidance during implementation, was successful in moving the majority of facilities toward the goal of eliminating stage III and IV hospital-acquired PrUs. This phase required a commitment from facilities to invest in the process, culture, and technology changes necessary for implementation and continued progress. The facilities also adapted the tools, resources, and implementation guidance to meet local needs. As a result, many developed innovative solutions to overcome specific barriers to implementation. These solutions, identified as best practices, formed the basis of the second phase of this program.

The second phase allowed for a midterm recalibration of the program based on internal lessons learned and empirical evidence. Attention was focused on those facilities that were struggling with particular components of the program. These facilities benefited from presentations of best practices and advice from facilities that had seen improvement in their PrU rates, such as those highlighted in Table 3. By first focusing on moving the majority of facilities toward the goal and then following up with those requiring additional assistance, this program was able to wisely maximize resources and intellectual capital across the enterprise. Because of the variety of facility types within the system, this approach is likely generalizable to other health care systems or collaborations and may serve as a model for taking full advantage of available knowledge and resources in the pursuit of improved PrU rates.

This program also emphasized the importance of local flexibility in PrU improvement projects. Although this program emphasized a firm goal—elimination of stage III and IV hospital-acquired PrUs—there was less structure in the processes

TABLE 3. Program Strategies Used, Challenges, and Results in 3 Facilities

	Facility A	Facility B	Facility C
Overview	175-bed facility with 32-bed expansion	350-bed facility	187-bed facility
	Southeastern U.S.	Coastal Southwestern U.S.	Mid-Atlantic U.S.
	Mean daily census: 130	Mean daily census: 200	Mean daily census: 130
	Mean admissions per month: 1000	Mean admissions per month: 1200	Mean admissions per month: 1000
Top strategies	Comprehensive admission skin assessment and reassessment every 12 h	Redesigned wound care team, adding nutritional services, physical therapy, medical-surgical, and critical care staff representation	Addition of certified wound, ostomy, continence nurse to staff
	Addition of certified wound, ostomy, continence nurse to staff	Created "Save our Skin" action plan	Dietician consult triggered when wound consult entered
	Created multidisciplinary wound care team	Implemented signage to alert staff, provide turning schedule for vulnerable patients	Nurse orientation regarding PrU prevention, staging, documentation
	Participated in NDNQI Quarterly Prevalence Survey	Education through storyboards, small-group discussions, skills laboratories	Development of PrU prevention plan specific to each unit
	Weekly nurse peer review of hospital-acquired conditions	Emphasize shift reports between charge nurses, registered nurses, nurse aids	Intense focus on linen layers, floating heels
	Circulating storyboards depicting all aspects of PrU prevention, intervention, and care	Reports of high-risk patients each shift	Upgraded heel boots, added chair cushions
Challenges	Increasing compliance with POA identification and photo documentation	Further improvement in consistency of staging	Implementing annual competency for nurses, technicians
		Compliance with photography on discharge	
	Ensuring availability of supplies	Development of patient education materials for prevention and treatment	Continued refinement of unit-specific PrU prevention plan
	Encouraging participation of wound care team	Implementing hourly rounding for PrUs	
No. hospital-acquired stage III and IV PrUs	2010: 5 2013: 0	2010: 1 2013: 0	2010: 6 2013: 0

NDNQI, National Database of Nursing Quality Indicators.

required to meet this goal. Ultimately, this required trusting that clinicians, when empowered with appropriate tools and data, will make the process changes necessary to drive improvement. As a result, facilities were able to devise creative solutions uniquely suited to their local needs that may be more effective and efficient than centralized strategies.

This program did have several limitations. Interpretation of baseline data is limited because we were unable to determine which, if any, methods to reduce PrUs were in use before the start of this program. Similarly, no efforts were made to compare the effectiveness of program components or determine which components were used by individual facilities. However, as illustrated by the examples in Table 3, there were many similarities in the methods used by different facilities. Because these facilities reflect the diversity of community hospitals in the HCA system and across the United States, these results support our method of allowing local needs to dictate the use of available tools, resources, and data. In addition, the use of final billed and coded data from patient discharge records is a limitation, especially when comparing between facilities.[21] Final billed and coded data from patient discharge records reflect physician documentation. Because physicians are more likely to miss early (e.g., stage I) PrUs at admission, this increases the possibility that PrUs present but not documented at admission may be erroneously coded as hospital acquired during a patient's stay.

CONCLUSIONS

With increased attention on the prevention of hospital-acquired PrUs by payors and national organizations, there is a need to design programs that can reduce PrU rates in a variety of acute care environments. As we demonstrated here, a comprehensive program providing a toolkit of best practices, timely and appropriate data for focusing efforts, and continuous implementation

support can lead to improvements in PrU rates. By allowing facilities the flexibility to adapt these tools and processes to meet local needs, they were able to meet the 3 major potential failures in the prevention of hospital-acquired stage III and IV PrUs: identification at admission, the use of evidence-based care, and proper documentation. This helped refocus efforts away from repetition of risk assessments and allowed for more time to be available for patient care. In total, we have demonstrated that, with the right tools, resources, and implementation support, it is possible to improve PrU rates in a large number of diverse acute care facilities.

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