

The Health Care Improvement Foundation  
2015 Delaware Valley Patient Safety and Quality Award  
Entry Form

**1. Hospital Name**

Magee Rehabilitation

**2. Title Of Initiative**

Innovations to Stop Pressure Ulcers among Patients at Critically High Risk for Pressure Ulcer Development in Rehabilitation– a Multidisciplinary Approach

**3. Abstract (Please limit this description to 250 words)**

Our facility has the privilege and challenge of serving some of the most complex persons with spinal cord injury (SCI) in the country. Within the national eRehab outcomes database in 2014, this facility ranked at the 100th percentile for acuity within the SCI Rehabilitation Impairment Category.

Our journey to stop pressure ulcers began more than 3 years ago, after several patients acquired serious pressure ulcers, despite a constellation of evidence-based prevention efforts. As we struggled to uncover the causes, the team came to realize that the life-saving care delivered to these patients in the acute hospitals often came at a cost. When these patients were transferred to rehab, they were typically malnourished, incontinent, not on effective bowel programs, and on tube feedings that had inadequate protein for their extreme metabolic needs. The stage was set for catastrophic skin breakdown. In 2014 42% of our patients with SCI had one or more pressure ulcers at admission, compared to a national average of 13%. This did not necessarily reflect negligent care, but rather that the industry had much to learn about maintaining skin integrity in this very high risk population.

This application will highlight the key multidisciplinary discoveries and innovations that led to a 45% reduction in serious hospital acquired pressure ulcers among patients at critically high risk for ulcer development. The innovations and processes described, while developed within a rehab facility, have application to other levels of care and may provide direction for those who serve complex patients in other settings.

**4. What were the goals of your initiative?**

In the early days and weeks of hospitalization after spinal cord injury, nutrition is far from optimal and skin integrity is often compromised in an effort to maintain respiratory health and stable vital signs. The dramatic effects of malnutrition in the ICU have recently garnered some attention, but easy solutions remain elusive. Consequently, when these patients are transferred to rehab, often directly from the ICU, they are typically malnourished, putting them at very high risk for skin breakdown. Additionally, they are incontinent, not on effective bowel programs, and on tube feedings that have inadequate protein for their extreme metabolic needs. The compromise of the micro-circulation to the skin that occurs as a result of the spinal cord injury adds to the inordinately high risk

for skin break-down. Healing existing ulcers and keeping the remaining skin intact poses a tremendous challenge. For those on ventilators, who must have the head of the bed elevated when at rest, the challenge of maintaining skin integrity is even greater. Despite the dearth of information in the literature about how to prevent pressure ulcers in this very high risk population, the goal of our project was to eliminate acquired pressure ulcers.

#### **5. What were your initiative's baseline data and the results of your initiative?**

Interestingly, despite our many early efforts, we were not able to affect the overall rate of serious acquired pressure ulcers until the third year of our project. In fiscal year 2015, it appears that we hit critical mass with our prevention bundle, or perhaps, plugged the few last gaps, demonstrating a 47 percent reduction in the number of serious acquired pressure ulcers as compared to the peak in fiscal year 2013. The decrease has been sustained for nearly a year. Of note is that the overall acuity of the patient mix in the hospital and of the SCI population was essentially flat during the same four-year period, with the exception of a spike up in FY 2014, when the rate of serious pressure ulcers was already dropping.

In our baseline year, (fiscal year 2012), our patients experienced 39 serious hospital-acquired pressure ulcers, for a rate of 1.38 serious pressure ulcers per 1000 patient days. Despite our initial efforts, FY 13 was actually worse, with a rate of 1.6 serious pressure ulcers per 1000 patient days. As we continued to add interventions in FY 14, we brought the rate back down to 1.32 and finally, after three years of essentially static incidence rates, we brought the rate of serious acquired pressure ulcers down to 0.85 ulcers in the first nine months of fiscal year 2015, demonstrating a 47 percent reduction from the peak. (See Appendix A for graph of results)

It should be noted that one of our innovations was to develop a working definition of “serious pressure ulcers,” so that we could measure meaningful change. The staging of pressure ulcers is not simple and continues to evolve. To date, there is no agreed method for calculating or comparing pressure ulcer rates. Simply adding raw numbers of ulcers across stages fails to recognize that some are very minor and easily healed and others are catastrophic. Thus, the field has been left to question whether 5 Stage 2 ulcers are better or worse than 1 Stage 4 ulcer, in a given period of time. Additionally, one wonders whether wound size and location should matter in an aggregated total, given that the potential for healing might vary considerably with these factors. Unstageable ulcers, whose depth cannot be determined due to slough in the wound, are, by definition, full thickness ulcers (stage 3 or 4), yet for years, CMS did not collect data on these because no one could figure out how to factor them into any calculations. Suspected deep tissue injuries which may or may not open into ulcers also pose a challenge. Without an agreed definition, we were at a loss to measure our progress.

To resolve this issue, we decided to use a definition that made sense to us. We considered all Stage 3 and Stage 4 ulcers to be serious, regardless of location and even if

they were very small and healed quickly. All unstageable ulcers were also considered serious, as were any deep tissue injuries that were present at least two weeks, even if they never opened.

**6. Describe the interventions that were instrumental in achieving the results for your initiative.**

We started our journey by putting together an interdisciplinary leadership group and setting our target at zero acquired pressure ulcers. Since we did not find much guidance specific to this population in the literature, we created a database of the patients who had acquired skin breakdown, as well as some similar patients who had not, and we began looking for similarities and differences. All had spinal cord injuries and were incontinent of bowel. However, we discovered that nearly every patient with breakdown was on a ventilator and tube-fed. Our first major insight occurred when we realized that several of the patients with sudden and “unexplained” skin breakdown had started courses of antibiotics a few days prior. Further research revealed that the antibiotics caused persistent diarrhea that preceded the skin breakdown. This discovery was critical because it enabled us to define a problem we could address for the first time, paving the way for innovative solutions.

In addition to the discoveries related to antibiotics and diarrhea, we also knew that our patients were extremely compromised nutritionally. The heroic life-saving efforts performed with these patients in acute care often came at a cost that could not be rectified quickly.

In order to address these two issues, we gathered an interdisciplinary team consisting of our SCI nurse practitioner, an SCI physician champion, dietitians, wound nurses, nursing supervisors, therapists and pharmacists, and we began running daily reports from our electronic health record for every patient with a Bristol Stool score of 6 or 7 in the previous 24 hours. Bristol scores of 6 and 7 represent loose or watery stools and pose the greatest threat to skin integrity. The team met daily to discuss each patient with loose stools and to figure out what could be done to regulate the bowels quickly and protect the skin. Solutions ranged widely from changes in bowel or other medications, to adjustments in tube feedings, and limitations in sitting time, until bowels were better regulated. Our physician champion aptly renamed moisture dermatitis, typically caused by loose stools, “stage 0,” and the entire team went on high alert any time it was noted.

The daily “poop in a group” meeting was the first of many interdisciplinary innovations that helped us drive down the incidence of serious pressure ulcers among the most complex of our patients. Over the last few years we have continued to drill into our data, problem solve with every discipline, and try various innovative prevention strategies. Appendix B describes a bundle of 42 different interventions that we applied, as indicated, to each patient. While some interventions were specific actions to be taken by one discipline, (nurse, physician, dietitian, or therapist), many required interdisciplinary collaboration. Others required new supplies or equipment, and several of the interventions specifically involved leadership, up to and including the Board of Trustees.

Ultimately, all staff developed a sense of urgency related to the prevention of pressure ulcers, and a culture change was noted.

More recent innovations have focused on ramping up protein intake quickly for those patients who are tube fed, even when the overall intake is still below the goal rate. The goal is to meet 80% of the protein needs from the time of admission, even if we need to start off with a low tube feeding rate due to bowel impaction and the risk of aspiration. Noon bolus feedings are added to the overnight feeding regimen, if needed, to meet protein and calorie demands, especially for our thin, young adult males, who tend to have very high metabolic rates. Additionally, our dietitians acquired an isotonic liquid modular protein for use with these patients. Unlike standard liquid protein, this formula does not contribute to diarrhea.

**7. How can this initiative be replicated through the region? (Please limit this description to 100 words.)**

Replication of our successful outcomes will depend on adapting the interventions to fit within the culture and structure of each setting and patient mix. For example, while every patient needs to shift weight when sitting, some may need to shift weight every fifteen minutes. Positioning devices and seating systems can vary widely, but all should be fitted and modified by seating experts. Likewise, nutritional interventions must be patient-specific, but the principles of optimizing protein intake and minimizing loose stools should be applied to all patients at high risk. Regardless of the setting, the same iterative process can be utilized.

**8. Explain how the initiative demonstrates innovation (Please limit this description to 100 words.)**

As described previously, the development of the various prevention strategies required considerable and continuous innovation. We integrated known strategies with new innovations to create our prevention bundle. Examples included the development of the “poop in a group” collaboration and the more recent changes in the approach to nutrition and protein intake for the tube-fed patients. Other innovations included placing limitations on therapy activities, based on the various Braden risk levels, the identification of therapy activities and equipment that put sacral skin at high risk, and the institution of interdisciplinary wound rounds and bowel rounds.

**9. How does this initiative demonstrate collaboration with other providers within the continuum of care? (Please limit this description to 100 words.)**

Throughout this project we shared our learnings with clinicians in acute care who refer patients to us and to whom we transfer patients for acute management. We purchased bracelets to alert staff in other facilities of the need to turn our patients while they awaited care. We modified information on our transfer form to insure that the risk of skin breakdown was evident immediately, and we educated our patients and their families regarding the care necessary to prevent skin breakdown so that they could advocate for themselves. We also participated actively in the statewide HEN project to reduce pressure ulcers.

10. Explain ways in which senior leadership exhibited commitment to the initiative (Please limit this description to 100 words.)

Beginning in 2012 a high level of urgency was conveyed to project leaders by the Board of Trustees and senior leaders, related to pressure ulcer prevention. We had support for “whatever was needed” to prevent pressure ulcers. This was demonstrated repeatedly through the allocation of resources for additional equipment, supplies, and staff. Additionally, senior leaders are responsible to lead a biweekly review of all acquired ulcers. Therapy and nursing leaders as well as wound nurses report. The focus of this meeting is to identify failures (not blame) and determine what should be done to insure that they do not recur.

11. Appendices (i.e., tables and graphs)

Stroke alert tim	Number of Stro	Number of Stro	% within goal	(% within goal	(% within goal	(% within goal	(Door to Drug - 45 Min)
2013	15	33.3%	86.67	92.86	40.00	13.33	
2014	14	57.1%	92.86	100.00	57.14	42.86	
2015	21	81.0%	100.00	100.00	80.95	71.43	

**Table 1**

Measure	2013 (Baseline)	2014	Jan - Jun 2015	p-value
Stroke Patients Arriving by Ambulance	15	14	21	
Stroke Alerts Called from Field	33.3%	57.1%	81.0%*	0.006
Door to CT in 25 Minutes	86.7%	92.9%	100%	
Door to CT Read in 45 Minutes	92.9%	100%	100%	
Door to tPA in 60 Minutes	40.0%	57.1%	81.0%*	0.017
Door to tPA in 45 Minutes	13.3%	42.9%	71.4%*	0.001

\* Significant improvement compared to baseline