



# Reducing Hospital-Acquired Pressure Injuries (HAPI) in Long-term Acute Care with Turn Cueing Technology

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## ABSTRACT

### Background and Introduction

Long-term Acute Care Hospitals (LTACH) manage critically ill patients after their critical care hospitalization has ended. Many patients are admitted after unsuccessful weaning attempts with either indwelling endotracheal tubes or new tracheotomies. The medical complexity and prolonged immobility increase pressure injury (PrI) risk<sup>1</sup>, and in LTACHs, prevalence rates have been reported as high as 32.9%.<sup>2</sup> Pressure injuries not only delay patient recovery, but also increase the risk of serious infections and are a major cause of mortality.<sup>3</sup> CNO-lead nursing team at a 50-bed Northeastern LTACH wanted to explore whether improved patient repositioning would reduce Hospital-Acquired Pressure Injuries (HAPI) and improve wound healing rates for pre-existing PrI. The facility specializes in weaning mechanically ventilated, critically ill patients and receives 100% of admissions directly from area hospital ICUs. Over 70% of admissions have present-on-admission PrI, and similar to other LTACHs, HAPI incidence is high. Most common HAPIs are sacroccygeal and could potentially be reduced by better adherence to turning protocols.

### Methods

The Quality Improvement program was initiated in September 2018. The program consisted of staff education and deployment of wearable monitoring system which cues staff to turn patients at a prescribed turn period and a minimum turn angle. Patients with Braden Scale Score  $\leq 14$  were deemed appropriate for monitoring and assigned a 2-hour turn protocol with minimum 20-degree lateral turns. Sacroccygeal PrI and wound healing data were collected and compared for the baseline and QI periods. Statistical significance of the change in PrI's and wound healing were calculated using Pearson's Chi-square test at 0.05 significance level. Nursing staff was surveyed about attitudes towards patient repositioning, teamwork and communication before deployment and after the first 30 days.

### Results

From September 2018 to June 2019, 248 patients were included in the program, 98% of all admissions. Average monitoring time per patient was 499 hours. Staff successfully maintained an average turn protocol adherence of 87.3% throughout the 10-month period. Number of sacro-coccygeal HAPI were reduced by 84.6% from baseline ( $p < .00001$ ). Full-thickness HAPI, the most common PrI stages in the baseline period, did not occur in the QI period at all, a reduction of 100%. Mean wound healing rate for present-on-admission PrI's improved by 5% and heel HAPIs were reduced by 43%, but neither were statistically significant.

Forty-one nursing staff participated in the pre-survey, and 36 completed the post-survey. In the pre-survey, 54% felt that on-time turning was either difficult or very difficult, compared to 14% of post-survey respondents. Only 5% felt turning was easy or very easy before start of the QI program, compared to 75% of staff surveyed after the first 30 days. Most post-survey respondents thought the program had helped improve workflow efficiency (69%) and staff communication (67%).

### Conclusions

Patient repositioning can significantly reduce sacroccygeal Pressure Injuries and improve facility quality metrics when provided consistently over a long period of time. Nurse leaders are in a unique position to impact outcomes by bringing in innovation and sponsoring quality improvement initiatives targeting nursing sensitive indicators.

## METHODS

- Patient wearable sensor technology was implemented to monitor patient position, orientation and ambulation
- System provides visual cues to aid turning frequency and dosing (turn angle)
- Staff were trained on turn techniques and importance of patient repositioning for pressure injury prevention
- Daily and monthly reports provided feedback on system use and achieved turn protocol adherence
- HAPI incidence and severity, and wound healing rates were calculated and compared between baseline and intervention periods



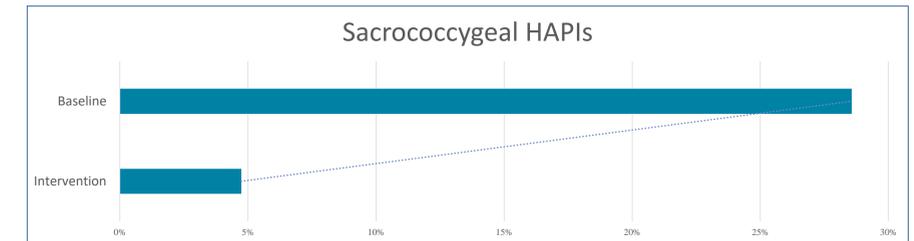
## Patient repositioning aided by cueing technology reduced incidence of sacro-coccygeal pressure injuries by 85%.

## Nurse leaders can improve patient outcomes by sponsoring quality improvement initiatives that target nursing sensitive indicators.



## RESULTS

Unit	Mean Turn Adherence	Monitoring Time (H)
4W	87%	58,226
5W	88%	65,541
Total	87%	123,767



Key Outcomes	Baseline	Intervention	reduction	Chi-Square	P value
Total Discharges	273	253			
Sacroccygeal + Heel HAPIs	31%	6%	81.2%	35.99	<.00001
Sacroccygeal HAPIs	29%	5%	84.6%	37.8925	<.00001
Mean woundhealing%	90%	94%			

- Mean turn protocol adherence in the 9 months was 87%
- There were no stage 3, 4 or Unstageable HAPIs in the **intervention** period (**reduction of 100%**)
- Sacro-coccygeal HAPIs were reduced by **84.6%**; Overall HAPIs by 81%
- HAPI reduction was statistically significant ( $p < .0001$ )

Return on Investment	
Cost per unreimbursed HAPI	\$ 21,784
Total HAPI cost avoidance	\$ 1,437,744
Sensor cost	\$ (49,600)
Estimated ROI	\$ 1,388,144

## REFERENCES

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3. AHRQ National Scorecard on Hospital-Acquired Conditions, June 2018. Retrieved on July 16, 2019 from [https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/pfp/nathacratereport-rebaselining2014-2016\\_0.pdf](https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/pfp/nathacratereport-rebaselining2014-2016_0.pdf)