

A Lean Six Sigma Approach Achieves Breakthrough Reductions in Hospital Acquired Pressure Ulcers for High Risk, Critical Care Patients

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RESEARCH OBJECTIVE

- Under the value based purchasing program, Medicare withholds reimbursements for hospital acquired pressure ulcer (HAPU) treatment and rewards hospitals that meet or exceed the established performance standard.
- With little evidence of a validated prevention process, avoiding HAPUs is a challenging task, especially in intensive care units where patients are typically older and immobile with contributing comorbidities.
- The goal of this study was to implement a unit acquired pressure ulcer (UAPU) prevention program using Lean Six Sigma (LSS) methodology to reduce the UAPU rate by 15% on intensive care and stepdown units with rates persistently above benchmark..

STUDY DESIGN

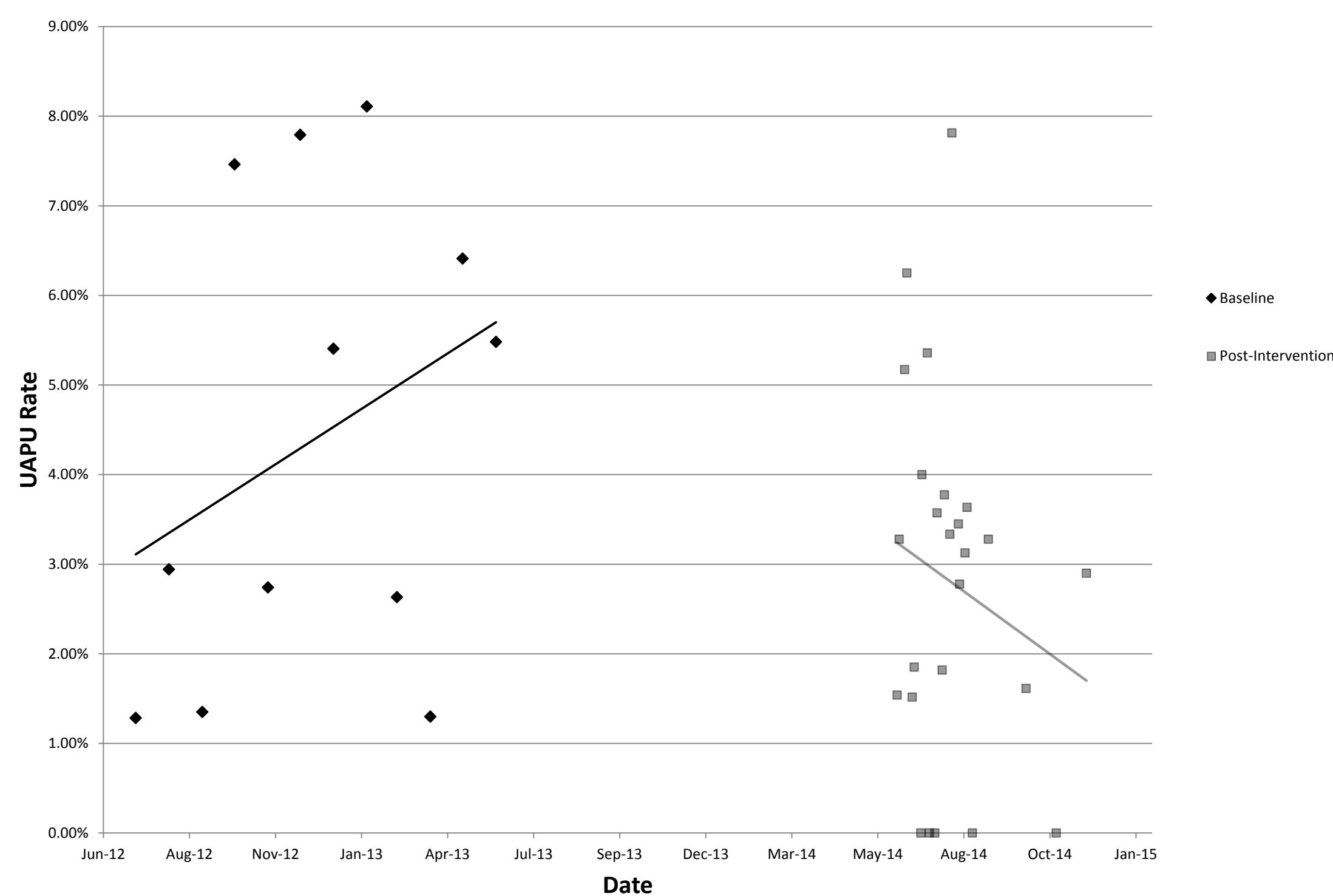
- An interdisciplinary team comprising nursing leadership, wound, ostomy and continence (WOC) nursing specialists, nursing support staff, nutritionists, researchers, physical and occupational therapists and physicians designed and executed the project.
- Using the LSS process improvement DMAIC principals, Define, Measure, Analyze, Improve and Control, the team collected and analyzed baseline measures and contributing factors for UAPUs.
- The team identified vital root causes of UAPUs, process insufficiencies, and opportunities to maximize, which formed the basis of the pilot program.
- A two month pilot program that included equipment monitoring, patient out of bed to chair monitoring, a daily goals interdisciplinary rounding checklist and standardization of the pressure ulcer documentation process was implemented in June and July 2014.

POPULATION STUDIED

- The three study units included a surgical neuro/trauma intensive care unit, a cardiovascular intensive care unit and an ortho-neuro-trauma stepdown unit selected from a 913 bed hospital that is a part of 1,200 bed level one trauma regional health system.

PRINCIPAL FINDINGS

UAPU Rate at Baseline and Post-Intervention



- Baseline period (July 2012 to June 2013) the combined UAPU rate was 4.4% (39/889).
- Ten week pilot program (June-July 2014) the combined UAPU rate for our study units was lower at 2.8% (22/790) (p=0.08). This surpassed our goal of a 15% reduction to a rate of 3.7%.
- During the pilot period, two of the individual unit had an average rate below their respective benchmarks for comparable units: 2.3% (5/221) on the surgical neuro/trauma unit, and 3.4% (8/235) on the cardiovascular unit.
- Control period (August 2014-January 2015) the combined UAPU rate remained below a 15% reduction with a rate of 2.9% (21/710) showing a statistically significant reduction of UAPUs since the pilot start date (p=0.05).

- At project update meetings, unit-based process owners reported that staff demonstrated pride in their efforts to increase patient safety and satisfaction through these initiatives.
- There was consensus that general awareness about pressure ulcers had increased among all providers and that the new documentation process and monitoring tools were readily incorporated into the daily workflow.
- Using estimated direct costs from Truven Health Analytics for patients with Stage III/IV pressure ulcers not present on admission, the project reduced systems costs from \$351,858 during baseline to \$225,550 during the pilot.

UAPU Vital Root Causes Determined from Baseline Analysis and Proposed Strategies to Address

Vital Root Causes Of UAPU	Strategies to Address
Insufficient equipment levels for repositioning devices; units did not have one device per patient	Implement tracking devices; Purchase new chair cushions, wedges and heel ups
Patient sitting in chair without a cushion	Place indicator in room as a visual trigger for cushion use when the patient is out of bed
Patient sitting episodes greater than two hours	Place sign in the room indicating time patient needs to be moved back to bed
Lack of patient repositioning while out of bed to chair	Purchase devices for pressure offloading while in chair; Create a mobility position dedicated to patient mobilization, repositioning, out of bed monitoring and walking
Variable skin inspection tools	Streamline documentation to an electronic format ; Create skin integrity documents tab to house electronic forms
Handoff communication from nurse to provider about a patient's pressure ulcer status	Implement interdisciplinary rounds checklist to include skin risk, impairment and goals; educate providers on pressure ulcer prevention

CONCLUSIONS

- An UAPU prevention program designed using LSS methodology and an interdisciplinary team can reduce UAPU rates in high risk intensive care units.
- Sustained results show that increased risk awareness and compliance with process tools among all staff members was maintained.

IMPLICATIONS FOR PRACTICE

- Costs of a HAPU can range from \$500 to \$70,000 depending on severity and were estimated at \$11 billion per year nationally in 2009.
- HAPUs have negative impacts on patient outcomes, length of stay, readmission rates and quality of life and staff morale.
- A systems approach with an interdisciplinary team distributes the responsibility for monitoring and treatment plans across many different staff members to increase the likelihood that a developing pressure ulcer will be identified early.
- This project provides concrete examples of key elements of a successful system approach to pressure ulcer prevention that are adaptable and should be incorporated into best practice models on all inpatient units in acute care setting.
- Following this proven process can yield higher Medicare reimbursements for exceeding the benchmark measure and improve hospital ranking.

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