

# A Multi-Faceted Approach for Reducing Heel Pressure Ulcers

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## Abstract

A 443-bed acute care facility desired to reduce nosocomial heel ulcers among patients in its three intensive care units (38 beds). In order to better understand trends, co-morbidities, and anatomical locations, the wound care nurse initiated monthly prevalence and incidence studies. These studies revealed an aggregate of 1.2 heel pressure ulcers per thousand patient days over the 12-month period from March, 2008, through February, 2009.

In March, 2009, the wound care nurse implemented a multi-faceted intervention in each of the three ICUs. The intervention included development of evidence-based intervention criteria;<sup>1,2,3</sup> posting the criteria in every room; extensive education of nursing staff; stocking heel flotation devices on the unit; ongoing monthly measurement of prevalence and incidence; and active oversight by a committed wound-care professional.

During the 12-month period following the intervention, from March, 2009, through February, 2010, heel ulcers were reduced by 65%, to 0.43 per thousand patient days, saving the facility \$44,000 annually in expected treatment costs.<sup>4,5,6,7</sup>

Of the five heel ulcers that presented in the 12-month period following institution of the intervention, two were among CABG patients that presented life-threatening complications. The other three occurred when the wound nurse was on leave. The implication is that continued success of an intervention – even a rigorous, multi-faceted one – often requires the continued oversight of a committed wound care professional. Clearly, even better staff education and accountability are desired, so that the process is not dependent upon the daily presence of a single individual.

During the most recent 12-month period, from March, 2010, through February, 2011, patients presented 0.24 heel ulcers per thousand patient days (an additional reduction of 44% over the prior year). This further reduction increased the total reduction in expected treatment costs to over \$53,000 annually.<sup>4,5,6,7</sup>

Future studies might include refinement of the intervention criteria, staff education, and organizational factors, with the goal of totally eliminating nosocomial heel ulcers.

## Building Blocks of a Successful Intervention

After identifying a device with the potential to reduce nosocomial heel ulcers, a six-faceted intervention was developed and implemented.

- **Research** was undertaken to develop evidence-based application guidelines to prevent heel ulcers (see "Evidence-Based Criteria" at right).
- **Posting** these criteria in every room enables clinicians to be visually reminded of the criteria when attending to every ICU patient.
- **In-servicing** all nursing staff, both initially and when new staff are hired or assigned to ICUs, ensures that all nurses are trained. Presenting the dire clinical and financial costs of not following the criteria has helped to elicit staff commitment (see "Cost Savings" at right).
- **Monthly monitoring** and posting of heel ulcer rates helps ensure that prevention remains top-of-mind (see "Incidence" at right).
- **Oversight** is key to ensure that staff understand and are following the intervention. This was especially important at the beginning. There is no substitute for walking around and observing.
- **Stocking** devices on the unit was found to be a key to compliance during weekend shifts, when orthopedic support (responsible for administering the devices), is not present in the hospital.



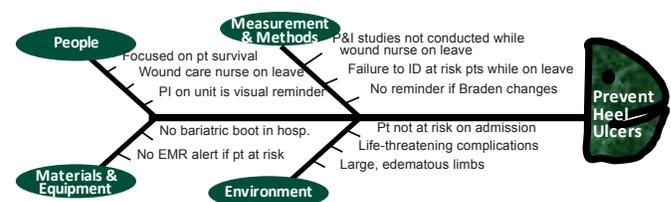
- Post criteria in every room
- Research-based criteria
- In-service extensively
- Monitor monthly
- Oversee actively
- Stock on the unit

*The "PRIMOS" mnemonic may be helpful when planning the implementation of other interventions.*

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## Root Cause Analysis of Residual Events



No events caused by failure of intervention criteria

Root Cause	Future Study
Lacked bariatric size boots	Measure P&I among pts w/ large limbs (no events since bariatric boots stocked)
Failure to re-assess when patients deteriorated rapidly	Investigate automatic reminders to re-assess (e.g., EMR alerts)
Compliance dependent on regular oversight – declined when wound nurse on leave	Investigate impact of training, staffing, and organizational factors on accountability & compliance

*Goal of future studies: evaluate process improvements to achieve and maintain zero nosocomial heel ulcers in ICUs.*

## Evidence-based Protocol

### Key Co-Morbidities

- Diabetes Mellitus,<sup>2,9</sup> CVA,<sup>2</sup> PVD,<sup>2</sup> Hemiparesis,<sup>11</sup> Quadriparesis,<sup>12</sup> malnutrition<sup>13</sup> (albumin < 3.0,<sup>2</sup> Braden Nutrition score of 1 or 2<sup>9</sup>)
- Unconscious,<sup>12</sup> comatose,<sup>9</sup> spinal cord<sup>9</sup> or head injury<sup>12</sup>
- Orthopedic<sup>2</sup> and other surgeries that limit motion of the legs<sup>9</sup> (hip fractures,<sup>2,9</sup> total hips,<sup>12</sup> and total knees<sup>2</sup>), leg compartment syndrome<sup>12</sup>
- On medications such as sedatives,<sup>9</sup> paralytics<sup>9</sup> & vasopressors<sup>2,9</sup>

### Predictors

- Total Braden Score  $\leq 16$ <sup>2,8,9</sup>
- Braden Mobility Score of 1 or 2<sup>8</sup>
- Braden Activity Score of 1 or 2<sup>8</sup>
- Expected immobility / inability to move legs<sup>9</sup>
- Arteriosclerosis<sup>10</sup> of legs, absent pulse<sup>9</sup>

### Care of Patient

- Remove the boot Q-shift and inspect the patient's skin
  - Use boot on patient only while in bed
- DO NOT allow the patient to stand or walk while wearing the boot.**

Peer-Reviewed Research

Mfr Indications and Contra-Indications

Internal Studies, Nursing Practice

### Key Co-morbidities

Internal Phoebe study revealed high incidence of heel ulcers among patients with hip fractures

### Care of Patient

- Clean and moisturize the skin daily
- Follow procedures for assessing pedal pulses

Staffing Constraints

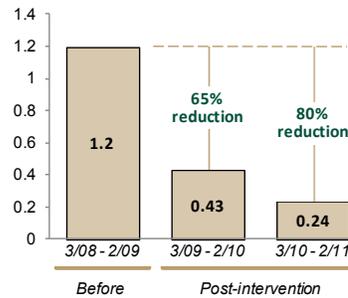
### Week-end Shifts

Orthopedic support will stock extra boots in the ICU's for the week-end shifts. If you use the boots please send a message to Orthopedic support through HBO stating who the patient is so appropriate charges and inventory changes can be made.

**Evidence-based criteria – based on peer-reviewed research, internal studies, manufacturer documentation, and staffing plans – are now posted in every ICU room.**



## Incidence Heel Ulcers per Thousand Patient Days

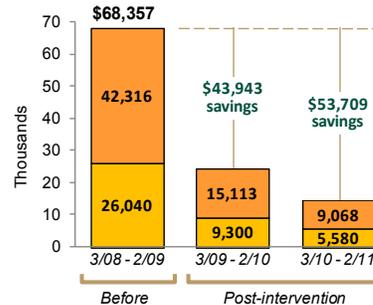


### Notes:

- Population: All patients in PPMH's three ICUs (38 beds total)
- Prevalence and incidence data collected monthly from March 1, 2008 through February 28, 2011
- Intervention implemented during March, 2009

**Implementing a multi-faceted intervention reduced the incidence of nosocomial heel ulcers by 80% ...**

## Cost Savings Expected Nosocomial Heel Ulcer Treatment Costs



### Assumptions:

- Expected distr. of heel ulcers by stage:
- 93% Stage I & II
- 7% Stage III & IV
- \$2,000 cost to treat Stage I & II PU
- \$43,180 cost to treat Stage III & IV PU

### Key:

- Stages III & IV
- Stages I & II

**... and saved an estimated \$53,000 annually.**

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