Problem: Our critical care unit experienced a sharp increase in hospital-acquired pressure injury (HAPI) incidence from 4.4 to 1,000 patient days in fiscal year 2015 to 11.13 per 1,000 patient days in Quarter 2 Q4 2016. This culminated in a total of 32 non-device related HAPIs from Q1-Q4 2016, 24 of which were Deep Tissue Injuries (DTIs). With 75% of our HAPI being DTIs, and February 2016 reaching a peak incidence rate of 21.44 per 1000 patient days, the frontline staff began to seek a solution for it. (See Figure 1)

Setting: A 24 bed medical surgical critical care unit in the Central South from June 2016 through March 2017

Interventions: A multidisciplinary team was formed to initiate a quality improvement project (QIP) to reduce non-device related pressure injuries utilizing the Plan, Do, Study, Act (PDSA) Table 1). The team established current pressure injury prevention protocol (PnP) was reviewed (See Table 2). Compliance with the PnP, including turning every two hours, was confirmed through chart audits. It was noted, however, that the PnP lacked specific interventions to reduce friction and shear force.

Additionally, a review of literature identified unique risk factors in the critical care environment that were not addressed by the risk assessment tool in place. (See Table 2). Though evidence-based validation is currently lacking, nurses were taught the importance of a high risk model for shear and reduced hospital-acquired pressure injury. As a result, a >72 score on the Richmond Agitation and Sedation Scale (RASS) was included as a risk factor. The PnP was continued on patients who were identified to be at risk with the addition of a group of bundled interventions. Bundled interventions included a Five layer soft silicone bordered foam sacral dressing, offloading Fluidized positioning heel boots (Fluidized Heel boot) and a non-powdered reactive support surface positioning system (NRSSPS with fluidized positioner*). (See Figures 2-4)

Through the month of June 2016, a product total of two similar sacral dressings was performed. The Five layer soft silicone bordered foam sacral dressing was chosen after a review of supporting evidence and survey of nursing staff. The presentation dressing was left in place for up to seven days unless occluded. To further reduce friction and shear, the patients scored a >12 on the Braden scale were placed on the NRSSPS. The Fluidized positioner component of the NRSSPS replaced positioning with a foam wedge and pillow. Because the positioning system made turning assisted patient mobility significantly easier for staff, patients scoring a >12 on the Braden mobility subscale were also placed on the NRSSPS. Nurses were encouraged to place fluidized heel boots on these at-risk patients.

Staff were educated on all shifts. Each discipline evaluated the bundled interventions. Skin and risk assessments every twelve hours continued throughout the project.

Discussion: The search for a solution began when the frontline team realized that compliance with our institution’s PnP failed to prevent shear, a major causative factor in the development of deep tissue injury. Continued patient repositioning increases shear forces on deep tissue injury to accommodate for mobility. To reduce shear and friction forces during nursing, an NRSSPS made of low friction material and a static low pressure mat was placed under patients identified to be at risk. The accompanying fluidized positioner was recognized by nursing staff to be a better alternative to foam wedges or pillows. It was felt to better maintain positioning because it did not compress or flatten and was able to be molded to hold the intended position.

Strong evidence, including three RCT’s, supports the effectiveness of a five layer soft silicone bordered foam sacral dressings used for prevention of pressure injury in critically ill patients, but this intervention was new to our unit. The prophylactic dressing absorbs shear force, and the dressing covers vulnerable skin and has a low friction backing. Fluidized heel boots were available for use throughout the hospital before the start of our QIP, but were rarely used. Fluidized boots protect the heel by elevating the heel to offset pressure, and provide pressure redistribution to the Achilles’ tendons. Identification of high risk patients and bundling shear reducing interventions brought attention to the product we already had available for use.

Conclusion: A significant reduction in ICU acquired pressure injuries was achieved by using a bundled approach to reduce friction and shear. A five layer soft silicone bordered foam sacral dressing and non-powdered reactive support surface positioning system with fluidized positioner, in combination with fluidized heel boots were added to the pressure injury prevention protocol. An additional benefit of this project was that ICU specific risk factors for PI development were identified.

While most of the pressure injuries on our unit were DTIs, the estimated cost of a DTI is variable and dependent on the injury etiology. At minimum, the cost of treatment for a Hospital acquired Stage 2 pressure injury is estimated at $10,000. Stage 3 and 4 pressure injuries can total upwards of $70,000 per incidence*. The total cost of adding bundled interventions per patient including: 2 heel boots, (1) positioning system and (1) sacral dressing was $242.18. The preventive cost using bundled interventions for forty-one ICU patients would be roughly equivalent to the cost of treating a single Stage 1 HAPI.

**Product silhouette and manufacturer information—Mepilex® Border (San Antonio, TX) and Tortoise® Turning and Positioning Systems (Edina, MN) are manufactured by Mölnlycke Health Care US LLC. Intermittent pneumatic therapy for foot and ankle—MPL Pump® is manufactured by HOCM, Inc. Manufactured by HOCM, Inc. and sold through Mölnlycke Health Care US LLC. HOCM is a registered trademark of Accord Health Care.”