

Title: Prospective Study to Decrease Nosocomial Pressure Ulcers and Specialty Bed Rentals in Critical Care Areas

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## Abstract

### Objective

The purpose of this research was to decrease the occurrence of nosocomial pressure ulcers and to decrease the number of specialty bed rentals in the Intensive Care Units (ICU) at Brookhaven Memorial Hospital Medical Center.

### Design

A prospective quasi-experimental study design was used.

### Setting

All three (3) ICUs at Brookhaven Memorial Hospital Medical Center were included in the study: the Surgical Intensive Care Unit (SICU), Medical Intensive Care Unit (MICU) and the Coronary Care Unit (CCU).

### Patients

All patients in the ICUs on the day of the skin assessment were included in the study. Patients, not pressure ulcers were used as the unit measured.

### Interventions

Prior to the start of the study, all ICU support surfaces were replaced with XPRT, a support surface that redistributes pressure and provides low air loss along with lateral rotation, percussion and vibration therapy. The ICU staff attended educational in-services.

### Main Outcome Measures

The two dependent variables measured were clinical effectiveness of preventing nosocomial pressure ulcers as demonstrated by a reduction in facility acquired pressure ulcers and reduction in specialty support surface rentals.

### Main results

Overall, the nosocomial rate of pressure ulcers in the three (3) ICUs decreased 59%. Specialty support surface bed rentals decreased by 73%.

### Conclusion

Through the team efforts of the wound care team at Brookhaven there has been a decrease in the percent of nosocomial pressure ulcers and specialty bed rentals.

## Introduction

Pressure ulcers represent a health care concern for the patient, family and healthcare provider. The prevention of pressure ulcers can eliminate pain and suffering for the patient and family and prevent the consequences of increased health costs.<sup>1</sup> It has been estimated that pressure ulcers cost the American healthcare system over \$20 million a year.<sup>2</sup> In an effort to better predict which patients are at risk for developing pressure ulcers, a skin and risk assessment should be completed immediately upon arriving at a facility or unit, regardless of the care setting.

The risk assessment tool used should include both intrinsic and extrinsic factors that contribute to pressure ulcers. Intrinsic factors include but are not limited to mobility status, cardiopulmonary compromise, sensory deficit, poor nutritional status, anemia, tissue fragility, steroid administration, immunosuppression diseases, age, and weight. Extrinsic factors always include pressure, shear, friction, moisture and heat. Patients identified as being at an increased risk should have a prevention protocol initiated.

The intensive care population has a broad range of physiologically unstable patients. Studies have found that the nosocomial rate of pressure ulcers stage II or greater in the ICU is higher than the rates in the non-critical areas. These studies have found rates of 8% of the patients in a surgical ICU<sup>3</sup>, 12.4 in a neurologic ICU,<sup>4</sup> and over 30% of the trauma patients.<sup>5</sup>

The key component of a pressure ulcer prevention program for patients in the ICU is an initial skin and risk assessment tied to a plan of care that identifies the specific level and type of risk the patient faces. A pressure ulcer may be considered unavoidable if the facility properly assessed the patient, developed an evidenced based plan of care, implemented the care plan, evaluated the outcome, revised the care plan as needed and documented these events. Using an appropriate support surface that will help redistribute pressure is an important role in the prevention of pressure ulcers.

## Objective

The purpose of this research was to decrease the occurrence of nosocomial pressure ulcers and the number of specialty support surface rentals in the Intensive Care Units (ICU) at Brookhaven Memorial Hospital Medical Center.

## Methodology

### Design

A prospective quasi-experimental study design was used.

### Setting

All three (3) ICUs at Brookhaven Memorial Hospital Medical Center were included in the study: the Surgical Intensive Care Unit (SICU), Medical Intensive Care Unit (MICU) and the Coronary Care Unit (CCU).

## Subjects

All patients in the ICUs on the day of the skin assessment were included in the study. Patients, not pressure ulcers were used as the unit measured. Each ICU reported the number of patients with new pressure ulcers divided by the total number of patients assessed.

## Data Collection Tool

The standard Prevalence Audit collection tool (see appendix 1) was used to collect data on all patients. If a patient was found to have a pressure ulcer, a follow up form was completed (see appendix 2). Stage I pressure ulcers were included in the study.

## Terms and Definitions

Pressure ulcer prevalence audit - A complete skin assessment of all patients in a facility/unit on the day of the audit. All patients that meet the inclusion criteria must be assessed and data collected the day of the audit.

Prevalence rate – the total number of patients that have a pressure ulcer the day of the audit / the total number of patients assessed

Nosocomial rate – the total number of patients that developed a pressure ulcer since being admitted to the facility or unit / the total number of patients assessed

Partial-thickness - wound that involves the epidermis and or extends through the epidermis and into the dermis without penetrating the dermis

Full-thickness – wound that penetrates through the epidermis and dermis and into subcutaneous layer of the skin.

## Interventions

Prior to the beginning of the study, in an effort to decrease nosocomial pressure ulcers in the ICU and specialty rental beds, all ICU support surfaces were replaced with XPRT, a support surface that redistributes pressure and provides low air loss along with lateral rotation, percussion and vibration therapy. ICU nurses received in-servicing on XPRT to ensure the correct setting of the support surface to provide the therapy each patient needed to prevent and treat pressure ulcers. These mattresses were delivered in May 2005.

During the period the mattresses were being replaced, the ICU staff attended educational in-services. Intrinsic and extrinsic risk factors for pressure ulcers were presented. The importance of accurate and timely skin assessments was reviewed. Nurses were also instructed about recognizing pressure ulcer stages, measuring pressure ulcers and deep tissue injury. Information to differentiate between types of ulcers (pressure, venous, arterial, and diabetic) and Stage II pressure ulcers and denuded skin was also included. The importance of the total score and subcategory scores of the Braden Risk Assessment was examined. Special attention to the nutritional needs of the patient was stressed. In-depth information on the legal implications on the importance of documentation was emphasized.

Weekly pressure ulcer prevalence audits were conducted. Each patient's skin, from head to toe, was assessed during the audit. Dressings, compression devices and other barriers to skin assessment were removed so that all areas could be viewed. Only registered nurses collected the data and filled out the forms.

#### Analysis

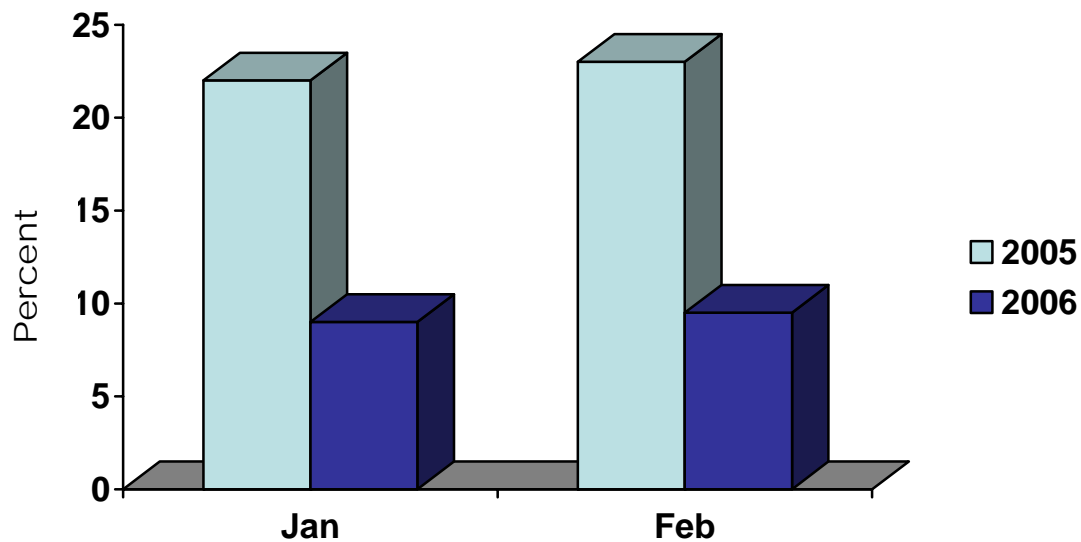
The January and February 2005 prevalence audit results in the SICU, MICU and CCU were compared to the same period of time in 2006.

The number of specialty support surface rentals from January through June 2005 was compared to the specialty support surface rental costs from January 1 through June 2006. The same months were used for the comparison to eliminate the effects of seasonal differences.

#### Results

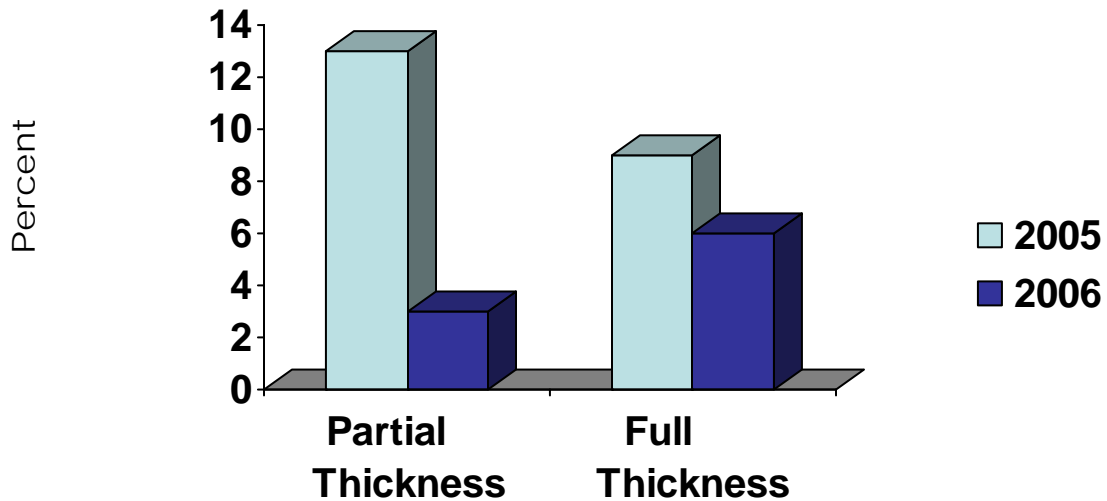
Overall, the nosocomial rate of pressure ulcers in the three (3) ICUs decreased 59%. (Figure 1).

Figure 1 Percent of ICU Nosocomial Pressure Ulcers



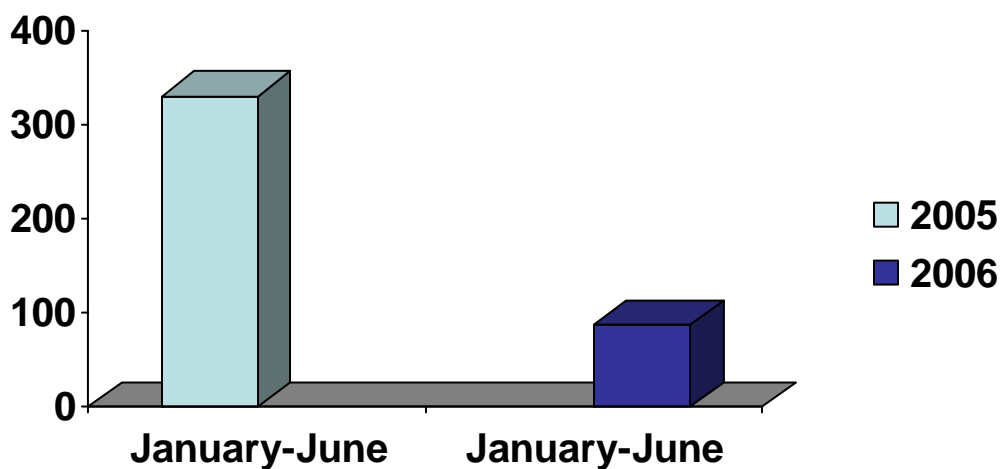
There was a decrease in both partial and full thickness pressure ulcers. There was a 77% decrease in partial thickness pressure ulcers and a 33% decrease in full thickness ulcers (Figure 2).

Figure 2 Percent of Partial and Full Thickness ICU Nosocomial Pressure Ulcers



A review of the number of specialty support surfaces rented for six (6) months (January through June 2005) was obtained. The January through June 2006 specialty support surfaces rentals was obtained. The same six (6) months were used to avoid any seasonal differences. There was a 73% decrease in the number of specialty rental beds following the purchase of XPRT mattress (Figure 3).

Figure 3 Number of Specialty Rental Beds Before and After XPRT



## Discussion

Brookhaven Memorial Hospital Medical Center ICUs conduct pressure ulcer prevalence audits weekly and identified that the nosocomial rate was higher than they found acceptable. Additionally, the number of rental specialty beds was continuing to increase.

Several areas of improvement were identified. The admission protocol to the ICU was changed to include skin and risk assessment to be completed within two hours of the patient being admitted. This included all patients arriving from the operating room, post anesthesia care unit, emergency department or another unit in the hospital. Skin assessments were to be conducted daily and charted. Risk assessments continue to be completed at least weekly, with a change in condition, or transfer. Specific interventions such as floating heels, frequency of turning and repositioning, either manually or assisted by a bed, was to be completed and documented every two hours. In a comprehensive effort to improving clinical outcomes while decreasing the use of specialty rental beds, all ICUs received new XPRT support surfaces for each bed frame.

All three ICU's use existing evidenced based standard prevention and treatment protocol to be implemented based on the results of skin and risk assessment.

## Conclusion

Critically ill patients have multiple pressure ulcer risk factors. It is the responsibility of the health care team to make every effort to mitigate these factors. Through the team efforts of the wound care team at Brookhaven they have decreased the percent of nosocomial pressure ulcers and the costs of specialty bed rentals.

Therapeutic support surfaces play an important role in the prevention of pressure ulcers. Although support surfaces do not replace good nursing care, they can greatly minimize the effects of pressure, shear and moisture.

Nosocomial pressure ulcers decreased 59% and the number of specialty bed rental decreased 73% as a result of quality nursing care and the XPRT mattress.

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