PRESSURE ULCER PREVENTION:

USE OF SACRAL MEPILEX IN PREVENTING PRESSURE ULCERS

IN THE INTENSIVE CARE UNIT PATIENT:

An Evidence-Based Project

By

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**Abstract**

During the past few years, the interest on preventative strategies has become apparent in the healthcare field. Pressure ulcer prevention is a key issue being addressed as the cost and methods of treatment are astronomical. The purpose of this evidence-based research project was to determine if the use of a sacral Mepilex, or like dressing, helps to prevent pressure ulcers in the intensive care unit (ICU) population. A pressure ulcer in the ICU can be life threatening. The PICO(T) question for this evidence-based research project was, “In adult intensive care unit patients, does the application of sacral Mepilex, or like dressing, to the lower back/coccyx/sacral area, lead to a decreased incident of pressure ulcer formation in the coccyx/sacral area throughout the patient’s intensive care unit stay?” A literature search using the Cumulative Index to Nursing and Allied Health Literature (CINAHL) database, Google Scholar, and Journal of Critical Care Nurse was performed. The search was performed using key terms identified in the PICO(T). Results yielded five articles that were found to be applicable for this project and were then reviewed. Evidence from these five articles supports the issue of pressure ulcers in high risk patients. The prevention of pressure ulcers using different quality improvement projects while utilizing a multidisciplinary team approach and appropriate measuring tools was identified. Proposed changes for nurse educators would support the continued development of recurrent educational programs to help instruct current and future nursing staff on proper skin prevention and healing techniques. Proposed changes for nurse administrators would support the financial assistance required to execute preventative strategies for patients from admission to discharge and to conduct research required to develop these preventative strategies. Future research regarding the effect of preventative dressings, such as Mepilex, is recommended.

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**Pressure Ulcer Prevention: Use of sacral Mepilex in preventing pressure ulcers in the Intensive Care Unit patient: An evidence-based project**

**Introduction**

Problem

Patients in the Intensive Care Unit (ICU) setting are at an increased risk of acquiring pressure ulcers. Pressure ulcers, also known as pressure sores, bedsores or decubitus ulcers (McCance & Huether, 2010), can be defined as “lesions caused by unrelieved pressure resulting in damage of underlying tissue” (p. 1647). The risk of developing pressure ulcers is increased in the ICU population as these patients spend the majority of their stay in bed, increasing the exposure to “friction,” “shear,” “moisture” and “pressure” (McCance & Huether, 2010, p. 1647), the factors that lead to pressure ulcer formation. According to Kaitani, Tokunaga, Matsui, and Sanada (2010), up to 40% of patients in a critical care setting develop pressure ulcers. The cost of care to those patients who develop a pressure ulcer while in the hospital critical care setting is immense in the United States of America alone. Due to changes accompanying healthcare reform, patients who develop ulcers may not be covered by medical insurance. This results in added cost of care to the patient and facility. Additionally, pressure ulcers result in an increased length of stay, increased morbidity and mortality, and increased suffering for the patient (Elliot, McKinley & Fox, 2008). Pressure ulcer prevention is necessary in the ICU patient.   
**Purpose**

Patients must be assessed for their risk of pressure ulcer formation on admission to the hospital. This is necessary in order to develop a tailored plan of care focusing on pressure ulcer preventive strategies. Identifying risk factors for the inpatient can decrease hospital stay and out of pocket cost to the patient. While the use of appropriate skin care techniques such as repositioning, reducing friction and shear, and pressure relieving mattresses may reduce the risk of pressure ulcers, pressure ulcers can still develop (McCance & Huether, 2010). Because of this, additional measures should be considered. In effort to reduce the incidence of pressure ulcers, select ICUs in the Midwest have recently begun placing sacral Mepilex on the lower back region of patients when they are admitted. This dressing provides a moisture proof barrier to the skin that does not allow bacteria or viruses to penetrate (Molnlycke Health Care, 2011), reducing the moisture component that promotes pressure ulcer formation. The purpose of this evidence-based project is to determine if sacral border Mepilex dressings successfully reduce the risk of pressure ulcers in the ICU.

**Background description of topic**

Pressure ulcers remain “one of the five most common causes of harm to patients” (Elliott, McKinley, & Fox, 2008, p. 329), and can lead to significant morbidity and mortality for patients. Furthermore, "it is estimated that 5% of the total ICU budget is spent on the prevention and treatment of pressure ulcers, and that the nursing workload increases by around 50% once the ulcer develops" (Compton et al., 2008 p. 417). Pressure ulcers are staged depending on the levels of tissue affected. These levels include “‘Stage I: Non-blanchable erythema’, ‘Stage II: Partial thickness’, ‘Stage III: Full thickness skin loss’, ‘Stage IV: Full thickness tissue loss’, ‘Unstageable/Unclassified: Full thickness skin or tissue loss-depth unknown’, and ‘Suspected deep tissue injury: depth unknown"' (National Pressure Ulcer Advisory Panel, 2009, pp. 8-9). Because of the varying levels of tissue damage that can occur, prevention methods are essential. These methods may include turning the patient at least every four hours, floating heels with pillows under legs, using specialty sacrum padding (Mepilex), and utilizing specialty mattresses, which can prevent pressure ulcer formation. Furthermore the methods of prevention are largely the responsibility of the nursing staff (National Pressure Ulcer Advisory Panel, 1992).   
**Theory/model description and connection to PICOT**

Many models have been identified in order to maintain or improve holistic patient care. For instance, Levine’s Conservation Model (1973) can be used as a theoretical framework for wound management (Allgood & Tomey, 2010). Levine’s model identifies the importance of maintaining “the wholeness of the individual” the patient’s personal integrity, worth, self-esteem and physical body (Alligood & Tomey, 2010, p. 299). The nurse is challenged to provide the individual with appropriate care while respecting the individual’s integrity.

“Conservation of structural integrity” (Alligood & Tomey, 2010, p. 229), a focus of Levine’s conservational model, relates to this evidence-based research. "Healing is a process of restoring structural and functional integrity through conservation in defense of wholeness" (Alligood & Tomey, 2010, p. 229). Nursing’s role is to maintain or re-establish skin integrity to ICU patients by preventing physical breakdown to the body and promote healing. Nursing can help limit the amount of tissue damaged through detailed assessment and identification of risk factors on admission (Alligood & Tomey, 2010). Evaluation tools, such as the Braden Scale, assist in determining a patient’s risk for impaired skin integrity and developing a pressure ulcer (Braden & Maklebust, 2005). The Braden Scale allows for identification of the patient’s risk level for pressure ulcer development based on “sensory perception, mobility, activity, moisture and nutrition” (Braden & Makelbust, 2005, p. 70). The categories of the Braden Scale are scored based on patient findings and allow clinicians to identify the amount of attention that should be focused toward preventative skin care measures for a patient (Braden & Makelbust, 2005). Using the results of this scale, high risk patients that may benefit from the application of sacral Mepilex on admission to the hospital setting can be identified.

**Significance of the topic/Overall importance**

The prevention of pressure ulcers is essential in the hospital setting. From a patient perception, pressure ulcers “increase a patient’s length of stay, morbidity, and cost,” as well as decrease a patient’s overall “quality of life” (Campbell, Woodbury, & Houghton, 2010, p. 28). In October of 2008, the Centers for Medicare and Medicaid Services (CMS) stopped providing financial reimbursement to hospitals for pressure ulcers developed within the hospital (United States Department of Health and Human Services, 2011, para. 1). Nursing staff must document an existing pressure ulcer within 48 hours of the patient arriving to the facility or the cost for treating this wound will not be repaid to the facility (Meehan, 2009). Most pressure ulcers can be prevented when appropriate risk factors are recognized and actions are taken (Lavrencic, 2011, p. 6). Typical pressure ulcer prevention methods include adequate positioning, nutritional status, and repositioning. In addition, new techniques such as additional skin barriers are being examined for effectiveness.  
**PICOT**

In an attempt to further reduce the incidence of pressure ulcers in ICU patients, the following PICOT will be addressed. (P) In Adult ICU patients, (I) does the application of sacral Mepilex (or like dressing) to lower back/coccyx/sacral area, (C) when compared to no use of sacral Mepilex on the lower back/coccyx/sacral area, (O) lead to a decreased incident of pressure ulcer formation in the coccyx/sacral area (T) throughout the patient’s ICU stay.  
**Setting(s) Discussion**

Patients in the ICU are at a greater risk for pressure ulcers than the general population (Brindle, 2010). While these patients are not always immobilized, they are sedated, lack proper nutrition, typically are of an advanced age, and lack appropriate sensation (Brindle, 2010). All of these risk factors can lead to an increased prevalence of pressure ulcers. Because of the increased risk for pressure ulcers development in the ICU, the use of sacral Mepilex will be examined as a method to prevent pressure ulcers.

**Stakeholders Discussion**

Numerous stakeholders can be identified for this question. The National Pressure Ulcer Advisory Panel (1992) states “Responsibility for pressure ulcer prevention is shared by health care professionals, bedside caregivers, patients, and families” (para. 7). Patients are of primary concern and their skin should be protected with any method possible in order to prevent skin breakdown. Patients do not want to have an increased length of stay, increased medical cost, or the increased pain associated with the pressure ulcer. Nursing staff would also be prime stakeholders. Lovins and Boliek (2008) state “Never in the history of the profession have the basics of nursing care been more relevant to positive patient outcomes than now” (para. 1). Nursing is responsible for assuring their patients are cared for appropriately. Additionally, nursing has the opportunity to control numerous aspects of patients’ skin care. Physicians would also be major stakeholders. As patients develop pressure ulcers, the length of stay increases. With increased length of stay, the patient becomes more complicated, has an increased risk for infection and requires more personnel to attempt to heal the sore.

Hospitals, in general, would be major stakeholders due to the funding aspect (Brindle, 2010). Insurance companies that pay for pressure ulcer care could also be stakeholders, as they would prefer to not pay to treat the pressure ulcer, but rather prevent it.

**Potential/Actual cost benefits/effectiveness**

The cost of treating a patient with a hospital acquired pressure ulcer is estimated to range from “$2,000 to $70,000 per wound” (Courtney, Ruppman, & Cooper, 2006, p. 1). These numbers pale in comparison to the estimated national costs of “$1.3 and $3.5 billion annually” (Courtney, Ruppman, & Cooper, 2006, p. 1) for treatment. Since a pressure ulcer can range from an area of reddened skin that can be healed with a minimal intervention, to an ulcer that develops and causes septicemia and possibly death, the price for treatments vary significantly. Additionally, nursing staff must spend extra time in the treatment and prevention of pressure ulcers, leading to an increased cost to the facility. With effective interventions, such as the sacral Mepilex that costs $22 online, one can assume the cost of prevention far outweighs the cost of treatment (Metro Medical Online, 2011).

**Desired outcomes for the ICU setting**

The desired outcome for this evidence-based project is to analyze the literature to determine if the Mepilex can reduce the incidence of pressure ulcers in the ICU patient.

**Search Plan Method**

**Search Methods**

Evidence based research and nursing practice relies heavily on the most accurate, current information available. Library databases, which provide current information and up-to-date research results, can be extremely helpful in finding appropriate research (Melnyk & Fineout-Overholt, 2011). Textbooks can also be utilized to provide basic information; however the information may not be as current as journals nor are these a source for research. To supplement for this shortcoming, current journal articles should also be considered (Melnyk & Fineout-Overholt, 2011). Because numerous databases and sources can provide a diversity of information, various methods of obtaining evidence were utilized for the PICOT. The PICOT search was completed using a library computer search, a web-based search and a hand search of current nursing literature. The initial computer search was completed using the Cumulative Index to Nursing and Allied Health Literature (CINAHL) Plus with Full Text database. As Melnyk & Fineout-Overholt (2011) discuss databases such as CINAHL “contain the largest number and widest variation of articles describing clinical research” (p. 45). Once again to assure current information was obtained, a Google Scholar Internet search was also completed. This search was then complemented with a hand search of the 2011 journal *Critical Care Nurse*. This journal was identified because of the link to the population in this evidence-based research. These three methods were utilized to obtain the most comprehensive and current search on literature surrounding the PICOT.

**Database Search Terms and Strategy**

The search terms utilized in the CINHAL Plus with Full Text included: (P) Adult, intensive care unit, hospitalized patient, patient, inpatient, (I) Mepilex, sacral dressing, coccyx dressing, pressure dressing, foam dressing, back dressing, (O) pressure ulcer and pressure sore (see Table 1).

T**able 1. PICOT Search Terms**

|  |  |  |  |
| --- | --- | --- | --- |
| **P** | **I** | **C** | **O** |
| Adult\* | Mepilex\* | (none entered) | Pressure Ulcer\* |
| OR | OR |  | OR |
| Intensive Care Unit\* (and ICU) | Sacral N4 Dressing\* |  | Pressure Sore\* |
| OR | OR |  |  |
| Hospitalized Patient | Coccyx N4 Dressing\* |  |  |
| OR | OR |  |  |
| Patient or Inpatient | Pressure N4 Dressing\* |  |  |
|  | OR |  |  |
|  | Foam N4 Dressing\* |  |  |
|  | OR |  |  |
|  | Back N4 Dressing\* |  |  |

**\* Truncation**

Search terms for the population were first entered into the CINAHL Plus with Full Text database. The key words of “Adult,” “Inpatients,” and “Intensive Care Unit” were entered. The method of truncation was also used for each of the terms to include various endings for the search term. For example Adult\* was expected to yield results of Adult or Adults. Next, a Boolean search was completed utilizing the word “or” to identify the possible population results. This Boolean search yielded 514448 results.

The intervention was the next topic that was entered into the CINAHL database. The key terms “Mepilex,” “Sacral Dressing,” “Coccyx Dressing,” “Pressure Dressing,” “Foam Dressing,” and “Back Dressing” were entered into the database. A proximity search was completed for the key words coccyx dressing, pressure dressing, foam dressing, and back dressing. The term “N4” was entered between the two key words in each search. The results that were expected included any article in which the two words of the search were anywhere within four words of one another in an article. After these individual results were obtained, a Boolean search was completed using the operator “or” and yielded a total of 2,279 results. The comparison group was not entered due to the nature of this PICOT.

The outcome search was then completed. The key term “Pressure Ulcer” was searched as a main heading. Additionally the search term “Pressure Sore” was entered. A Boolean search was again completed using the Boolean operator “or.” This produced a total of 14,952 results. A Boolean search was then completed to combine all of the search terms. The results from the Population, Intervention and Outcome search were combined utilizing the Boolean operator “and” to assure articles would be relevant to the PICOT. This allowed for 205 results.

Limiters were then placed on the search. These limiters included articles published between 2000 and 2011, the articles must be peer reviewed, a research article, and in English. With the limiters set, 67 articles were identified that met criteria, while 138 articles were excluded due to being older than 2000, not peer reviewed, not a research article or in a language other than English.

The web-based search was next completed using Google Scholar. The key terms sacral Mepilex and pressure ulcer were entered. This search produced 24 articles. Limiters were then set including articles published between 2000 and 2011, written in English, and appropriate correlation to the PICOT. Twenty-three articles were excluded based on this criteria while one article met criteria for the PICOT. Critical Care Nurse (2011) was then searched by hand. Of the five articles in this journal, four were excluded due to inadequate correlation to the PICOT. One article met inclusion criteria. Appendix A provides a graphic of the results of this search. These results were further evaluated and excluded based upon irrelevance to the PICOT.

**Inclusion/Exclusion Criteria**

Inclusion criteria included articles from the CINAHL database that were peer reviewed, research article, and English language. Additionally, articles were examined from 2000 to present. Exclusion criteria included articles that were not peer reviewed, those that were not research articles, older than 2000, and those in a language other than English. Articles were further searched based upon relevance to the PICOT. Those articles that pertained to the PICOT were included, while those that were irrelevant were excluded. Inclusion criteria for the Google Scholar search included articles from 2000 to present.

**Articles Meeting Criteria**

The CINAHL database search established sixty-seven articles to be reviewed. Twenty two articles were further excluded due to inadequate correlation to setting (outside of the ICU) and/or body area. Forty-two were excluded due to inadequate correlation to intervention (sacral dressing) or outcomes (decreased incidence of pressure ulcer formation). After all exclusion criteria were applied, three articles from the CINAHL database were left for critical appraisal.

The Google Scholar search resulted in 24 articles. Twenty-three articles were excluded based on inadequate correlation to the PICOT, languages other than English, and overly specific patient populations. One article was appropriate as this article discussed sacral Mepilex as a method to prevent pressure ulcer formation. The hand search of *Critical Care Nurse* (2011) revealed five total articles, one article which fit inclusion criteria. Four articles were excluded because of irrelevance to the PICOT.

**Analyzing the Literature**

**Critical Appraisals**

Critical appraisals were completed on five articles that met the search criteria for the PICOT question. The level of evidence table established by Polit and Beck (2008) was used to analyze and rank each article depending on the strength of evidence. Critical appraisals were completed on these articles to identify the validity, reliability, adaptability and trustworthiness of the articles as well as the significance the studies may have to the PICOT. Each article has noted areas of strength and weakness. The articles appraised look at various factors related to pressure ulcer development.

**Critical Appraisals of Individual Studies**

**Study One: Incidence, prevention and treatment of pressure ulcers in intensive care patients: A longitudinal study.**

Shahin, Dassen, and Halfens (2009) completed a level VI quantitative longitudinal study identifying the prevalence of pressure ulcers, the risk factors for pressure ulcer development, and the evolution of pressure ulcers in the ICU. The study followed 121 adults admitted to two different ICUs. Participants were assessed for pressure ulcers on admission to the ICU and again on discharge, death or two weeks as a patient in the ICU.

Tools used to collect data included an author-developed questionnaire, the European Pressure Ulcer Advisory Panel (EPUAP) grading system, the Braden Scale, and the APACHE II scale. The findings identified an overall pressure ulcer incidence of 3.3% in the ICU population with the most common site for pressure ulcer development on the “sacrum, heel, ischium” (p. 416). Patients with Braden skin assessment scores between 14-18 were identified as higher risk of pressure ulcer development. Nursing care practices of skin inspection, repositioning the patient and massage were identified as methods to reduce the risk of pressure ulcers as well as facilitate healing of pressure ulcers in this particular setting.

**Study Two: Outliers to the Braden Scale: Identifying high-risk ICU patients and the results of prophylactic dressing use.**

Brindle (2010) conducted a Level VII, performance improvement to test the effectiveness of a prophylactic sacral dressing in preventing pressure ulcers. The study followed 93 patients admitted into a Surgical ICU over a period of three months from August 2008 to November 2008. These 93 patients were assessed for risk factors for skin breakdown based on a tool developed by the author and nursing staff on this specific Surgical ICU. Forty-one patients were identified as “high risk.” Sacral Mepilex was used on these “high risk” patients and changed every three days as a prophylactic measure for sacral pressure ulcer prevention.

Of the 41 patients with Mepilex applied, none developed pressure ulcers during their ICU stay. Three patients who were not identified as high risk and did not have sacral Mepilex applied during their ICU stay, developed pressure ulcers. An additional three patients that were high risk developed pressure ulcers following discharge or transfer from the ICU. However, according to the author, “a more in-depth study is needed to ascertain whether the proper use and applications of a prophylactic dressing prevent sacral pressure ulcer formation” (Brindle, 2010, p. 7).

**Study Three: Risk profile characteristics associated with outcomes of hospital-acquired pressure ulcers: A retrospective review.**

Alderden, Whitney, Taylor, & Zaratkiewicz (2011) conducted a Level IV, single observational study identifying the correlation between the risk factors for and development of pressure ulcers. The results showed a definite increase in pressure ulcer development or nonhealing ulcers and risk factors. The review examined 87 hospitalized patients who developed pressure ulcers over a six-month period. Data collection was completed using the Hospital Acquired Pressure Ulcer (HAPU) Subjects Characteristic Tool developed by the researcher. This tool extensively identified factors related to the patient’s hospital stay as well as pressure ulcer development. Data collection was completed by a certified wound nurse using the author developed tool and the Braden Scale with each patient’s chart to stage pressure ulcers (Alderden, Whitney, Taylor & Zarathkiewicz, 2011). Patients who had been given an intravenous vasopressor medication, those who had sustained a spinal trauma injury, and patients aged 40 or older were noted to have unhealed pressure ulcers at discharge/death. Furthermore, from the statistically significant data analysis findings, patients receiving vasopressors were five times more likely to have an unhealed pressure ulcer (p<0.01) while patients over the age of 40 were seven times more likely to have an unhealed pressure ulcer (Alderden, Whitney, Taylor, & Zaratkiewicz, 2011, p. 37). Conclusions of the research noted nurses that have knowledge of the risk factors for developing a pressure ulcer take aggressive preventive measures to prevent or reduce tissue damage.

**Study Four: Use of a new, flexible lipidocolloid dressing on acute and chronic wounds: Results of a clinical study.**

Meaume, Perez, Descamps, Voinchet, Jault, Saunier & Bohbot (2011) conducted a level VI single descriptive study to evaluate the effectiveness of the Urgotul flex dressing compared to the use of Urgotul dressing. The Urgotul products are non-adhesive, non-absorbent hydrocolloid and petroleum jelly impregnated dressing used on acute and chronic wounds to reduce the surface area of tissue injury. The purpose of the study was to document the performance of Urgotul flex in efficacy, tolerability and patient acceptance with wound care. Evaluation of ease of use, pain level and adherence of the dressing to the wound site during dressing changes was also evaluated. A wound nurse collected data with every dressing change. Wounds were measured to evaluate reduction in surface area with each wound. The product was replaced and patient reaction and nurses’ ease of use was assessed during each dressing change.

Forty-four patients participated in the clinical study. Each patient received weekly follow-up with evaluation of the Urgotul Flex effectiveness. Weekly documentation showed a significant reduction in surface ulcer area in wounds. There was no difference in pain scores reported related to the type of dressing used, however Urgotul Flex was identified by the wound nurse as easier to use during the dressing change.

**Study Five: An observational study of the use of a soft silicone silver dressing on a variety of wound types.**

Meuleneire (2008) conducted a Level VI, single descriptive study to evaluate the effectiveness of Mepilex Ag, a polyurethane foam dressing, on various types of wounds. The objective of Meuleneire’s research was to evaluate the effect of Mepilex Ag on “clinical signs of local wound infection…, wound-related pain and progression towards healing…, and patient acceptance of the dressing” (Meuleneire, 2008, p.535). The tools used in this study were the visual analog scale, an author developed qualitative visual assessment to collect observational data on wound healing, and self-reporting from patients of acceptance of dressing. All measurements were subjectively collected by one tissue viability nurse specialist.

The results demonstrated that the use of Mepilex Ag may be beneficial to wounds requiring topical therapy. Of the 30 patients studied, 27 had eliminated signs of local wound infection and a statistically significant pain reduction was noted from prior to initial dressing change.

**Synthesis Discussion of Evidence**

The critical analysis of the literature was completed to answer the following PICOT question: In Adult Intensive Care Unit patients, does the application of sacral Mepilex (or like dressing) to the lower back/coccyx/sacral area when compared to no use of sacral Mepilex on the lower back/coccyx/sacral area lead to a decreased incident of pressure ulcer formation in the coccyx/sacral area, throughout the patient’s ICU stay. The articles found during the review were limited, although articles of similar contemplation were located. In the five articles reviewed during the critical analysis of the literature, two identified the use of Mepilex specifically. The other three articles noted an interest in decubitus ulcer prevention, type of patient at risk, and treatment. Published research articles are limited relating to the PICOT. The literature suggests the use of a skin assessment tool, the Braden scale, to assess the risk of a patient acquiring a pressure ulcer during his or her hospital stay. Three articles used this reputable tool and the other two used other means of documenting ulcers such as pictures, an author developed measurement tool, and visual assessment.

**New Understandings Generated by the Evidence**

Analysis of the articles revealed critically ill patients are at an increased risk for pressure ulcers increasing patients' morbidity and mortality. Quality improvement projects decrease the frequency of pressure ulcers. The first study was a longitudinal study identifying the prevalence and risk factors of pressure ulcer development in the ICU. Participants were assessed for ulcers on admission and again at discharge or death. Findings were collected using the European Pressure Ulcer Advisory Panel grading system. Nurses used the Braden Scale, pressure ulcer lenses, and the APACHE II scale to calculate risk of pressure ulcers and implement preventative measures. The second study, a controlled trial, was completed to test effectiveness of a sacral dressing in preventing pressure ulcers. Participants were followed in the Surgical ICU and assessed for risk factors for pressure ulcers. Those who were found to be “high risk” were treated with sacral Mepliex as a prophylactic measure for pressure ulcer prevention. All patients with sacral Mepilex applied were noted to have remained free of pressure ulcer development. The use of this product showed positive results, however, more studies need to be done to determine worth. Study three was a retrospective review identifying a correlation between the risk factors for and development of pressure ulcers in the ICU. Results showed a link between intravenous medications, spinal trauma, and patients aged 40 or older and pressure ulcer occurrence. Furthermore, the study noted that the deeper the tissue damage the more unlikely healing took place. This article did not pertain to the PICOT but the information will be used to support the current research.

The fourth study evaluated another product, Urotul Flex to determine if tissue surface area lessened, its ease of use, pain level and adherence to the wound site during dressing changes. Weekly wound checks noted a significant reduction in wound size in acute and chronic wounds. Results showed a 78% reduction for acute wounds and 42% for chronic wounds (Meaume et al., 2011, p. 185). The final study was an observational study. Again, a product called Mepilex Ag, a polyurethane foam dressing was evaluated to determine its role in wound healing on a variety of wounds. Application was topical only. This was done over a four week period or until healing was noted. Evaluation during dressing changes for pain and infection were completed each time. Assessment consisted of wound classification of four categories: “Healed”, “Almost healed”, “Minimal lesions”, or “Healing slowly” (Meuleneire, 2008, p. 536). This study showed a benefit of use but more research studies need to be done to determine worth.

Throughout the critical analysis of the literature, similar factors and assessment findings noted risk in the intensive care patient for the development of pressure ulcers. Popular measurement tools were utilized, such as the Braden Scale for skin assessment, photos, and a visual analog scale to determine pain. Pressure ulcers appear preventable through the use of appropriate nursing interventions. Products studied were noted to prevent or lessen the severity of pressure ulcers during hospital stays or during home/clinic dressing changes.

For the purpose of this evidence-based project, Levine’s Conservation Model identifies the importance of the “wholeness of the individual” (Alligood & Tomey, 2010, p. 299). This theoretical model was used to explain the nurse’s role in prevention and treatment of pressure ulcers. A focus of Levine’s Conservational Model, “conservation of structural integrity” (Alligood & Tomey, 2010, p. 229) relates to this research based study. Nurses that follow Levine’s Model develop strategies to maintain or re-establish the patient’s skin integrity. Strategies to decrease the incidence of pressure ulcer formation included thorough skin assessment on admission and continuously monitoring for risk factors. Nursing can implement appropriate early preventative skin care measures after using measurement tools that identify risk level for skin breakdown.

**Limitations**

Limitations of this evidence-based research must be acknowledged. The beginning search was completed using the CINAHL with Full Text Database accessed from Nebraska Methodist College. In the search of this PICOT, numerous terms were used to identify appropriate research articles. However, more findings may have resulted using decubitus ulcer as an additional outcome search criteria. A Google Scholar search was also completed to find more resources. This could have been expanded using additional Internet based search engines. Additionally, a hand search of *Critical Care Nurse*’s August 2011 journal was completed. An increase in findings could have been found if additional sources were used, including the *Journal of Wound, Ostomy, and Continence Nursing* among many others.

Due to the PICOT being specific to Meplix dressing, overall studies were not specifically related to the PICOT with the exception of one study with a low level of evidence. Reliability and validity were not mentioned in four of the five studies, leading to an overall lower level of study findings.

Studies used for this evidence-based research range in level of evidence. Evidence hierarchy, “a ranked arrangement of the validity and dependability of evidence based on the rigor of the method that produced it,” (Polit & Beck, 2008, p. 752) was moderately low in the research assessed. Of the articles, one was a level IV, three were level VI, and one was a level VII leading to an overall low level of evidence.

**Implications**

Numerous implications can be noted with this evidence based research project. As previously discussed many stakeholders would be affected based on potential findings from this research; patients, nursing staff, physicians, and hospitals. While the direct PICOT question was not answered, additional information was provided related to pressure ulcer development in the high-risk population that would be of concern to these stakeholders. First and foremost patients are of main concern as their skin integrity is at risk. It is expected that nursing staff know and implement methods to prevent skin breakdown in these high-risk patient populations.

Nursing staff will benefit from this information as it reiterates the characteristics of those at a high risk for skin breakdown as well as discusses nursing practices that can decrease the risk of pressure ulcers. Nursing staff must realize that those patients with multiple co-morbidities or illnesses (Brindle, 2010; Shahin, Dassen, & Halfens, 2009) along with those patients who have received vasopressor therapy, with spinal cord injuries or over the age of 40 are at an increased risk for pressure ulcers (Alderden, Whitney, Taylor, & Zaratkiewicz, 2011). Findings also demonstrated use of different dressings to assist in healing of wounds in various patient populations (Meaume et al., 2011). As stakeholders, nursing can advocate for use of these specialized dressings if patients do develop pressure ulcers.

The information from this evidence based project can assist physicians in understanding not only those patients at high risk for pressure ulcer development, but also the importance of monitoring patient laboratory values and correcting imbalances among other interventions as a method to decrease the risk of pressure ulcers.

Overall, as a hospital employing staff that recognizes and implements appropriate measures to prevent pressure ulcers, can not only increase patient satisfaction but also can decrease the length of stay and cost to the hospital in general. “Development of a hospital acquired pressure ulcer increases the mean duration of hospitalization by 8 days with an associated $15000 increase cost of care” (Alderden, Whitney, Taylor & Zaratkiewicz, 2011, p. 31). While the information presented in this evidence based research project does not relate specifically to sacral Mepilex in the ICU population, it does provide valuable information to reiterate the importance of knowledge of protecting skin integrity in the hospital population.

**Future Recommendations for Nursing Research**

Much information regarding the importance of pressure ulcer prevention has come to light in recent years. However, there are still large amounts of patient who suffer a preventable pressure ulcer during their time in the ICU. Efforts should be made by the medical community to advocate for additional research to help prevent these unnecessary events from occurring. Additional nursing research regarding the effect of preventative dressings, such as the Mepilex, need to be performed. Although many hospitals have begun to use such dressings, little research is done about the true preventative effect. A literature search performed did not produce many studies regarding Mepilex’s effect on coccyx/sacral pressure ulcers. Therefore, an additional broadened literature search is recommended, focusing on prevention of generalized pressure ulcers.

**Future Recommendations for Nursing Education**

Nurse educators should join forces with bedside nurse to help develop and analyze current and future preventative strategies. As nurse educators are teaching the next generation of nurses, they also understand many current issues in practice. The application of a quarterly meeting between the educators and hospital nursing unit directors, hospital educators, or bedside nurses may be beneficial in helping bridge this gap.

**Future Recommendations for Nursing Administration**

The support of nursing administration is considered necessary when seeking funding for additional research. Understanding costs associated with a single pressure ulcer is recommended for administrative personnel. A single pressure ulcer may cost a hospital up to“$70,000 per wound” (Courtney, Ruppman, & Cooper, 2006, p. 1). The use of preventative strategies, such as Mepilex, may cost only “$22” (Metro Medical Online, 2011). Understanding of the idea that cost of prevention far outweighs the cost of treatment is necessary. During this time of hospital reform all administrative personnel should be in-tune to preventative strategies for money saving techniques.

**Future Recommendations for Nursing Practice**

Although no practice recommendations regarding the use Mepilex may be made from this study, the basic nursing preventative strategies may apply. A general understanding that ICU patients who may be immobilized, sedated, lack proper nutrition, advanced age, lack appropriate sensation, among other things, are at an increased risk for the development of pressure ulcers is of upmost importance (Bell, 2008). Continued education regarding proper prevention methods including positioning, nutrition, repositioning, and skin barriers is essential to preventing pressure ulcers within the ICU (Lavrencic, 2011). These techniques and preventative strategies should be evaluated frequently by educators and reassessed with nursing staff often. It is recommended that nurses advocate for proper skin care through their own practice and the practice of others.

**Conclusion**

Pressure ulcer development in the critically ill patient remains of great concern to the healthcare provider as well as the patient. Because these ulcers can develop very quickly with the correct combination of risk factors, an effort to prevent the development of ulcer has been noted especially in the intensive care unit. The focus of this evidence-based research project was to identify if the use of sacral Mepilex would decrease the risk of pressure ulcers in the ICU population. Since the use of these dressings has not been statistically noted to reduce prevent ulcer development, it appears the more research on sacral Mepilex is needed. However, supportive findings from reviewing the five articles related to pressure ulcer development were noted. The articles reviewed confirmed it remains the responsibility of nursing to monitor and provide appropriate nursing interventions to reduce the risk of pressure ulcer development. These interventions include a thorough skin assessment on admission by nursing as well as being aware of risk factors for pressure ulcer development while maintaining proper positioning, nutrition and skin barriers as indicated in this high risk patient population. Recommendations gathered from this evidence based project included gaining support for research from nursing administration and continued education for nursing staff related to pressure ulcer development. While more research is needed related to the use of specialized dressings to prevent pressure ulcer development, it appears at this time, there is no replacement for preventative nursing care practices.

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**Appendix A**

**CINAHL SEARCH RESULTS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Query** | **Limiters/Expanders** | **Last Run Via** | **Results** |
| S16 | S4 and S11 and S14 | Limiters - Published Date from: 20000101-20111231; Peer Reviewed; Research Article; English Language Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 67 |
| S15 | S4 and S11 and S14 | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 205 |
| S14  O | S12 or S13 | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 14952 |
| S13 | pressure sore\* | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 4552 |
| S12 | pressure ulcer\* | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 12998 |
| S11  I | S5 or S6 or S7 or S8 or S9 or S10 | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 2279 |
| S10 | coccyx n4 dressing\* | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 12 |
| S9 | back n4 dressing\* | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 124 |
| S8 | "Mepilex\*" | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 128 |
| S7 | foam n4 dressing\* | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 1084 |
| S6 | pressure n4 dressing\* | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 1184 |
| S5 | sacral n4 dressing\* | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 40 |
| S4  P | S1 or S2 or S3 | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 514448 |
| S3 | (MH "Inpatients") | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 49203 |
| S2 | (MH "Intensive Care Units") | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 14871 |
| S1 | (MH "Adult") | Expanders - Also search within the full text of the articles Search modes - Boolean/Phrase | Interface - EBSCOhost Search Screen - Advanced Search Database - CINAHL Plus with Full Text | 465640 |

**Appendix B**

**FLOW DIAGRAM OF ARTICLE SELECTION**

CINAHL

(P) In Adult Intensive Care Unit patients, (I) does the application of Sacral Mepilex (or like dressing) to lower back/coccyx/sacral area, (C) when compared to no use of Sacral Mepilex on the lower back/coccyx/sacral area, (O) lead to a decreased incident of pressure ulcer formation in the coccyx/sacral area (T) throughout the patients ICU stay.

Database Searched

Search Terms

**Population**

Adult (465640) or Inpatients (49203) or Intensive Care Units (14871)

**Intervention**

Mepilex (128) or Sacral Dressing (40) or Coccyx Dressing (12) or Pressure Dressing (1184) or Back Dressing (124) or Foam Dressing (1084)

**Outcome**

Pressure Ulcer (12998)

Pressure Sore (4552

AND

AND

Boolean Results

**205**

*Limiters*

2000-2011

Peer Reviewed

Research Article

English Language

*Included*

**67**

2000-2011

Peer Reviewed

Research Article

English Language

*Excluded*

**138**

Older than 2000

Not Peer Reviewed

Non Research Article

Foreign Language

Boolean ***P***

Results—514448

Boolean ***I***

Results—2279

Boolean ***O***

Results—14952

Google Scholar

**Search Terms**

Sacral Mepilex & Pressure Ulcer

Google Scholar Results

**24**

*Limiters*

* 2000-2011
* Inadequate correlation to the PICOT
* Languages other than English
* Overly specific patient populations

*Included*

**1**

*Excluded*

**23**

Critical Care Nurse

**Search Terms**

Pressure Ulcer

Critical Care Nurse Results

**5**

*Limiters*

* 2011
* Inadequate correlation to the PICOT

*Included*

**1**

*Excluded*

**4**

*Irrelevant to PICOT*

**64**

*Relevant to PICOT*

**3**

**Appendix C**

**EBP MATRIX**

**Appendix C**

**PICOT:** (P) In Adult Intensive Care Unit patients (I) does the application of sacral Mepilex (or like dressing) to the lower back/coccyx/sacral area (C) when compared to no use of sacral Mepilex on the lower back/coccyx/sacral area (O) lead to a decreased incident of pressure ulcer formation in the coccyx/sacral area (T) throughout the patient’s ICU stay?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Author & Year**  Brindle, 2010  **Level of Evidence**  Level VII | **Purpose of Research and Design Used**  This study tested the effectiveness of prophylactic sacral dressings in preventing sacral pressure ulcers. This was a performance improvement in one specific ICU. | **Measurement Tools Used and Reliability & Validity**  Data was collected through a 3-month trial on all patients admitted to the ICU. A tracking tool developed by the author was used to assess the development of pressure ulcers in the high risk patient population. Additionally, patients who were admitted to the ICU but not identified as high risk but developed pressure ulcers were also tracked. Tools were not noted to be reliable or valid, but provided an overview of information found from this performance improvement. | **Sample and Size**  A convenience sample of 93 inpatients from an adult Surgical ICU was selected for the study. Of these, 41 patients were identified as “high risk” and received the intervention. The average age of the patient was 46.7 years. | **Data Analysis**  The variables studied include the application of sacral border Mepilex on the sacrum of patients identified as “high risk” for pressure ulcer development.  Data was analyzed through assessing the tracking tools created by the author. | **Results of Research**  Of the 41 patients with the sacral Mepilex applied, zero developed pressure ulcers. 3 patients identified as high risk developed pressure ulcers after their stay in the ICU and 3 patients not identified as high risk, thus not receiving the intervention, developed pressure ulcers. One patient had the sacral border Mepilex applied for 92 days with no pressure ulcer development. The average length of application was 16 days. | **Comments (strengths and limitations of study, results related to PICOT, level of evidence, strength of evidence, practice change/education change due to study)**  While this level VII performance improvement produced favorable results, the sample size was very small. Additionally, no randomization or intervention group was noted decreasing the overall strength of the evidence. According to this study, sacral border Mepilex can be identified as reducing the rate of sacral pressure ulcers in the Intensive Care Patient. However, because the study is not randomized nor having a control and intervention group, the overall strength of evidence is low. This article cannot be generalized to other ICU populations due to the above factors. Based on this, a change in practice cannot be supported at this time. Additional research should be done to replicate this study, thus adding to the reliability and validity of the use of Mepilex. |
| **Author & Year**  Shahin, Dassen, & Halfens, 2009  **Level of Evidence**  Level VI | **Purpose of Research and Design Used**  This study identified the prevalence, risk factors, and evolution of pressure ulcers in the ICU.  Design used--Descriptive Study | **Measurement Tools Used and Reliability & Validity**  Data was measured through the use of a questionnaire focusing on “patient demographics, pressure ulcer occurrence, grades, body site of pressure ulcers, duration, origin, types of dressing and preventive measure” (p. 415).  The EPUAP grading system for pressure ulcers was also utilized as a method to grade stages of pressure ulcer development from Stage 1 to Stage 4 with consistently high inter-rater reliability at 61.9%.  The Braden Scale was also identified as it assesses risk factors and is “highly predictive of pressure ulcer development in all settings” (p. 415).  Data was also collected regarding the use of incontinence supplies.  “Pressure ulcer lenses were used to identify nonblanchable erythema” (p. 415)  Patients were identified using the APACHE II, which predicts hospital mortality with a correct prediction of 84.3%.  Two ICU nurses collected data, one at each of the institutions on patient admission and discharge, death or 2 weeks after admission. | **Sample and Size**  A convenience sample of patients admitted to the ICU was obtained. 224 patients were invited, 121 accepted. | **Data Analysis**  “The data were analyzed using the Statistical Package of Social Science (SPSS) version 13” (p. 416). The incidence of pressure ulcer formation was identified using EPUAP definition of pressure ulcers and correlating the incidence of new pressure ulcers with those at risk for pressure ulcer development. Further descriptive findings were identified in a chart including “patients numbers, percentage, mean and standard deviation regarding the factors gender, age, body mass index, Brand score, severity of illness, length of stay, unconsciousness, urinary catheter at admission and patients with pressure ulcer at admission” (p. 416). Data analysis strategy was appropriate for the data collected in this study. | **Results of Research**  In this study, 25% of the pressure ulcers that developed occurred in one week of admission while 75% occurred in patients staying 7 to 14 days. The most common sites for pressure ulcers included the shoulder, sacrum, heel and ear. Foam mattresses, standard mattresses and alternating air mattresses were used to assist with pressure ulcer prevention. Nursing care methods to prevent pressure ulcer development including skin inspections (89.3 %), mobilization (79.3 %), and massage (40.5 %). Most patients with pressure ulcers did not have dressings applied to the pressure ulcer however a hydrocolloid dressing was the most common dressing used when one was applied. Additionally the study identified patients with a longer length of stay in the ICU at a greater risk of new pressure ulcer development vs shorter lengths of stays (9.25 days vs. 6.9 days). APACE II scores were also related to pressure ulcer development. Those patients with lower scores were not as likely to develop pressure ulcers as identified in this study. | **Comments (strengths and limitations of study, results related to PICOT, level of evidence, strength of evidence, practice change/education change due to study)**  The sample size of this study was limited leading to the study not easily being generalized. Additionally, no significant findings can be identified from this study. Generalizations about the incidence of pressure ulcers can be stated however it does not appear that this study brings any new information to the nursing discipline.  This study does not provide an answer to the PICOT questions.  No change in practice can be made based upon these study findings. However, this study does provide background information on pressure ulcers in the intensive care setting. |
| **Author & Year**  Alderden, Whitney, Taylor, & Zaratkiewicz, 2011  **Level of Evidence**  Level IV | **Purpose of Research and Design Used**  The purpose of this study was to evaluate patient’s risk factors and pressure ulcer outcomes as healed or present at discharge or death.  Retrospective chart review. | **Measurement Tools Used and Reliability & Validity**  The Braden scale skin assessment tool was used to determine pressure ulcer severity of eligible patients. Also, a hospital based pressure ulcer database was utilized by research team. This database was managed by a wound nurse. Braden scale is a nationally used skin assessment tool which increases reliability. | **Sample and Size**  The sample included 87 participants, the majority being males. All participants were aged 17 and older.  The sample was selected from ICU, 10 were not ICU patients. Seventy-three required artificial ventilation.  Braden score was part of inclusion criteria. Participants had a mean Braden score of 9.9, indicating the average patient in this setting had a high or severe risk of pressure ulcer development.  Scores for the Braden scale correlate the likelihood of development of pressure ulcers. Braden scores range from less than or equal to 9, indicating a severe risk of ulcer development. A score of 18 notes a mild risk. | **Data Analysis**  Data was analyzed by SPSS, a t-test was used to evaluate “independent continuous and interval level variables and pressure ulcer outcome” (p. 35). Multivariate logistic regression was used to identify the risk factors for the unhealed pressure ulcer(s) on a patient at discharge or death. | **Results of Research**  Results of the study noted severely ill patients are who are more prone to acquiring HAPU’s. A multivariate analysis found three factors relating to pressure ulcer development.  Patients requiring intravenous vasopressor medication, or have sustained spinal injury, or are aged 40 and older are at an increased risk. Bivariate analysis showed correlation between patients’ ulcer stage and healing.  Results for healed HAPU’s are as follows:  Stage 1 healed at 33%  Stage II healed at 64%  Stage III healed at 0%  Stage IV healed 0% Unstageable healed at 41%  Patients with HAPU’s present at discharge resulted in the following:  Stage I at 66%  Stage II at 36% Stage III at 100% Stage IV at 100% Unstageable at 59% (p. 38).  Of 111 ulcers found, 51 (45.9%) were healed at discharge or death. In addition, 60 ulcers were present at discharge or death (54.1%). | **Comments (strengths and limitations of study, results related to PICOT, level of evidence, strength of evidence, practice change/education change due to study)**  Patient records were accessed using electronic medical records; and yet, there is no mention of the patient diet/nutrition, or skin care routine, and no noting of patients being turned.  PICOT question can be related to the article as nursing staff is able to gain knowledge regarding the pressure ulcer risk factors patients can come into the hospital with. The PICOT discusses pressure ulcers and treatments, while this study shows the unintentional progression of ulcers in the hands of healthcare providers.  Three factors noted to have significance in ulcer development in the ICU patient or any inpatient may become vulnerable. An unhealthy person who is admitted into the hospital is more at risk for the development of HAPU’s .  Noting the odds ratios, the odds of a patient with a non-healed ulcer at discharge was "5-fold" (p. 37) when the patient had received a vasopressor medication intravenously. Patients involved in a trauma injury showed an odds ratio of 15, and those patients who are aged 40 and older where given an odds ratio of 7 of developing a pressure ulcer.  Nursing can take this information into practice knowing the importance of performing a thorough head to toe skin assessment and utilizing a skin assessment tool when admitting patients to the hospital. This is key to evaluating their risk for pressure ulcer development. |
| **Author & Year**  Meaume, Perez, Descamps, Voinchet, Jault, Saunier, & Bohbot, 2011  **Level of Evidence**  Level VI | **Purpose of Research and Design Used**  The purpose of the study was to document the performance of Urgotul flex including the overall ability of the wound dressing’s efficiency, tolerability, and patient acceptance.  The design of study is single descriptive. | **Measurement Tools Used and Reliability & Validity**  Efficacy and tolerability were evaluated by physicians every week. Surface area was measured in cm² at baseline with each weekly assessment. Transparent film was used and photographs taken to help validate findings.  Acceptability was evaluated by nursing staff at each dressing change. Acceptability was monitored by nursing staff based upon the following parameters: ‘ease of dressing application and removal’, ‘Pain at dressing change’, ‘conformability’, ‘adherence of the dressing to the wound bed and bleeding at removal’, and ‘maceration of surrounding skin’ (p.183). Parameters were rated based an author developed scale of “very good, good, poor, very poor” for the initial three parameters and “none, minimal, moderate, high, very” for the fourth and fifth parameter, and “none, moderate, high” for the last two parameters (p.183).  Author developed, standardized measurement tool was not specified and no reliability and validity information was given. | **Sample and Size**  A convenience sample of forty-four patient participants, both inpatients and outpatients, presenting to a specified surgical, burn, rehabilitation, pediatric, geriatric, or dermatology unit from 11 healthcare areas | **Data Analysis**  Independent variable: Urgotul Flex.  Dependent Variables: efficacy, tolerability, and patient acceptance.  Statistical analysis of study performed, no statistical tests. All data analyzed in “means, medians, standard deviations and percentages” (p. 183). Analysis appropriate for study. | **Results of Research**  Over a 4 week period, there was a surface area reduction using the Urgotul Flex, of “78% and 42% for the acute and chronic wounds respectively” (p. 180). Twenty wounds noted to have healed.  This is similar to the prior study with Urgotul, 76% and 44% respectively (p. 185).  Four patients did not complete the study. Twenty  wounds (45.5%) healed by the end of the 4-week period (p. 184).  “Two local adverse events were reported, but these were not considered to be dressing related” (p. 180).  Additional results showed “the majority (67%) of the wounds had been previously treated with a type of hydrocellular, hydrocolloid or alginate dressings prior to inclusion in the evaluation” (p.184).  This gives the study strength in reliability. | **Comments (strengths and limitations of study, results related to PICOT, level of evidence, strength of evidence, practice change/education change due to study)**  Information in the study indirectly relates to PICOT. Pressure ulcers can be in awkward areas and need a dressing that conforms well. Dressing changes occur frequently, 2-3 times a day. Awkward areas may pose an issue with infection if not secured properly. Conformability was considered good.  The study introduced a new way to assist the patient towards a positive outcome. Wounds do come in many varieties; from burns and scrapes to post-op incisions and trauma injuries.  The study lacks validity because the qualitative data collected by nursing is subjective. Nurses in the study were involved in both Urgotul and Urgotul Flex studies. Reliability of study is not strong because the company that manufactures the product sponsored the study resulting in a conflict of interest. |
| **Author & Year**  Meuleneire, 2008  **Level of Evidence**  Level VI | **Purpose of Research and Design Used**  The purpose was to evaluate the effect of Mepilex Ag on local wound infection, pain control, and patient acceptance of dressing.  Design of study is single descriptive. | **Measurement Tools Used and Reliability & Validity**  Data was measured via in- person, self-reporting using the visual analog scale (VAS) for patients to rate their pain. Pain severity was monitored prior to initial dressing change, at each dressing change, and again at the end of treatment. An author developed tool, qualitative visual assessment, and visual records of the wounds, via photographs, was used to collect observational data on wound healing. Visual assessment classified wounds as ‘healed’, ‘almost healed’, ‘minimal lesions’, or ‘healing slowly’ (p.536). Assessment and photographs were taken prior to initial dressing application, at each dressing change, and at the end of the study. In person, self-reporting from patients was used for collection of patient acceptance/evaluation of dressing. Patient evaluation of dressing was measured on a scale of ‘excellent’, ‘very good’, ‘good’, or ‘poor’. All measurements were subjectively collected by one tissue viability nurse specialist. Tools were not noted to be reliable or valid. | **Sample and Size**  A convenience sample of new inpatients or outpatients.  A total of 30 patients met the inclusion criteria and three were later withdrawn due to inadequate wound healing, making the final sample number 27. | **Data Analysis**  Independent Variable: The use of Mepilex Ag.  Dependent Variables: Pain control, wound infection, and patient acceptance.  Data on wound healing and patient acceptance was analyzed through the tracking tools developed by the author. Pain severity was analyzed via descriptive statistics and a Mann-U Whitney test, which compared baseline, first dressing, and last visit pain scores. | **Results of Research**  Of the final27 patients identified, none showed signs of clinical infection by the end of the study period. Healing response of the 27 wounds included: 16 wounds ‘healed’, eight ‘almost healed’, two ‘minimal lesions’, and one ‘healing slowly’(p.537). No adverse events related to dressings were noted.  The median pain rating associated was significantly (p<0.001) decreased from before initial dressing change (6.5/10) to final dressing change (0/10).  Patient acceptance of dressing was identified by the majority of patients as “‘excellent’ (64%)” or “‘very good’ (18%)” (p.537). | **Comments (strengths and limitations of study, results related to PICOT, level of evidence, strength of evidence, practice change/education change due to study)**  This study does not provide an answer to the PICOT, but identifies decreased pain, and appropriate wound healing with Mepilex Ag (foam dressing), leading to generalizations about the dressing.  This study was able to show, with a small sample, that through the use a Mepilex Ag less pain occurred during dressing changes. Practice change could be suggested. The use of a less painful dressing could in turn result in more compliance with patient wound care, and thereafter produce better wound healing. |

**Appendix D**

**QUERY LETTER**

January 29, 2012

Dr. Mikel L. Gray

Journal of Wound, Ostomy and Continence Nursing

15000 Commerce Parkway Suite C  
Mt. Laurel, NJ 08054

Dear Dr. Mikel L. Gray,

We would like to inquire about your interest in an evidence-based project with the working title of “Use of Sacral Mepilex in Preventing Pressure Ulcers in the Intensive Care Unit”. Pressure ulcer development is on the rise in medical facilities, especially in the intensive care units.

As graduate students at Nebraska Methodist College, we have completed an extensive literature review based on the PICOT question which is: In Adult Intensive Care Unit patients does the application of sacral Mepilex (or like dressing) lower back/coccyx/sacral area when compared to no use of sacral Mepilex on the lower back/coccyx/sacral area lead to a decreased incident of pressure ulcer formation in the coccyx/sacral area throughout the patient’s ICU stay? Our evidence based research presents best practice information regarding dressings and nursing care that may be of interest to your readers.

Patients in the ICU setting are at an increased risk of acquiring pressure ulcers. The cost of care to those patients who develop a pressure ulcer while in the hospital critical care setting is immense in the United States of America alone. Due to changes accompanying healthcare reform, patients who develop ulcers may not be covered by medical insurance. This results in additional cost of care to the patient and facility. As nurses who have worked within the ICU environment, and dealt with pressure ulcers all too often, we had many questions about ways to cost effectively improve the care of our patients. Although there is limited data regarding best practice associated with the sacral Mepilex, we compiled literature from various nursing sources using evidence based research to make best practice recommendations.

If you are interested in this evidence based research project, we would appreciate hearing back from you so that we can submit “Use of Sacral Mepilex in Preventing Pressure Ulcers in the Intensive Care Unit” to the Journal of Wound, Ostomy and Continence Nursing. As avid readers of this journal, we believe this information would fit well within the “Challenges in Practice” section. We will be able to send the manuscript for your review by June 2012.

Sincerely,

Melissa Carder, RN, BSN

Elizabeth Gard, RN, BSN

Maria Medina, RN, BSN

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