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# Protecting the Skin of Older Adults Through Surveillance and Pressure Ulcer Prevention Beginning in Emergency Services

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PROTECTING THE SKIN OF OLDER ADULTS THROUGH  
SURVEILLANCE AND PRESSURE ULCER PREVENTION  
BEGINNING IN EMERGENCY SERVICES

Jennifer Lynn Zoeteman

A Dissertation

Submitted to the Faculty of

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In

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## **Dedication**

This dissertation is dedicated to my dear children: Matthew, David, Adam and Sarah.

## **Acknowledgement**

I would like to express my sincere gratitude to Dr. Jean Barry PhD for her guidance and support in development of this dissertation work.

## **Abstract**

ED (emergency department) personnel are admitting to inpatient services increasing numbers of elderly clients who are at risk for skin breakdown. The ED environment is designed for short term care in response to emergent situations. Pressure related injuries originating in the ED lead to both physical suffering and financial burdens. Pressure relief strategies have been actively employed on an inpatient basis without translation to the ED environment. Evidence for best practice in PUP (pressure ulcer prevention) in the ED is not widely embraced. Prevention of PUs is primarily within the scope of nursing practice and amenable to improvements in the standard of care. Therefore, the purpose of this project is to translate current evidence for PUP from the literature to sustainable best practice in emergency nursing.

Synthesis of existing literature revealed the most effective strategies for PUP focused on enhanced support surfaces, patient positioning, moisturizing dry skin, restricting head of bed (HOB) elevation, and timely removal of backboards. These measures reflect current evidence and were proposed as innovative strategies in the ED. A logic model was utilized to guide planning and evaluation of the program. The theory of planned behavior, the consolidated framework for implementation research, and polarity thinking were employed to ensure theory driven practice.

Following an organizational assessment and IRB approval, the project was implemented at a 254 bed community hospital in the Midwestern United States with a 20 bed ED. A significant challenge to implementation was the culture of ED nursing which was focused upon stabilization and disposition versus prevention. The timeline for the project involved data collection, intervention, and evaluation over a four month period.

A chart review was conducted to establish current practice of skin assessments and ED interventions directed at maintaining skin integrity. Nursing and support staff participated in an educational intervention addressing the relationship between routine care and the unintended consequence of skin breakdown. Evidence for best practice in prevention was reviewed and realistic measures for PUP presented for adoption. Learning was evaluated in pre-test/post-test

format. Nurse's intention to implement best practice measures and perceived barriers/facilitators were identified. The post intervention evaluation period lasted two months and documented utilization of skin moisturizer from ED supply. The terminal outcome was repeat chart audit of vulnerable elderly patients which assessed for increased documentation of skin assessments and identified PU strategies.

Follow up chart audit revealed a 56.6% improvement in the frequency of nursing documentation of integumentary assessments. Documentation of prevention measure improved less dramatically. Inventory analysis, however, demonstrated actual use of recommended products. Nursing knowledge regarding pressure ulcer identification, staging, and prevention increased in 93% of participants. All four evidence-based strategies were embraced with greater than 70% of participants reporting intent to implement. The most frequently identified barriers to implementing prevention measures were time and staffing. The most common facilitators were availability of supplies and visual reminders. Recommendations include revision of the electronic health record to facilitate documentation of strategies by staff and inclusion of the protective dressing in the bedside treatment carts.

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## CHAPTER 1

### INTRODUCTION

#### **The Practice Problem**

Emergency departments (ED) are increasingly challenged with overcrowding, long wait times, and boarding of patients pending admission (Lucas et al., 2008). The average time spent by a patient in the ED nationally is 4 hours and 13 minutes. Older adults who frequently present with multiple comorbidities average 5 hours and 9 minutes (Robinson & Mercer, 2007). These extended periods of immobility increase the risk of tissue injury.

An environmental scan of the ED reveals numerous non-yielding surfaces including backboards, cervical collars, and diagnostic equipment. ED stretchers are typically narrow with mattresses designed for short term use. Prolonged pressure over bony prominences has long been understood as a threat to tissue viability. Impaired perfusion for as little as 30 minutes can result in hypoxic tissue damage and deep tissue injury that may not be recognized for 2 to 7 days (Anders et al., 2010; Spahn, n.d.). However, the use of pressure ulcer prevention (PUP) strategies is rarely considered early in the patient's hospital stay (Rich, Shardell, Margolis & Baumgarten, 2009).

All patients with immobility are potentially affected by this problem. However, those individuals at highest risk for skin breakdown demonstrate the following characteristics (Baumgarten et al., 2006):

- age greater than or equal to 65 years
- male gender
- dry skin over bony prominences

- nursing home residency prior to admission
- moisture due to incontinence (urinary or fecal)
- low body mass index
- moderate to high nutritional risk, and
- hospitalization in the past six months.

The development of a pressure ulcer (PU) can result in unnecessary suffering and increased morbidity, mortality, resource consumption, duration of hospitalization, and readmission rates within the critical 30 day window after discharge (Lyder et al., 2012). Prevention of PUs and associated poor patient outcomes is primarily within the scope of nursing practice and amenable to improvements in the standard of care. Therefore, a practice inquiry dissertation was conducted with the purpose of translating current evidence for pressure ulcer prevention from the literature to sustainable best practice in emergency nursing.

The population of interest for this project was adults greater than or equal to 75 years of age. While 65 years is considered traditional retirement age, most individuals in the 65 to 75 year range remain quite active. Those age 75 years and older better reflect the frail elderly population of interest. Additional inclusion criteria were a minimum ED visit length of 2 hours followed by an inpatient admission.

### **Magnitude and Importance of the Problem**

Foundational to selection of this topic was the 2008 announcement by the Centers for Medicare and Medicaid Services that eliminated payments to hospitals for care related to preventable complications (Rosenthal, 2007). Prior to this ruling, hospitals received outlier payments for additional expenses associated with clinical complications such as

infections related to urinary and vascular catheters. Cessation of payments for these preventable complications eliminated the counter-intuitive feature of diagnosis-related groups that reduced overall revenues to hospitals that actually improved safety and avoided these identified complications.

Under congressional mandate hospital acquired pressure ulcers (HAPU) were indicated on this short list of conditions that demonstrate both frequent incidence and high cost (Rosenthal, 2007). Specifically, hospital acquired stage III and IV ulcers were documented in 322,946 Medicare cases in fiscal year 2006 (Rosenthal, 2007). An analysis of data from the National Medicare Patient Safety Monitoring System Study determined that 4.5% of Medicare patients develop a new PU during their hospital stay (Lyder et al., 2012). Stage IV HAPUs were found to be the most costly with an average hospital cost of over \$129,000 incurred solely for treatment of the ulcer and any resulting complications (Brem et al., 2010).

As an issue of significant financial importance, interest in the identification of PUs existing at time of admission and prevention strategies surged (van Rijswijk & Lyder, 2008). Risk assessment became customary practice on inpatient units and PU prevalence also became a nursing sensitive quality indicator. Despite the implementation of PUP teams and aggressive measures to reduce HAPUs on inpatient units, the time patients spend in ED has been consistently overlooked. With 6.2% of HAPUs occurring within the first three day of admission (Baumgarten et al., 2006) and 1.9% of ED patients suffering new skin breakdown (Pham, 2011), nurses practicing in emergency services need to re-vision customary practice to include protection of fragile tissue integrity among the elderly.

ED nurses traditionally function with a rescue and stabilize mindset that may serve as a barrier to actual implementation of preventative measures (Moore & Price, 2004). A lack of time and insufficient staffing have also been identified as perceived obstacles. With an estimated 6.2 million hospital admissions of older adults occurring each year through the ED and 55% of total hospital admissions originating in the ED, skin protection in this population of susceptible individuals can no longer be ignored (Owens & Elixhauser, 2006; Pham et al., 2011).

### **Interventions**

Synthesis of the existing literature revealed the most effective strategies for PUP are focused on enhanced support surfaces and positioning (Reddy, Gill, & Rochon, 2006). Specifically, ED mattresses with five to eight inch pressure redistributing foam (PRF) were found to significantly decrease ED acquired PUs (Pham et al., 2011). Repositioning of geriatric clients was also established as an effective strategy. Turning on standard mattresses is minimally recommended every two hours and on PRF mattresses every four hours (Defloor, Debaquer, & Grypdonck, 2005).

A medical backboard is a device designed to provide immobilization during transport of patients with suspected spinal injury. Typically placed in the field prior to hospital arrival, these restraints have long been the standard of care for trauma (Bledsoe, 2013). Prolonged use of backboards was documented as a major threat to skin integrity with the recommendation of reducing time spent on these surfaces (Edlich et al., 2011).

Interestingly, tissue viability was found to be adversely affected by head of bed (HOB) elevation. Peak sacral interface pressures were significantly increased with all elevations from 30 to 75 degrees when compared to supine (Peterson et al., 2008).

Therefore, HOB elevation should be maintained at 29 degrees or less in the absence of acute respiratory distress.

In addition, recent studies support the prophylactic application of multi-layered silicone dressings in the ED. These dressings are thought to redistribute pressure and reduce both shear and friction forces. Dressing utilization also maintains skin integrity through microclimate control including temperature, moisture, pH, and humidity (Clark et al., 2014). Specifically, the application of a silicone based protective dressing has been shown to significantly decrease the incidence of sacral pressure injuries in high risk populations (Cubit, McNally, & Lopez, 2012; Santamaria et al., 2013).

The Braden Scale has been widely adopted on inpatient units as a PUP strategy. This instrument is used to evaluate risk of developing skin breakdown and was found to generate the best mix of sensitivity and specificity and the most precise risk estimate when compared with other similar tools (Pancorbo-Hidalgo, Garcia-Fernandez, Lopez-Medina, & Alvarez-Nieto, 2006). Overall, the use of scales increases both frequency and intensity of prevention measures. However, there is no documented reduction in PU incidence attributable to an assessment scale. Therefore, the addition of yet another screening at the time of entry into the ED is a controversial intervention and was not recommended.

Finally, acknowledging dry sacral skin and incontinence associated dermatitis (IAD) as risk factors for PU development, the literature supports the routine application of a moisturizer or skin protection preparation to this vulnerable area (Torra I Bou et al., 2005; Beeckman, Woodward, & Gray, 2011). The use of moisturizing incontinence wipes and zinc based protective creams appear to be prudent, economical, and non-



invasive prevention strategies. These measures reflect the most current evidence and were considered as innovative strategies for implementation within the ED.

### **Implementation**

This project was implemented in academic year 2013-2014 at a 284 bed community hospital in the Midwestern United States. This facility obtained the Nurses Improving Care for Healthsystem Elders (NICHE) designation in 2008 and established an inpatient unit committed to acute care of the elderly. Prior to making a final decision on the applicable interventions, a focused assessment of the ED was conducted along with consideration of existing inpatient PUP practices. Macro level organizational barriers and facilitators to change were assessed including the formal and informal reporting structures as well as operational processes. The mission, vision, and values of the organization were considered for congruence with the proposed project.

Current practice related to ED skin assessment and pressure ulcer prevention in vulnerable populations was assessed through a preliminary chart review. Attention was paid to the perspectives of stakeholders including ED leadership, medical providers, and nursing staff. The identification of micro level perceived barriers and facilitators was essential to ensuring sustainability of recommended practice changes. Evidence for best practice from the literature was shared with nursing and support staff along with site specific ideas appropriate for implementation. Finally, a follow-up chart audit was completed 45 days following educational intervention to evaluate for changes in practice.

### **Outcomes and Evaluation**

The identified site underwent major ED renovations in 2010. Therefore, it was anticipated that mattresses currently in use would not be deficient when compared to

literature recommendations. The most relevant outcome measure for this project would have been a documented decrease in HAPU incidence among elderly ED patients admitted to medical services. Most hospitals routinely monitor HAPU incidence as an overall quality and nursing sensitive indicator. The population of interest is a subset of the larger inpatient population and HAPU incidence among this group could be revealed by data mining. However, instituting PUP measures in the ED is only one of many factors that contribute to incidence rate and this measure was unlikely to demonstrate sensitivity to the innovations. Therefore, intermediate outcomes were considered.

A number of process outcomes were found to be measurable and reflect adherence to the interventions identified as realistic for implementation at the site. Specifically, the frequency of documented skin assessments was considered before and after the educational intervention. The actual quantities of skin protecting lotion and dressings utilized were recorded for anticipated increases post education through inventory monitoring. Measurable changes in HOB elevation and repositioning were dependent upon documentation completed by the ED staff and limited by design of the electronic health record. The identification of skin champions to promote sustainability of the interventions was an additional outcome of the project.

### **Clarification of Purpose**

The specific aim of this project was to translate best practice in PUP as identified in the literature to the provision of care for geriatric clients in Emergency Services. The integumentary system is the largest organ of the human body. Much like the heart, kidneys, liver, or pancreas, the skin can be subject to failure. The response of inpatient care team members to the mandates of regulatory bodies has been remarkable (Shaffer &

Tuttas, 2009). EDs continue to serve as the most prevalent point of entry into acute care. The time spent in this environment, which has been previously overlooked in terms of PUP, is rich with opportunities for improvement in the usual and customary care of the geriatric client. As growth in this population continues to rise and ED overcrowding worsens, PUP is critical to creating a gerontologically friendly and informed emergent care environment.

## CHAPTER 2

### LITERATURE REVIEW AND SYNTHESIS

In order to establish the current state of the science regarding prevention of pressure-related tissue necrosis among elderly ED patients, an appropriate foreground question was developed in PICOT format. PICOT is defined as "...*Patient population, Intervention or Issue of interest, Comparison intervention or group, Outcome, and Time frame*" (Melnyk & Fineout-Overholt, 2011, p. 11). The question that guided this literature review follows: In ED patients who are greater than or equal to 75 years old with visit time exceeding 2 hours followed by inpatient admission, how do pressure relief measures instituted in the ED affect the incidence of new pressure ulcer development within the first 5 days of admission?

#### **Strategies**

To address this question, a number of health science-related databases were utilized. Specifically PubMed, CINAHL Plus with Full Text, MEDLINE, and Cochrane Library were accessed through Grand Valley State University. Search terms included pressure ulcers, decubitus ulcers, bedsores, hospital acquired pressure ulcers, skin integrity, prevention measures, prophylactic, reduction, emergency services, emergency department, geriatrics, gerontology, aged, and elderly. Different combinations of these terms, controlled vocabulary, and mesh terms were employed to narrow the search and increase yield of relevant evidence. Gray literature was explored through the New York Academy of Medicine Gray Literature Report, Science.gov, and ProQuest Dissertations and Thesis. These sources did not reveal any studies of strong design, professional

commentaries, or practice guidelines that were germane to the topic within the specified setting.

Findings of the literature search were evaluated based upon the levels of evidence as suggested by Melnyk and Fineout-Overholt (2011) and outlined in Appendix A. Eight informational articles, descriptive studies, opinions of authorities, and/or related qualitative studies were analyzed to provide an understanding of the background and significance of the problem. These documents were rated as level V, VI, or VII evidence and were excluded from the final cohort due to weakness of design.

Citations of interest included 10 quantitative investigations and 3 related systematic reviews, all of which underwent critical appraisal. Validity, reliability, and applicability of each study were considered. Inclusion criteria encompassed settings and patient populations consistent with the PICOT question. Studies that were reported exclusively in a language other than English were excluded. The strength of the research design, as indicated by Melnyk and Fineout-Overholt (2011), was assessed and studies ranging from level I to level IV were included. The final cohort consisted of nine sources of evidence which are summarized in an evaluation table below.

Table 1

*Literature Evaluation*

Citation	Design/ Method	Sample /Setting	Major Variable	Outcome Measures	Data Analysis	Findings	Level and Quality of Evidence
Reddy, Gill, & Rochon (2006)	SR	72% AC 59 RCT	DV=PUI IV=SS Moist Turn	“objective, clinically relevant” p. 975	various	>SS=<PUI >Moist=<PUI >Turn=<PUI	I
Clark et al. (2014)	SR	66% AC 3 RCT; 100% AC:5 Cohort	DV=PUI IV=PD	PU incidence	various	>PD=<PUI	I
Kottner, Litchterfeld, & Blume-Peytavi (2013)	SR	Ger LTC 33 studies	DV=SI IV=Moist PBL	SCH SPU Incidence	various	>Moist=>SCH >Moist=<SPU >PBL=<SPU	I
Pham et al. (2011)	MA	ED Ger	DV: ED PUI IV: SS	QALD	MMP	>SS= >QALD by .0015	I
Edlich et al. (2011)	CT	HV	DV: SIP LOD IV: SS	PE Pain	t-test	>SS=<LOD SD p<.05 >SIP without SS	III
Defloor, DeBacquer, & Grypdonck (2005)	RCT	Ger LTC	DV: PUI IV: Turn SS	AHCPR (I-IV)	OR	>Turn=<PUI >SS=<PUI q 4hr T+VEM OR=0.12 P<.003	II
Kaitani, Tokunaga, Matsui, and Sanada (2010)	PC	ED to CC	DV=PUI IV=Turn	NPUAP (I-IV)	OR	<Turn = >PUI p<.05	IV
Peterson, Schwab, McCutcheon, vanOostrom, Gravenstein, & Caruso (2008)	CT	HV	DV=SSIP IV=DHO B	PE	MANOVA	>HOBE= >SSIP SD 30DHOB p<.02 SD 45DHOB, 60DHOB, 75DHOB p<.0001	III
Torra I Bou et al. (2005)	RCT	AC LTC	DV=PUI IV=Moist	ni	T-test	>Moist=<PUI SD p<.001	II

**Note:**

Design/Method:

PC Prospective Cohort  
RCT Randomized Controlled Trial  
CT Controlled Trial  
MA Meta-analysis  
SR Systematic Review

Other: I-IV Stage/Level  
na not available  
ni not indicated  
SD standard deviation  
>Increasing  
< Decreasing

Sample/Setting:

ED Emergency Department  
HV Healthy Volunteers  
LTC Long Term Care  
Ger Geriatrics  
AC Acute Care  
CC Critical Care

Variables:

DV Dependent Variable  
IV Independent Variable  
PUI Pressure Ulcer Incidence  
SS Support Surface  
Moist Moisturizing skin  
Moist Moisturizing Skin  
Turn Turning/Repositioning  
SIP Skin Interface Pressure  
LOD Level of Discomfort  
BBR Backboard Back Raft  
SIP Sacral Skin Interface Pressure  
DHOB Degrees Head of Bed  
Elevation  
PD Protective Dressing  
SI Skin Injuries  
PBL Protective Barrier Lotion

Outcome Measures:

**NPUAP** (National Pressure Ulcer Advisory Panel)  
**QALD** (Quality adjusted life days)  
**PE** (Pressure Evaluator)  
**Pain** (Pain Scale)  
**AHCPR** (Agency for Healthcare Research and Quality Guidelines)  
**SCH** (Stratum corneum hydration)  
**SPU** (Superficial Pressure Ulcers)

**Overview and Evaluation of Chosen Studies**

The literature search produced one systematic review specifically addressing best practice in the prevention of pressure ulcers. Reddy et al. (2006) identified 59 randomized controlled trials (RCT) that utilized clinically relevant outcome measures such as incidence of pressure ulcer development. The checklist to evaluate the quality of a report of non-pharmalogical trial (CLEAR NPT) was employed as an inclusion criterion to ensure overall quality of the studies (Bourton et al., 2005). Please refer to Appendix B which provides further information about this checklist.

Acute care settings were utilized in 72.3% of the studies and interventions were grouped into major categories (Reddy et al., 2006). Mobility impairments were most frequently addressed with the use of support surfaces and repositioning. Briefer

consideration was given to moisturizing dry skin surfaces. The most relevant interventions were succinctly identified within this level I evidence which was utilized to guide further literature review.

Investigations of pressure relief surfaces to prevent tissue ischemia were most commonly noted within the literature. The majority of studies provided comparisons between available dynamic and static support surfaces. Pham et al. (2011) provided current evidence by comparing standard three and five inch ED mattresses to eight inch pressure redistributing foam mattresses as an early prevention strategy.

A Markov model of probability was used to consider patients aged 65 and older exclusively (Fink, 2008). This statistical tool is helpful for decision making when risk persists over time, events can occur repeatedly, and when the timing of particular events is considered noteworthy (Sonnenberg & Beck, 1993). The model predicted a decrease in ED acquired PUs through use of higher quality mattresses costing just \$0.30 per patient. The resultant gain was 0.0015 quality adjusted life days (QALD) with average savings of \$32 per patient (Pham et al., 2011).

QALD is a metric utilized to quantify both the quality and quantity of one's life (National Institute for Health and Care Excellence, 2010). With values ranging between 1 (perfect health) and 0 (death), this economic value facilitates comparison of the effectiveness of health interventions across disease states (Marra et al., 2007). Early prevention was also found to be effective in short ED stays with less than 1 hour duration and low pressure risk candidates. With a projected hospital cost savings of \$7.2 million dollars through prevention of 1,005 ED acquired PUs, this study quantifies the economic evidence for initiating PUP measures in the ED (Pham et al., 2011).



The use of alternate support surfaces was blended with repositioning and further investigated by Defloor et al. (2005). A clustered randomized four-factor experimental design with combinations of different mattresses and turning schedules was used. A viscoelastic polyurethane (VEP) foam mattress of 15 cm (5.9 inch) thickness served as the treatment. A standard mattress served as the control. Study participants were geriatric nursing home residents with  $n= 838$ . The National Pressure Ulcer Advisory Panel (n.d.) guidelines for staging pressure ulcers from I-IV were utilized.

Data analysis revealed that frequency of turning did not predict the occurrence of Stage I PUs (non-blanchable erythema) on either mattress type. On standard mattresses, incidence of stage II or higher lesions was 14.3% in the every 2 hour turn group and 24.1% in the every 3 hour turn group. A change to the VEP foam mattress with every 4 hour turning resulted in only 3% PU incidence with every 4 hours turning and 15.9% incidence was noted with every 6 hour turning (DeFloor et al., 2005). Every 4 hour turning on the pressure-reducing mattress was associated with significantly less PUs than the standard care and other turning schedules (OR 0.12 and 95% = 0.03-0.48).

An odds ratio (OR) is a measure of the association between an exposure and an outcome. An OR near 1 indicates no difference based on treatment. An OR of greater than 1 indicates exposure to the intervention increases risk. In this study the OR is less than 1 and indicates that exposure to the intervention significantly decreased the risk of pressure ulcers (El-Masri, 2013). Therefore, the study suggests the best combination of therapy for prevention of Stage II or higher PUs would be the use of pressure relieving mattresses along with every four hour turning schedules (DeFloor et al., 2005).

Unfortunately the study design did not compare different repositioning schedules independent of support surfaces.

Tissue viability in response to surface pressure was considered by Edlich et al. (2011). In a controlled trial, healthy volunteers were placed upon either a standard backboard or one equipped with the Back Raft™ air mattress support system. Participant discomfort was recorded on a visual analog scale at 30 minutes (Edlich et al., 2011). Use of the standard backboard resulted in a mean perceived pain level of 6/10. When the Back Raft™ system was in place, mean perceived pain level was significantly lower at 0.9/10 ( $p < \text{or} = .05$ ).

An additional dependent variable of skin interface pressure at bony prominences was measured with the Tactilus™ pressure evaluator. Use of the backboard alone resulted in significantly higher interface pressures at the occiput, scapula, and sacral areas (Edlich et al., 2011). This study suggests the monitoring and limiting the length of time patients spend on backboards and use of pressure reduction devices such as the Back Raft™ are strategies that may reduce the incidence of ED acquired PUs.

Risk factors for PU development early in the hospitalization were evaluated by Kaitani, Tokunaga, Matsui, and Sanada (2010). In this prospective cohort study researchers included 98 patients admitted emergently to critical care units and the National Pressure Ulcer Advisory Panel (n.d.) staging from I to IV was utilized. Patients with the ability to reposition independently were excluded. PUs developed in 11.4% of patients. Patients who developed PUs were found to have statistically significant fewer repositions or turning events ( $\text{OR}=0.452$ ,  $95\% \text{ CI}=0.212-0.916$  and  $p<.05$ ). This OR is lower than 1 and indicates repositioning decreases risk of disease. Patients who were

scheduled admissions had fewer pressures ulcer than patients admitted emergently (OR=0.041, 95% CI=.004-.470 and  $p<.01$ ). This study validates the importance of turning and repositioning as pressure ulcer prevention strategy, particularly within the first 24 hours of hospitalization and among emergently admitted patients (Kaitani et al., 2010).

Tissue viability in relation to positioning was further considered in a unique study investigating head of bed (HOB) elevation by Peterson et al. (2008). In a controlled trial of 15 healthy volunteers, the X-sensor™ pressure mapping system was used to measure sacral skin interface pressure. The threshold for tissue damage was identified as interface pressure greater than or equal to 32mmHg. Analysis of data revealed that peak sacral interface pressures increased with HOB elevation at all levels from 30 to 75 degrees (Peterson et al., 2008). Peak sacral pressures when the HOB was elevated were significantly greater when compared to supine ( $p < 0.2$ ). Elevations to 45, 60, and 75 degrees produced damaging levels of sacral interface pressure which were significantly different from each other and from supine positioning ( $p<0.0001$ ).

Thus, HOB elevation significantly compromises tissue viability at the level of the sacrum. HOB elevation is commonly employed as an intervention for shortness of breath and patient comfort. This investigation suggests that restriction of HOB elevation to 30 degrees or less on ED carts would be a simple, effective, and low risk PUP measure to implement.

An additional study determined to be appropriate for inclusion was conducted by Torra I Bou et al. (2005). This multicenter, double-blind, randomized, clinical trial investigated the effectiveness of moisturizing the sacral skin as a PUP measure.

Conducted in both acute and long term care with  $n=331$ , a 7.32% PU incidence was noted in the intervention group and a 17.37% in the placebo group. There was a significant difference between groups ( $p < \text{or equal to } 0.001$ ). The number needed to treat (NNT) indicates the number of patients who must receive the treatment in order to prevent one adverse outcome (Centre for Evidence Based Medicine, 2012). In this study, researchers found that for each 10 patients treated with the moisturizer, one pressure ulcer was prevented (NNT=9.95). As dry sacral skin is a known risk factor for PU development, the application of a moisturizer to the sacral skin appears to be a prudent, economical, and non-invasive prevention measure.

Ongoing review of the literature revealed two more recent systematic reviews with applicability to the PICOT question. Specifically, Clark et al. (2014) considered the use of prophylactic dressings to prevent PUs. Evidence for this strategy was found in 3 RCTs and 5 cohort studies that directly compared PU incidence on dressing protected areas to skin with no dressing application. Congruence with an acute care population was demonstrated in 66% of the RCTs and 100% of the cohort studies. Three of these studies specifically addressed the sacral site and utilized soft silicone foam dressings. The demonstrated PU incidences were between 10.3 and 13.1% without protective dressing. With protective dressings in place, sacral PU incidence decreased to between 2 and 3.1%.

Of note, Cubit et al. (2012) considered only patients admitted to acute care from the ED, which is similar to the target population of this project. Cubit et al. (2012) found 1 of 50 patients developed a PU with soft silicone dressing use as compared to 6 of 68 patients without this dressing.

An additional study of the sacral area involved application of a polyurethane film dressing. When grouped with the three studies above, there was no statistical heterogeneity found. Statistical heterogeneity is variability among studies where the intervention effects observed are more different than what would be expected due to chance (Higgins & Green, 2011). The  $I^2$  or Index of Heterogeneity in this meta-analysis was 0% and demonstrated a consistent effect of the intervention (protective dressing application) on the outcome (Bland, 2009). Therefore, synthesis of these studies was appropriate and a Relative Risk (RR) of 0.37 was calculated (95% CI 0.21-0.67).

RR quantifies the risk of developing an adverse outcome when one group is provided a specified intervention and another group receives no treatment (Irwig, Trevina, & Sweets, 2008). If RR is equal to 1 there is no difference between groups in terms of risk. If the RR is less than 1, there is less risk of the adverse outcome in the treatment group than the no treatment group. Conversely, if the RR is more than 1, there is greater risk in the treatment group than the no treatment group. Therefore, a RR of 0.37 demonstrates a significant reduction in risk of developing a PU when prophylactic dressing is applied to the sacral area.

The last systematic review of interest examined empirical evidence for interventions aimed at maintaining skin integrity in the elderly (Kottner, Litchterfeld, & Blumet-Peytavi, 2013). Inclusion criteria included primary interventions directed at treating dry skin and incontinence associated dermatitis (IAD) as well as prevention of skin ulcerations. A final sample of 33 quantitative studies involving all geriatric clients in long term care facilities was included in data synthesis.

Prevention and treatment of xerotic eczema or dry, red, flakey skin was addressed by 17 of these studies ( $n=690$ ). When compared to standard treatment of soap and water, skin cleansing products that incorporated dimethicone, emollients, or surfactant demonstrated skin protecting effects. Barrier lotions were considered in the remaining 16 studies for treatment and prevention of IAD, superficial PUs, and skin tears ( $n\approx 2500$ ). Barrier lotions were found to increase hydration of the stratum corneum, decrease PU incidence, and decrease pain and erythema in the presence of incontinence. With limited direct comparisons there were no clinical or statistical differences found between specific formulations that utilized either petrolatum or zinc-oxide (Kottner et al, 2013).

### **Synthesis of Relevant Studies**

The synthesis process involved extraction and further refinement of data from the evaluation table. Keeping the outcome of decreased PU incidence in mind, commonalities among interventions were identified. Effective strategies were consolidated to include enhanced support surfaces, positioning, protective lotions, moisturizing, and the application of protective silicone dressings. A synthesis table was generated (Table 2 as below) and a multi-faceted approach to PUP in the ED emerged.

Table 2

*Literature Synthesis*

	Year	Number of Participants (P) or Trials (T) reviewed	Sample/Setting	Study Design	Intervention	Effect upon pressure ulcer incidence
Reddy	2006	59 (T)	AC	SR	SS Moist Turn	all=<PUI
Clark	2014	8 (T)	AC Com	SR	PD	<PUI
Kottner	2013	33 (T)	LTC Ger	SR	Moist PBL	<PUI
Pham	2011	2,127 (P)	ED Ger	MA	SS	<PUI
Edlich	2011	10 (P)	HV	CT	SS	<PUI
Defloor	2005	267 (P)	Ger LTC	RCT	Turn SS	<PUI
Kaitani	2010	98 (P)	ED to CC	PC	Turn	<PUI
Peterson	2008	15 (P)	HV	CT	HOBE	>PUI
Torra i Bou	2005	380 (P)	AC LTC	RCT	Moist	<PUI

**Key**

Design/Method:

PC Prospective Cohort  
PUI Pressure Ulcer Incidence  
RCT Randomized Controlled Trial  
CT Controlled Trial  
MA Meta-analysis  
SR Systematic Review

Sample/Setting:

ED Emergency Department  
HV Healthy Volunteers  
LTC Long Term Care  
Ger Geriatrics  
AC Acute Care  
CC Critical Care  
Com Community Care

Interventions:

SS Support Surface  
Moist Moisturizing Sacral skin  
Turn Turning/Repositioning  
HOBE Head of Bed Elevation  
PBL Protective Barrier Lotion

Other:

PUI Pressure Ulcer Incidence < decreases > increases

With four of the nine cohort studies considering support surfaces, the nurse

change agent is challenged to address the type and quality of mattresses used on ED carts.

The use of higher quality pressure redistribution mattresses consistently produced the most favorable patient outcomes. Although only one study addressed pressure redistribution during use of a backboard, the consistent findings from other support surface studies increase the urgency and advisability of backboard interventions.

Turning and positioning have long been the gold standard for PUP. There is an apparent gap in high quality evidence to support the frequency and logistics of this intervention despite four of nine studies considering the topic. Measurement of skin interface pressures was utilized across studies to quantify threats to tissue viability. The consistency of findings from these studies supports the notion that the immobility associated with emergent treatment and management of critical illness adversely affects tissue integrity. The recurrence of this theme amongst these studies supports the implementation of pressure relief strategies in the ED.

The novel research on the detrimental effects of HOB elevation is supported by the other investigations documenting the vulnerability of sacral region to tissue breakdown. Moisturizing dry skin, particularly in the sacral area, was evidenced in both the systematic review addressing PUs and the systematic review addressing skin integrity. The application of moisturizer to maintain skin hydration and the use of barrier lotion to prevent skin maceration and IAD were both supported by level I evidence. Finally, silicone based protective dressings were found to be effective in decreasing PU incidence, particularly in the sacral area.

## **Conclusion and Recommendations**



While focusing upon stabilization of the critically ill patients, the unintended consequences of immobilization are easily overlooked in the ED. A thorough and critical review of evidence for best practice in PUP for this unique environment revealed a small number of effective strategies. The strongest recommendation would be to ensure elderly ED patients are well supported on pressure redistributing foam mattresses of five inch minimum height. The literature also supports limiting the length of time patients spend on backboards. Another intervention appropriate for the ED would be the implementation of routine turning regimens that could be coordinated with scheduled vital sign assessments every one to two hours. This turning frequency could be expanded to every four hours with use of pressure relief mattresses.

Based upon the available and newly emerging evidence, additional interventions are appropriate for the population of interest. In order to reduce the incidence of ED acquired PUs, application of moisturizer to the sacral area of older adults should be instituted. This process would also facilitate inspection of skin condition at point of entry to acute care services. In the presence of incontinence, barrier creams should be employed. In the most vulnerable of elderly patients with anticipated admission status, a multi-layered silicone protective dressing should be applied prophylactically. The final recommendation for best practice would be to limit HOB elevation on ED carts. Maintenance of HOB elevation at 30 degrees or less will serve to protect sacral skin.

With the population aging and projected health care provider shortages, EDs will continue to experience overcrowding and protracted patient stays. Best practice in the care of gerontological clients demands attention to prevention of skin breakdown. This

review and analysis of the available evidence for pressure prevention in the ED has produced a number of interventions that can impact HAPU incidence.

The findings from the literature strongly suggest frequent turning and repositioning, avoiding HOB elevation, moisturizing sacral skin, prophylactic silicone dressings, and the use of barrier lotions. These activities are under the direct control of nursing and lend themselves to relatively effortless implementation. Although capital expenditures would be required to improve the quality of support surfaces in the ED, this author is strongly prompted by the literature to advocate for pressure redistribution products. The current state of the science for PUP in elderly ED clients reveals that changes to the standard of care are indicated and have a strong potential to improve patient outcomes.

## Chapter 3

### **THEORETICAL SUPPORT**

To ensure that nursing practice is both evidence-based and theory driven, four theoretical models were selected to guide design and implementation of this project. The logic model provided clarity to planning and evaluation. The theory of planned behavior (TPB) and polarity thinking provided insight as to the motivation of ED nurses to implement preventative measures. Finally, the Consolidated Framework for Research Implementation (Damschroeder et al., 2009) was considered as the project coordinator assists individual nurses to overcome barriers to implementation of recommended strategies.

#### **Logic Model**

A logic model is a simplified picture of an intervention in response to a particular situation. Logic models have been utilized across disciplines and settings. A literature review demonstrated applicability to nursing through geriatric education (Price, Alkema, & Frank, 2009), primary care (Hayes, Parchman, & Howard, 2011), and home health care (Butcher, 2009). With a focus on program performance, the University of Wisconsin-Extension developed a holistic approach to planning and evaluating programs.

The logic model, as described by this source, served as the theoretical framework for the practice inquiry dissertation (Taylor-Powell, Jones, & Henet, 2003). The logic model functions as a framework for both action and communication. Key elements are visually represented so stakeholders and participants can better understand the processes and intended outcomes. A logic model is also used to demonstrate a theory of change

(Price et al., 2009). The key tasks, responsibilities, and timeline will be further described in Chapter 4.

The complete logic model is comprised of five principle components and is graphically illustrated in Figure 1 below.

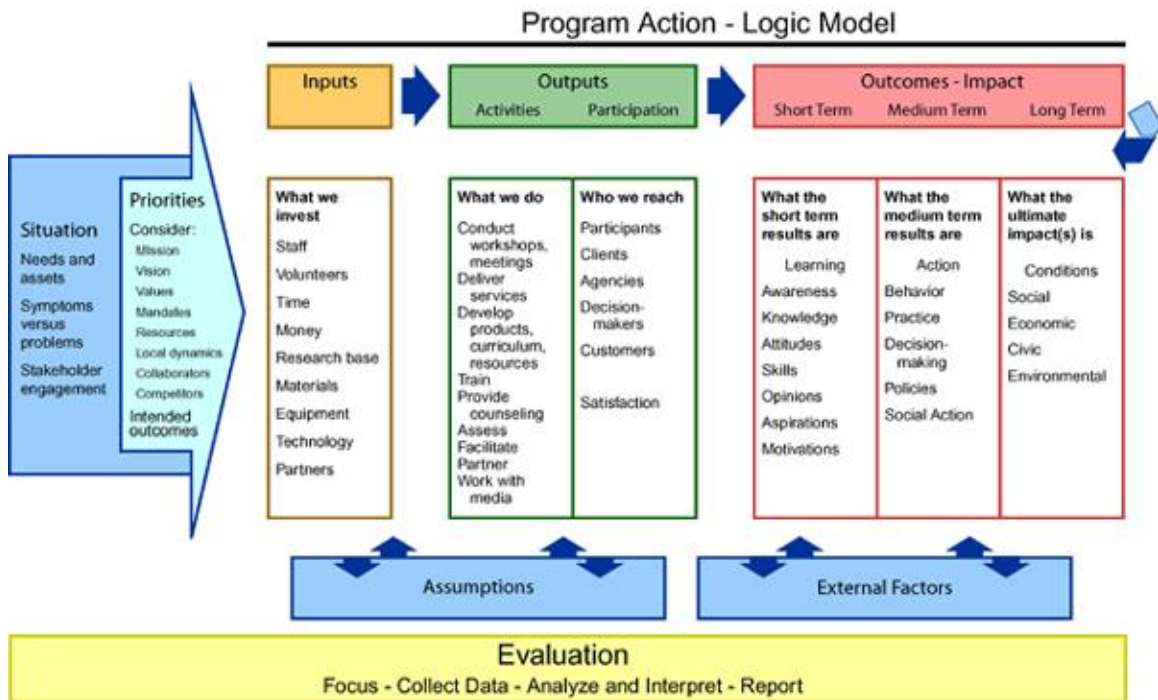


Figure 1. The Logic Model. (2012). Program Development and Evaluation: University of Wisconsin-Extension. Used with permission and retrieved from <http://www.uwex.edu/ces/pdande/evaluation/evallogicmodel.html> Copyright 1996 Board of Regents of the University of Wisconsin System, d/b/a Division of Cooperative Extension of the University of Wisconsin-Extension.

**Situation.** The foundation of the model is the specific situation. Taylor-Powell et al. (2003) encourages formation of a succinct statement that addresses the core of the originating conditions. In terms of the proposed project, this author suggests the following situation statement: EDs are caring for and admitting to inpatient services increasing numbers of elderly clients who are at risk for skin breakdown. The ED environment is designed for short term care in response to emergent situations. Pressure related injuries originating in the ED lead to both physical suffering and financial

burdens. Hospital administrators, health care providers, and elderly patients are all stakeholders in the resolution of this problem.

Pressure relief strategies have been actively employed on an inpatient basis without translation to the ED environment. Evidence for best practice in PUP in the ED is not widely understood or embraced. This situational statement is made with acknowledgment of valued assets, including registered nurses and technicians with extensive clinical experience, existing within the system. The capabilities of these assets was evaluated, strengthened, and empowered to assist in the actualization of the goals of the project (Taylor-Powell et al., 2003).

**Priorities.** Closely related to the situation is the determination of priorities (Taylor-Powell et al., 2003). Most projects are subject to limitations of some sort. Funding, staffing, and facility constraints prompt project designers to establish priorities that will eventually lead to desired outcomes. Values, expertise, resources, history, and existing efforts in regards to the situation may prompt priorities. This author has identified the implementation of PUP interventions within the ED environment as a priority for the project. The perspectives of stakeholders and participants within this project were explored, considered, and highly valued during the implementation phase.

**Inputs.** The first principle component of the logic model considers inputs to the project. The contributions of participants and resources are included as investments (Taylor-Powell et al., 2003). In terms of the proposed project, the human participants and their commitment to best practice is highly regarded by this author. The DNP student who coordinated project efforts was prepared as a Gerontological Nurse Practitioner (GNP) who practices within Emergency Medicine and was considered a significant input.

The former ED Clinical Nurse Specialist (CNS) from the proposed site provided project oversight as a committee member. The ED nurse manager was advised of the project and provided critical support of project implementation and evaluation. The implementation site is staffed with well-educated and experienced RNs who were an exceptional resource. ED support staff with diverse patient care experiences and skill sets lends insight regarding the realities of implementing potential interventions.

As expected, the physical surroundings and equipment at the implementation site employ state of the art technology in light of recent renovations. The utilization of a nationally known electronic health record (EHR) provided the ability to monitor and data-mine information about the target population and incidence of the adverse health outcome for statistical analysis. The existence of an established PUP team with defined PUP policies and strategies that have been previously implemented on inpatient units was of considerable value as an input. Financial resources were considered and no need for outside monetary support of the project was identified. The final input was the current evidence for best practice as identified in the literature review and synthesis. The presence of these impressive inputs facilitated identification of project outputs.

**Outputs.** The logic model continues with identification of the activities, events, products, and services that are targeted to specific groups, agencies, or individuals. Therefore, outputs are further subdivided into activities and participation. Activities indicate what is offered, while participation addresses who is reached (Taylor-Powell et al., 2003).

When applied to the project, an initial output was a summary of the current status of variables identified as contributing to the adverse health outcome. This data was

pivotal to project implementation and evaluation. Information came from both the organizational assessment and chart review. The next activity based output was collaborative meetings with ED registered nurses (RNs) and nurse technicians (NTs) in order to share information regarding pressure ulcer staging and documentation of skin assessments. Evidence for best practice was presented, followed by exploration of realistic and sustainable interventions. Skin protection products already in use as part of the inpatient PUP were introduced for application in the ED. A short program evaluation assessed nurse's perceived knowledge of PU staging and documentation.

Both registered nurses and nurse technicians served as primary program participants and were asked to report knowledge of prevention measures before and after the meetings. Facilitators and barriers to best practice were identified. A self-reported measure of intention to implement prevention measure was obtained. In order to promote sustainability of the project, volunteers were recruited to function as skin champions. The direct recipients of improved care were easily identified as the elders who sought medical assistance within the identified unit with resultant inpatient admission.

**Outcomes and Impacts.** According to Taylor-Powell et al. (2003), outcomes are the direct effects of the project upon the target populations. Individuals, communities, organizations, and even systems can be impacted. These results can be manifested as changes in decision making, processes, knowledge, skills, conditions, attitudes, capacities, policies, or behavior. Ideal outcomes are positive in nature and demonstrate differences from baseline. Observed outcomes may also be qualified as intended, unintended, negative, or neutral. Outcomes can be easily confused with outputs which were previously described as activities that assist with outcome achievement. The term

impact is used by the authors of the logic model interchangeably with ultimate consequences. Impact tends to describe longer term changes on a larger scale (Taylor-Powell et al., 2003).

Within the logic model, outcomes are placed in a timeline or continuum from short term to longer term. Throughout development it is important to consider the focus of the project. Criteria for outcomes include importance, reasonableness, realism, and the potential for negative consequences (Taylor-Powell et al., 2003). In terms of the project, an initial short term outcome focused on learning among the providers of care with the ED environment. An additional short term outcome involved employee identification of perceived barriers and facilitators to skin documentation and implementation of evidence-based prevention strategies. Motivation was also a short term outcome assessing intention to implement practice changes. Finally, the successful identification of education of skin care champions was considered a short term outcome.

The medium range outcomes address utilization of the suggested PUP strategies and were evaluated through chart audit 45 days post educational intervention. An additional method to assess attention to fragile skin involved tracking utilization of skin care products from ED supply. Changes in a specific patient condition would ideally be measured as the ultimate impact of the project. As the development of a HAPU is multifactorial in nature, the incidence of ED acquired PUs was not considered appropriate for measurement. An additional barrier to assessment of this potential outcome was the pre-established every 90 day frequency of skin evaluations as dictated by the facility. Finally, limitations of the information technology available to this student made consideration of ED acquired pressure ulcer incidence impractical.



**Assumptions.** Assumptions are the implicit and embedded beliefs about the manner in which the people and the program will work (Taylor-Powell et al., 2003). Clarification of assumptions is vital because an incorrect understanding of them may precipitate poorer than expected results. In terms of this project, it was assumed that ED staff will demonstrate some level of disinterest and unwillingness to learn about PUP and implement agreed upon measures. Without a change in theoretical mindset that meshes emergent care with preventive care, changes will be difficult to implement or sustain. Therefore, the theory of planned behavior which focuses on beliefs that guide human behavior and polarity thinking were given further consideration.

**External Factors.** The final component of the model is that of external factors. Generally these factors can include culture, economics, politics, climate, media, priorities, and prior experiences of the participants (Taylor-Powell et al., 2003). These factors interact with and influence the proposed program. Every project operates in a unique and dynamic environment over which planners typically have little control. Each environment is complex and creates multiple cause and effect situations (Taylor-Powell et al., 2003). As previously described, the project implementation site is committed to outstanding care of the elderly. The project will compliment prior efforts and function as a service learning partnership between the hospital system and the academic institution.

The concepts of the project have been integrated to modify the logic model designed by the University of Wisconsin Extension and displayed in Figure 2 (Taylor-Powell et al., 2003).

**Program: Pressure Ulcer Prevention in the ED Logic Model**

**Situation:** ED personnel are admitting to inpatient services increasing numbers of elderly clients who are at risk for skin breakdown. The ED environment is designed for short term care in response to emergent situations. Pressure related injuries originating in the ED lead to both physical suffering and financial burdens. Pressure relief strategies have been actively employed on an inpatient basis without translation to the ED environment. Evidence for best practice in PUP in the ED is not widely understood or embraced.

Inputs	Outputs		Outcomes -- Impact		
	Activities	Participation	Short	Medium	Long
DNP-GNP project coordinator ED CNS-committee member ED nursing management ED nursing staff ED nurse technicians Renovated ED facilities/equipment EMR Pre-existing Inpatient PUP team and plan Potential financial support Evidence for best practice	Complete pre-intervention chart audit of documented skin assessments and measures to reduce risk of skin breakdown Provide summary of identified variables and proposed plan of action as a white paper Develop a teaching plan and partner with ED staff to conduct collaborative educational meetings Complete post Intervention chart audit of same information	DNP student ED leadership Registered Nurses and Nurse technicians	ED RNs and nurse technicians (participants ) will report increased knowledge of PU staging, and prevention strategies appropriate for provision of care to the elderly within the ED environment Participants will identify barriers and facilitators to promotion of optimal skin health and PUP in the ED Participants will report intention to utilize PUP strategies post educational session Two RN and two nurse technician skin champions will be identified and educated for project sustainability	ED RNs will increase frequency of documented skin assessments and PUP strategies among elderly patients There will be increased utilization of z-guard and silicone protective dressing in the ED	The incidence of PU development in the target population within the first five days of admission will decrease

**Assumptions**  
 Unit staff may lack motivation to learn about PUP or make changes to routine practices.  
 Unit staff is committed to improving care of elderly clients.

**External Factors**  
 Organizational climate at implementation site  
 Academic environment  
 Finances

*Figure 2.* Logic Model Template. Adapted from Program Development and Evaluation: University of Wisconsin-Extension. Used with permission and retrieved from <http://www.uwex.edu/ces/pdande/evaluation/evallogicmodelworksheets.html> Copyright 1996 Board of Regents of the University of Wisconsin System, d/b/a Division of Cooperative Extension of the University of Wisconsin-Extension.

## **Theory of Planned Behavior**

The Theory of Planned Behavior (TPB) is a conceptual framework originating in the social sciences in an attempt to explain human action (Ajzen, 2002). Behavior is guided by three types of beliefs. Behavioral beliefs involve expectations related to consequences of a particular action. These beliefs produce an attitude toward said behavior which is either favorable or unfavorable. Normative beliefs originate in the expectations of peers and subjectively serve as social pressure for participation or non-participation in the particular behavior. Control beliefs are dictated by factors that hinder or facilitate the behavior and include perceptions about self-efficacy. The combination of these three beliefs generates intention, which is an antecedent to the desired behavior (Ajzen, 2002). The TPB has been utilized to understand decision-making in both patient health behaviors and nursing behaviors (Sheppard, Kennedy, & Mackey, 2006; Feng & Wu, 2005).

In terms of the project, implementing an innovation such as PUP into the daily routines of the ED requires effective communication as well as ongoing identification and resolution of obstacles. An initial objection to the project, as verbalized by ED leadership, was the perception that most ED patients present in critically ill condition. Therefore, it could be reasoned that preventative strategies would not be appropriate or possible. In consideration of this concern, the Emergency Severity Index was added to as a measured variable.

The target ED staff demonstrates diverse educational preparation. Technicians may have a high school education or a certificate from a health professions program. Nurses may be prepared at the associate, diploma, baccalaureate, masters, or doctoral

level. Therefore, the project coordinator needed to influence behavioral beliefs by clearly explaining tissue ischemia and the pathophysiology of pressure ulcer formation. Evidence for best practice in prevention was presented objectively and concisely from the literature. The relationship between routine care and the unintended consequence of tissue breakdown was made clear.

Normative beliefs are impacted by acknowledging the existence and effectiveness of PUP on other hospital units. Informing target participants of successful PUP measures implemented in two northern California hospital EDs may have enhanced self-efficacy and created peer pressure which has been identified in implementation science as helpful with persuasion (Bjorklund et al., 2012; Damschroder et al., 2009). The success of peers both locally and nationally might have served to motivate ED staff to both implement and sustain similar strategies. Perceived control over behavior change was most likely promoted through identification and education of skin care champions with the RN and nurse technician staff.

Evidence-based changes that are viewed as realistic and embraced internally by team members bear the greatest likelihood of adoption. Barriers to successful adoption were evaluated before, during, and after implementation. Careful consideration of the variables affecting belief and intention may have benefited the overall success of the project.

### **Polarity Thinking**

By definition the care provided in emergency services is treatment oriented. The polar opposite of treatment is the concept of prevention. Polarity thinking strives to manage unavoidable tensions and conflicts such as treatment versus prevention polarity

(Shankari & Franklin, 2012). Participants are encouraged to consider the upside values that drive both positions and the downside fears that over-commitment to any one position inevitably cause (L. Levknecht, personal communication, January 9, 2014). ED nurses were asked to consider the unintended consequences of the standard emergent care provided to the elderly. At the same time, participants were challenged to weigh the benefits of the evidence based prevention strategies presented for adoption. Embracing both poles of a situation facilitates acceptance, dynamic balance, and improved patient outcomes (L. Levknecht, personal communication, January 9, 2014). By embracing both treatment and prevention perspectives, ED nurses have the potential to improve the quality of care provided to older adults.

### **Consolidated Framework for Implementation Research (CFIR)**

The CFIR is a meta-theory that identifies the prevailing concepts of implementation theory across contexts (Damschroder et al., 2009). Snowball sampling was utilized to identify the overarching domains without input of key terms. This technique involves identification of seminal documents on the topic and branches outward based upon other papers that cited the original documents (Contandriopoulos, 2010). The domains identified were inner setting, outer setting, characteristics of the particular intervention, the process of implementation, and finally characteristics of the involved individuals (Damschroder et al., 2009). In terms of the assumptions that pose barriers to the project, the five constructs related to the individual are of great value.

The individual's familiarity with the evidence related to change is cognitive in nature and represents the first construct. Knowledge of the intervention and belief in the effectiveness of the intervention were generated through educational measures. The

second construct involves self-efficacy and the individual's belief in oneself to achieve the goals of the project. Those who demonstrate high self-efficacy in their role are more likely to adopt the intervention and overcome obstacles (Damschroder et al., 2009). These individuals were identified as charge nurses and recruited from all shifts in the target ED to be utilized as champions for the intervention.

Another construct of the individual addresses stages of change (Damschroder et al., 2009). As identified by Prochaska and Velicer (1997) participants may be in any of the four stages of change from early pre-contemplation to late action and maintenance of the intervention. Motivational interviewing is an evidence-based method of communication designed to help others overcome incapacitating ambivalence (Miller & Rollnick, 2002). Employment of this strategy by the DNP student was helpful during one-on-one interaction with participants of the proposed intervention.

The fourth construct describes how the individual identifies with the organization. Specifically the degree of personal commitment and level of citizenship in the organization impact the willingness of staff to participate in the project and suggested intervention. The length of time individuals have been employed by the target hospital, perceived job satisfaction, and perceptions of organizational justice should all be considered to influence how change is received (Damschroder et al., 2009). The final construct considers other personal attributes such as innovativeness, learning styles, and values (Damschroder et al., 2009). The DNP student delivered content in multiple modalities to reach as many participants as fully as possible.

The utilization of the numerous theoretical frameworks served to organize the project. The logic model guided planning and evaluation. The theory of planned behavior

provided motivational insight through ideas of belief and intention. Polarity thinking empowered participants to see the downside of treatment and the upside of prevention. Implementation science identified characteristics of involved individuals that can affect adoption and maintenance of proposed interventions. The translation of evidence-based interventions from the literature to the bedside can be a daunting process. The blending of theories allowed for a broader and deeper understanding of those factors which can affect moving an evidenced-based project from concept to reality.

## Chapter 4

### PROJECT METHODS

#### The Logic Model

Utilized as the primary theoretical model for the project, the logic model was employed to describe key tasks and the project timeline. Prior to implementation, multiple official approvals were sought including preliminary dissertation proposal approval from the identified academic committee. The proposal defense was conducted in November of 2013 and written approval of the supervising committee obtained (see Appendix C). A request for human subjects research protocol review was made to Grand Valley State University through IRBNet. The project was deemed not research and approved following exempt review in late January 2014 (see Appendix D). Director level sponsorship of the project at the implementation site was obtained in late January 2014 (see appendix E). The IRB for the human research protection program at the implementation site determined the project to be not research and granted exempt status in mid February 2014 (see Appendix F).

**Situation and Priorities.** The selected site was 284 bed community hospital in the Midwestern US. The target ED had two triage rooms and 21 active treatment beds. The project began with a focused organizational assessment. Information was gathered through interviewing of key stakeholders, direct observation, and through access of internet or intranet based resources. Macro-level organizational vision, mission, values, and strategic priorities were examined.

Organizational assessment revealed the hospital had attained the Nurses Improving Care for Healthsystem Elders (NICHE) designation and established an



inpatient unit committed to acute care of the elderly. Leadership identified a vision of becoming the national leader for health by 2020 with values that desire to ease human suffering. Innovation in process and quality improvement are encouraged and rewarded through an established synergy program. In addition, an operational initiative to reduce preventable complications by 50% in order to accomplish quality and safety goals for the Fiscal Year 2013/2014 was documented. While a comprehensive skin care and PU prevention program has been implemented and sustained inpatient units, evidence-based strategies to preserve skin integrity have not been employed in emergency services.

Current micro-level practice variables related to the issue were directly assessed by shadowing of RN and nurse technician staff. In the past year, target ED staff cared for more than 3100 patients per month with a 13.4% admission rate to inpatient services. Median length of stay from quick registration to arrival on the inpatient unit was 269 minutes or 4.48 hours. Nursing documentation is problem-focused and based upon body systems directly affected. A long-standing written policy was in place which facilitated removal of backboards on all trauma patients immediately following arrival via emergency medical services.

Collaboration with the ED nurse educator revealed that transformational information was typically communicated with staff via the Emergency Update newsletter. In both February and March of 2013, this modality was used to educate ED RNs regarding the importance of a thorough skin assessment to document the presence of pre-existing PUs. Screen shots of available documentation grids were provided and direct visualization was encouraged. Despite this information, the ED nurse educator reported and RN staff confirmed that comprehensive skin assessments were rarely documented.

Existing inpatient PUP policies and procedures were evaluated by shadowing the wound, ostomy, continence nurses. Assessment for HAPUs occurred once per quarter by direct survey of all patients on inpatient units, excluding surgical services. RNs are routinely identified from participating units to join the skin champion program. These individuals receive additional education regarding new products and approved skin care protocols. Skin champions are then charged with sharing of this knowledge with unit based staff. ED staff had previously been excluded from the skin champion program.

The clinical nurse specialist (CNS) and nurse manger from the primary receiving unit of elderly ED admissions were interviewed for additional perspective on the micro-level aspects of the problem. The most common skin related requests from receiving units were for placement of prophylactic dressings to the sacrum while in the ED and changing of patients who were incontinent prior to time of transfer.

A comprehensive environment inspection then followed including observation of routine ED practices related to care of the elderly. It was noted that ED mattresses were 7 inches of high density foam and met criteria pressure redistribution as demonstrated in the literature. Elders were cared for in a manner similar to younger adults. There was a small supply of silicone dressings appropriate for sacral placement stored in a hallway cabinet directly across from the centralized staff area. Unfortunately, these dressings were not routinely utilized or subject to restocking. Therefore the available supply had expired.

**Planning/Outputs.** The project coordinator met with the former ED CNS who is currently functioning as an applications analyst to determine the scope and specifics of the skin documentation chart audits. The primary inclusion criteria were age greater than

75 years and inpatient admission following ED encounter. This age group was requested by the implementation site staff and better reflects the frail elderly who are deemed vulnerable to skin breakdown. RNs were previously educated to document skin assessments based on the criteria of vulnerability.

A query was completed and patient episodes meeting criteria were identified from a 28 day period immediately preceding the planned educational intervention for the preliminary chart review. These charts were accessed via the electronic health record (EHR). Data was randomly collected from 30 charts. Based upon a total sample size of 224, every seventh chart was selected for audit. This sampling strategy was selected as a method of randomization in order to eliminate potential bias. A similar procedure was followed for identification of the follow-up chart audit. The query covered a 28 day period beginning 17 days post intervention and ending 45 days post intervention. Based upon a total sample size of 181, every sixth chart was selected for audit for a sample size of 30.

Charts were evaluated for patient age, gender, Emergency Severity Index (ESI), and reason for visit. ESI is a “five-level emergency department triage algorithm that provides clinically relevant stratification of patients into five groups from least to most urgent based on patient acuity and resource needs” (Agency for Healthcare Research and Quality, 2012, para. 1). This criterion was included in order to address RN concerns that most elderly patients present with a higher acuity and make prevention strategies less of a priority. Length of stay (LOS) and presence of a skin assessment in the ED were also noted.

If a PU is documented by the ED, location and staging was compared with inpatient admission assessment. If skin assessment was not documented in the ED, the skin assessment at time of inpatient admission was reviewed for any PUs documented as

pre-existing. Documentation of pre-existing PU by the medical provider at time of admission was also recorded. ED interventions directed at maintaining skin integrity were noted including repositioning, incontinence care, head of bed (HOB) elevation, and application of protective dressing. If the elder arrived by ambulance and was placed on a backboard prior to arrival, the duration of time spent on this surface while in the ED was noted. Information about hospital LOS (length of stay) was collected due to the known time delay between deep tissue injury and visible pressure related skin openings. If the LOS was of short duration, PUs may have resulted from the ED stay but remain undetected due to discharge or death. A longer LOS could reveal ED related skin injury. Finally, the prior residential status of the elder was considered. The data collection form that was utilized for both pre and post intervention is included as Appendix G.

Confidentiality of protected health information was assured by de-identifying patient data prior to placing in the spread sheet for analysis. Original paper copies of queries containing identifying data were retained by the organizational employee who served as onsite mentor. These records are stored in a locked cabinet in a secure information technology facility and will be maintained for a minimum of 3 years and then destroyed by shredding of paper documents. The de-identified data are stored on the project coordinator's password protect computer and utilized for statistical analysis. Only aggregate data were reported to sources outside of direct care providers and administration.

The next activity indicated by the logic model was development of a teaching plan that included topics such as previous skin assessment expectations and the aggregate results of the preliminary chart audit. Information regarding the pathophysiology of tissue

ischemia and skin breakdown was also provided. The relationship between routine care and the unintended consequence of tissue breakdown was demonstrated. Applicable portions of the organizational assessment were shared, especially potential facilitators and barriers. Evidence for best practice in prevention was presented objectively and concisely. This information was delivered at a series of scheduled staff meetings the last week in February of 2013.

Educational content was presented verbally with the assistance of PowerPoint® technology. Adult learning styles were considered and interactive participation encouraged. Laminated reference cards outlining evidence based strategies and PU staging were also supplied to all staff who attended. These educational meetings represent an activity output. Due to the nature of emergency care, staff members whom were unable to attend the educational sessions were accessed directly on the unit. These participants received identical content and references in a one-on-one format.

**Measuring Outcomes.** The short term outcomes were measured at the time of educational meetings. These outcomes are further delineated under the Theory of Planned Behavior and Consolidated Framework for Research Implementation theory sections that follow. Evaluation information was captured in a pre-test and post-test format utilizing the form indicated in Appendix F. The first medium range outcome addressing increased frequency of skin assessments and PUP strategies in the ED is measured by follow up chart audit as described above.

The second medium range outcome regarding utilization of protective lotion and dressings was measured primarily through analysis of inventory. An initial supply of the approved lotion for prevention and treatment of incontinence associated dermatitis (IAD)

and protective dressing was obtained from the central supply and placed in each ED treatment room. Utilization was assessed from both documentation in the EHR and replacement through a computerized inventory control program. It was assumed that if these items were removed from supply that they were used in actual patient care.

### **Theory of Planned Behavior**

Adoption of the key interventions by ED personnel was anticipated to be essential to success of the project. Therefore, the three behaviors that guide decision making by the nurse are reconsidered here. Behavior beliefs of the participants were influenced by the presentation of the initial chart audit findings and the expectation of pending chart audit following the educational meeting. This information quantifies both current and future levels of participation.

Normative beliefs were influenced through review of inpatient PUP current practice and the remarkable effectiveness of these strategies. Awareness of the success of peers in this type of preventative patient care may have generated social pressure for adoption of the recommended interventions. Informing participating staff of EDs in other states that have successfully implemented PUP measures may have also motivated participants to implement evidence-based strategies. Intention to implement was measured as part of the post presentation evaluation as outline in Appendix H.

### **Consolidated Framework for Research Implementation**

As described earlier, the characteristics of individuals involved within a change process greatly impact project outcomes. Active recruitment of volunteers to serve as skin champions was facilitated by adding a question to the education evaluation tool. Those RNs who opted into this role may have more experience with care of the elderly

and demonstrate the highest self-efficacy in this area of nursing practice. The champions then served as a resource and assisted others to overcome obstacles. Embedded within the permanent staff of the ED, these champions were individually educated to increase their cognitive understanding and promote sustainability of the interventions. Unit RNs are anticipated to be at different stages of change regarding the interventions; these champions will aid in advancing each nurse's stage of change. The project coordinator continued RN shadowing for one week post intervention and used motivational interviewing skills to help participants overcome barriers to implementation. When the group session did not meet the needs of a particular RN, alternate learning styles were addressed through one-on-one verbal instruction and the provision of written materials.

The construct of individual identification with the organization was considered as part of the organizational assessment. Results of the most recent Q12 Employee Engagement Survey conducted by Gallup were appraised and thought to be neutral in regard to impacting the project. The post intervention evaluation inquired as to perceived facilitators and barriers to implementation. The barriers identified were addressed and alleviated when possible by the project coordinator.

### **Summary of Outcomes Measures**

Table 3 is provided below in order to clarify how each outcome was measured.

Table 3

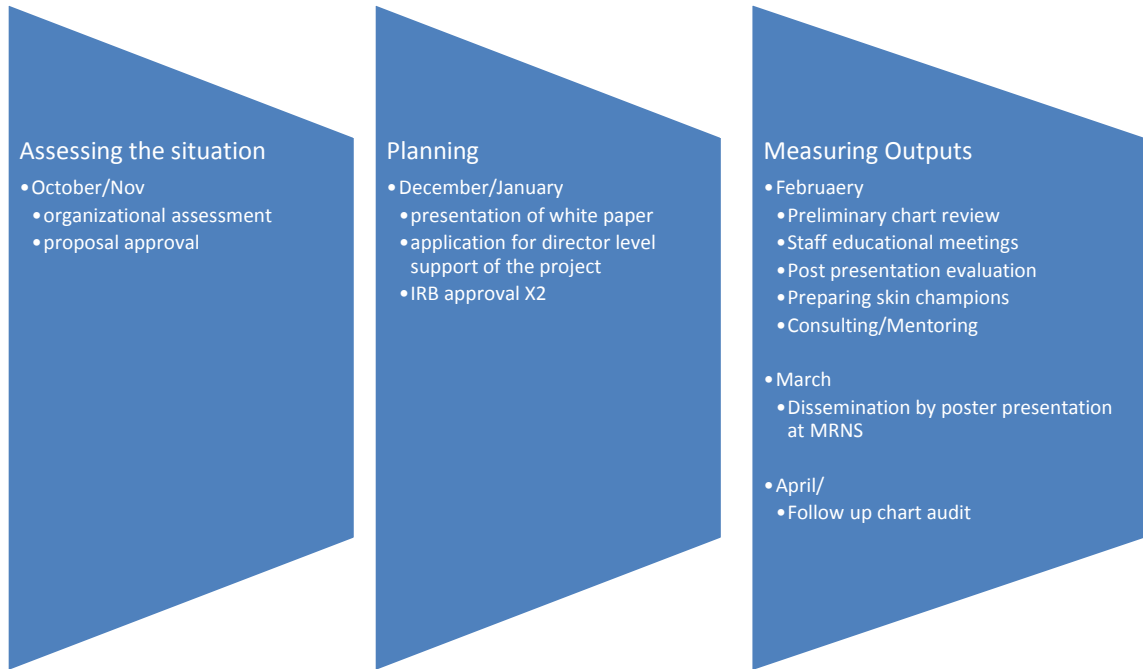
*Summary of Outcome Measures*

Outcome Time Frame	Outcome Description	Modality of Evaluation
Short	ED RN/NT knowledge of PU staging and prevention	Pre-Post Test Appendix H
Short	Identification of barriers/facilitators	Appendix H
Short	Intention to utilize specific PU strategies	Appendix H
Short	Identification of skin champions	Appendix H
Medium	Increased frequency of documented skin assessments and PUP strategies among vulnerable elderly ED patients	Appendix G
Medium	Increased utilization of skin protection products	Monitoring of ED supply utilization on a weekly basis
Long	Incidence of PU development in the target population	Was not measured



## Timeline

The project was planned, implemented, and evaluated as outlined over the course of two academic semesters. Refer to Figure 3 below for a visual representation.



*Figure 3.* Timeline for project implementation.

In conclusion, methodology for the project was driven by selected theoretical models. The logic model prompted consideration of the current situation and priorities within the participating institution. Clinically relevant outputs were determined and a planning for measuring outcomes established. The theory of planned behavior guided development of the pre and post intervention tools. Finally, the CFRI was used to guide interaction with the individual participants.

## Chapter 5

### **RESULTS**

Evaluation of the project involved data collection organized into three phases. A preliminary chart audit was conducted for a 28 day period closely preceding the educational intervention. These data were collected to document current practice and standard care related to elderly patients with a focus on the integumentary system. The second set of data was collected before and after the staff educational intervention. The educational evaluation was designed to reveal the self-perceptions of the staff related to PU knowledge, willingness to adopt evidence based interventions, and self-efficacy in skin care. The final set of data was collected over a 28 day period beginning 2 weeks following the educational intervention and was considered the follow-up chart audit. These data were collected to evaluate for the anticipated change in nursing practice and documentation.

#### **Preliminary Chart Audit**

For the designated period of time, a population of 531 individuals meeting age requirements visited the ED. This equates to approximately 21 patients per day. Of these, 224 were admitted to inpatient care and met inclusion criteria. Thirty unique episodes of patient care were randomly evaluated according to procedures described in the methodology section to generate a  $\pm 16.69$  confidence interval at a 95% confidence level. The confidence interval is typically reported as a plus or minus number and indicates the precision of measurement. The wider confidence interval demonstrated is a reflection of the relatively small sample size (Sauro, 2014). A description of the sample is as follows:

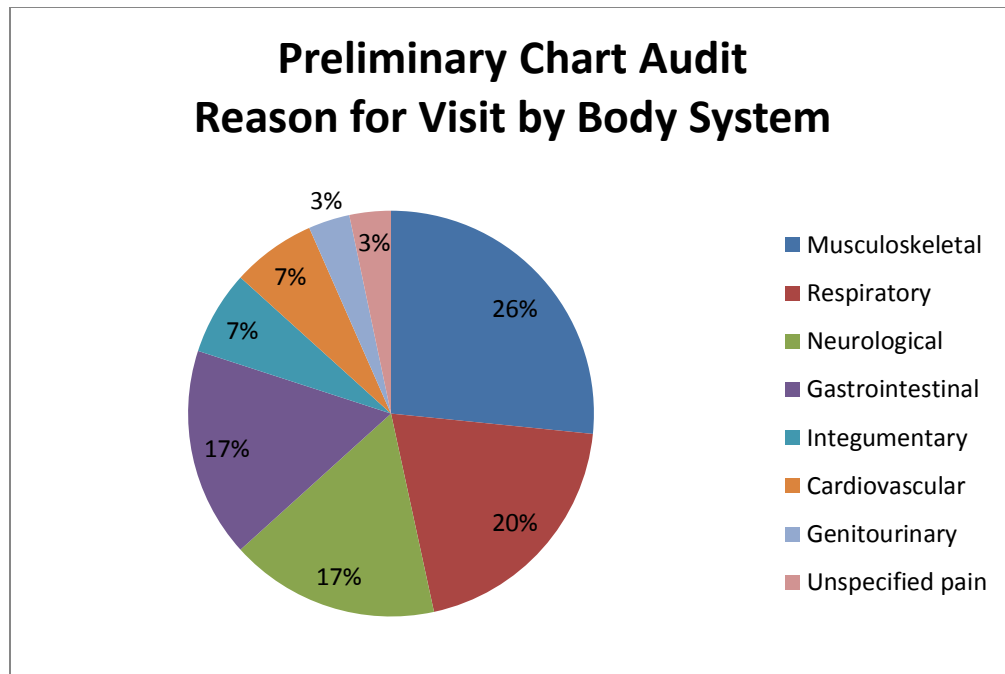
Table 4

*Descriptive statistics of preliminary chart audit sample*

Variable	Findings		
AGE (years)	Range: 75-95	Mean: 85	Median: 85
GENDER	Male: 13 (43.3%)	Female: 17 (56.6%)	
ESI Rating	One: 0 (zero)	Two: 18 (60%)	Three: 12 (40%)
ED LOS (minutes)	Range: 119-388	Mean: 247.3	Median: 272
Hospital LOS (days)	Range: 2-12	Mean: 5.5	Median: 5

*Note:* Age 95 reported for all patient 95 years and older. Actual ages were utilized to determine measures of center. ESI rating of 1 indicates highest acuity/urgency and 5 indicates lowest acuity/urgency.

The reason for visit as identified at time of triage was grouped according to body system. The most common systems affected were musculoskeletal (26.6%), followed by respiratory (20%), neurological (16.7%), gastrointestinal (16.7%), integumentary (6.7%), cardiovascular (6.7%), genitourinary (3.3%), and unspecified pain (3.3%). Refer to Figure 4 below for visual representation. Most patients were admitted from home (80%). Other residencies prior to admission were nursing home (13.3%) and assisted living (6.7%).



*Figure 4.* Preliminary chart audit: Reason for visit by body system.

**Nursing Documentation of Skin.** Integumentary assessments, from brief to comprehensive, were documented in the ED at a frequency of 16 out of 30 subjects (53.3%). PUs were identified and documented in the ED at a frequency of 1 out of 30 subjects (3.3%). One PU was identified by ED staff in the sacral area with staging not indicated. Inpatient nursing staff also documented PUs at a frequency of 1 out of 30 on the same subject. However, at time of inpatient admission, 4 PUs were identified on this patient with a stage 3 on the right buttock, a stage 2 on the upper coccyx, a stage 2 on the lower coccyx, and a stage 2 on the left buttock. The heels on this patient were also noted to be reddened but staging was unable to be determined as ability to blanch was not indicated. Overall, ED nurses documented general skin condition fairly infrequently. The one PU assessment lacked necessary detail when compared to documentation by inpatient staff on the same patient.

**Documented Prevention Measures.** Repositioning was documented at a frequency of 1 out of 30 subjects (3.3%). This single patient was repositioned one time. Incontinence care was documented on 3 out of 30 subjects (10%). Each of these patients had one episode of documented incontinence. HOB elevation and application of preventative dressing were not documented by ED nursing staff (0 out of 30 subjects). Overall, PU prevention measures were rarely documented in the ED. When noted, documentation was most likely incidental to routine management of incontinence.

### **Follow Up Chart Audit**

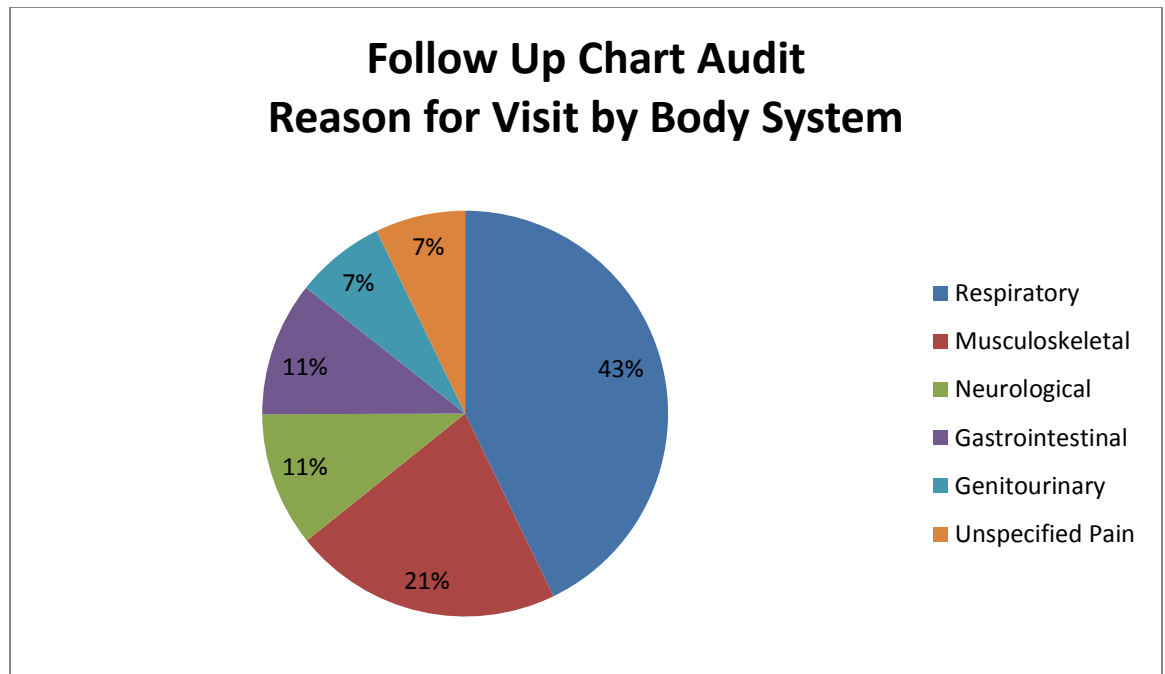
For the designated period of time, a population of 447 individuals meeting age requirements visited the ED. This equates to approximately 16 patients per day. Of these, 181 were admitted to inpatient care and met inclusion criteria. Thirty unique episodes of patient care were randomly evaluated according to procedures described in the methodology section to generate a confidence interval of  $\pm 16.39$  at a 95% confidence level. A description of the sample is as follows:

Table 5

*Descriptive Statistics of the follow-up chart audit sample.*

Variable	Findings		
AGE (years)	Range: 75-94	Mean: 83.7	Median: 83.0
GENDER	Male: 9 (30%)	Female: 21 (70%)	
ESI Rating	One: 1 (3.3%)	Two: 14 (46.7%)	Three: 15 (50%)
ED LOS (minutes)	Range: 95-595	Mean: 236.7	Median: 226
Hospital LOS (days)	Range: 2-20	Mean: 5.3	Median: 4

The reason for visit as identified at time of triage was again grouped according to body system. The most common systems affected were respiratory (40%), followed by musculoskeletal (20%), neurological (10%), gastrointestinal (10%), genitourinary (6.7%), unspecified pain (6.7%), integumentary (3.3%), and circulatory (3.3%). A visual representation of this data is provided below in Figure 5. Most patients were admitted from home (66.6%). Other residencies prior to admission were nursing home (16.7%) and assisted living (16.7%).



*Figure 5.* Follow up chart audit: Reason for visit by body system.

**Nursing Documentation of Skin.** At the time of follow up audit, integumentary assessments were documented in the ED at a frequency of 25 out of 30 subjects (83.3%). PUs were identified and documented in the ED at a frequency of 2 out of 30 subjects (6.7%). PUs locations included the right buttock and a toe. Staging was not indicated for either ulcer while in the ED. Inpatient nursing staff documented PUs at the time of admission with a higher frequency of 4 out of 30 subjects or 13.3% of the sample. Ulcer locations included toes, buttock, and coccyx with staging indicated as 1, 2, and unstageable. Overall, ED nurses increased the frequency of documenting general skin condition. Existing PUs were not documented by ED nurses on 2 subjects and staging details were again incomplete.

**Documented Prevention Measures.** Repositioning was documented at a frequency of 2 out of 30 subjects (6.6%). Each subject was repositioned one time. Incontinence care was documented on 5 out of 30 subjects (16.7%). Each of these

subjects had either one or two episodes of documented incontinence. HOB elevation was documented on 1 out of 30 subjects. Degree of elevation could not be determined as semi-fowlers was the only descriptor indicated. Application of preventative dressing was not documented by ED nursing staff (0 out of 30 subjects).

### **Comparison of Chart Audits**

Descriptive statistics revealed the samples were quite homogenous with regards to age. Subjects in the follow-up sample were slightly younger. As expected, female subjects outnumbered males. However, there were more males in the follow up group than the preliminary group. ESI ratings were consistently 2 and 3 across both samples. Only a single ESI rating of 1 was noted. The mean ED LOS was quite stable between samples at just over four hours. Hospital LOS was also consistent at approximately 5 days. Skin documentation by the nursing staff, either under the specific integumentary section or embedded within other bodily system sections, improved by 56.3% from the time of preliminary audit to the follow up audit.

### **Utilization of Other Prevention Measures**

As the application of preventative dressings was not documented by nursing, the count of actual product usage from supply inventory became more important. In the five weeks following educational intervention, five protective dressings were removed from the ED clean utility room. This number is thought to represent actual usage. Analysis of inventory further reflects 40 units of the lotion were utilized by ED staff during the same time period. These findings suggest that nursing staff integrated these suggested evidence-based strategies into routine practice despite a lack of documentation of same.



The use of protective lotion was embraced at a greater frequency than protective dressings.

### **Pre Educational Intervention Findings**

The number of participants who chose to complete and submit the pre/post educational evaluation was 29. Of these, 80% were registered nurses, 12% were support staff, 8% were nurse technicians, and the remainder held administrative or educator positions. Eighty-three percent of participants were aware of skin products or techniques appropriate for protection of fragile skin in the ED. Those who were aware of skin protection measures most commonly cited the use of preventative dressings. Repositioning and the use of incontinence wipes or barrier creams were also frequently indicated. Other participants suggested pressure redistribution with pillow propping as well as the use of paper tape.

The mean self-reported knowledge of PU identification, prevention, and staging among RN participants was 6.0 (with 1 being a low level of knowledge and 10 being a high level of knowledge). A mean knowledge score of 3.6 was self-reported by nurse technicians. Finally, a mean knowledge score of 3.4 was self-reported by administrators, support staff, and the unit educator. When asked where in the EHR one would document a PU, 100% of the RN participants indicated the skin assessment and 5% indicated the PU assessment.

### **Post Educational Intervention Findings**

Following the educational intervention, 93% of participants reported increased knowledge of the content delivered. Figure 6 below demonstrates the evidence-based

PUP strategies participants intended to implement into their professional practice. Only 3.6% of participants indicated that they intended to implement no strategies.

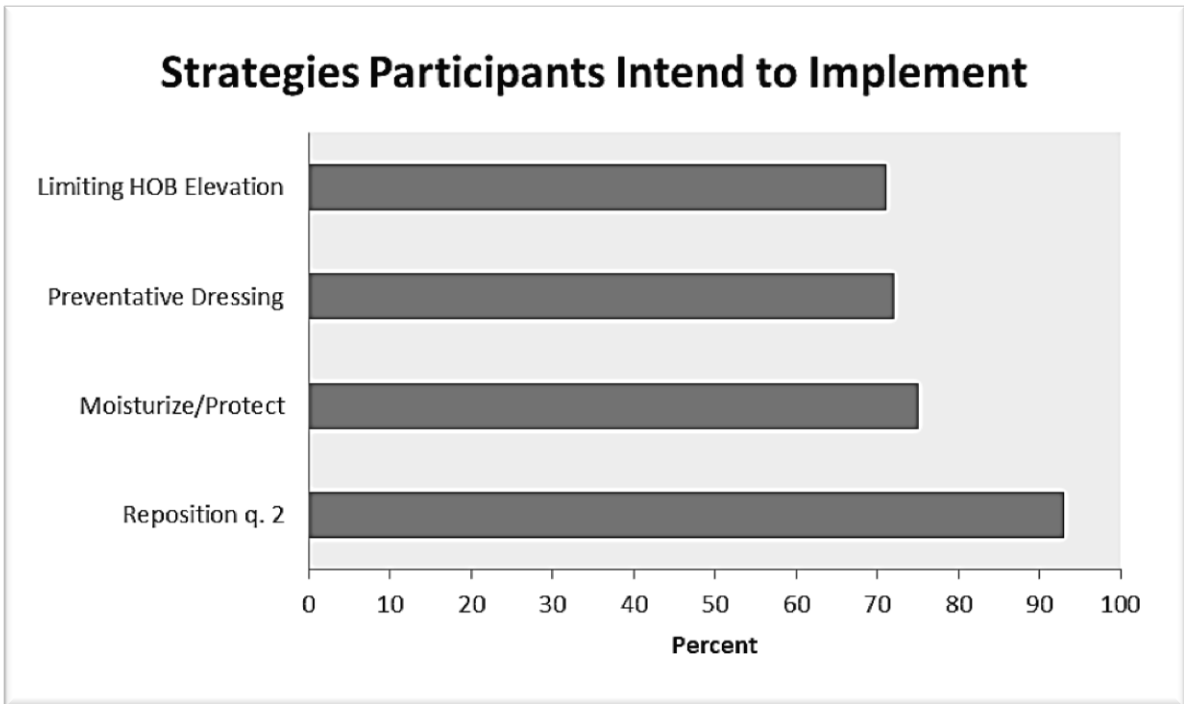


Figure 6. Strategies participants intend to implement

Identified barriers to the promotion of optimal skin health and PUP in the ED are graphically represented in Figure 7 below.

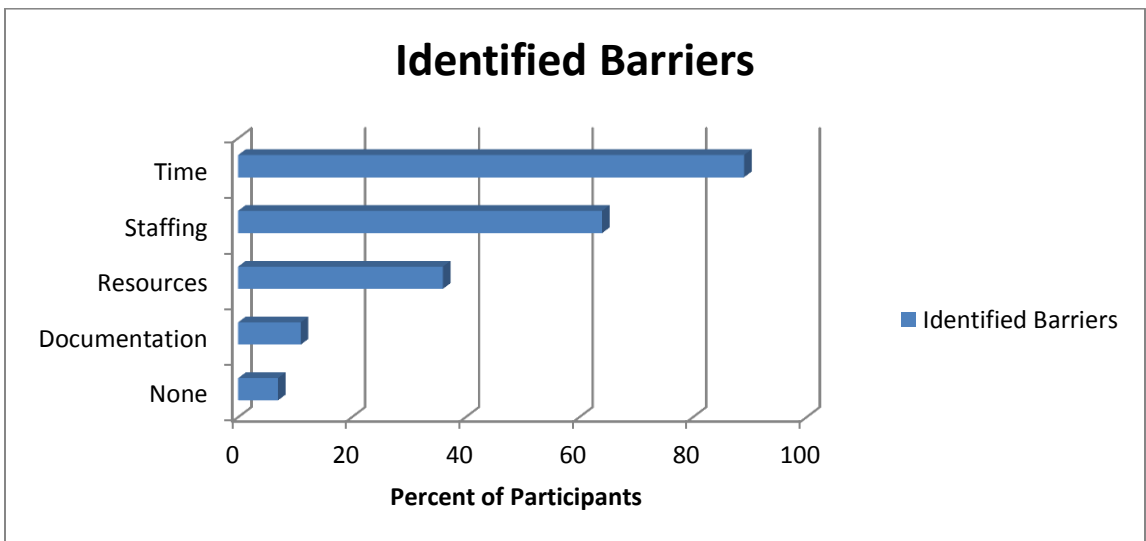


Figure 7. Identified barriers.

Identified facilitators to implementation of skin protection and PUP measures into daily routines and care of vulnerable elderly clients are graphically represented in Figure 8 below.



Figure 8. Identified facilitators

Finally, one RN volunteered to serve as a skin champion and resource to other staff regarding PUP and care of fragile skin among the elderly in the ED.

In summary, a preliminary chart audit was completed in order to document standard skin care provided to elderly clients who visited the ED with follow up inpatient admission. A pre intervention assessment provided insight about the perceived baseline knowledge of participants regarding the planned content and current practice. The post intervention data revealed the participants intentions regarding change in professional practice patterns as well as perceived barriers and facilitators to adoption of evidence-based strategies. These measures served as the key evaluation tools for the project.

## Chapter 6

### DISCUSSION

The summary and discussion of findings were organized by the literature review and conceptual framework. Explanations for short and medium term outcomes were considered as well as effectiveness, feasibility, sustainability, and limitations of the project. Finally, the alignment of the project with the DNP educational essentials (American Association of Colleges of Nursing [AACN], 2006) was noted as the project represents the culmination of the practice doctorate preparation.

#### **Findings Related to Updated Literature Review**

Approximately 24 months passed from the time of project inception to implementation. Therefore, new evidence for best practice in PUP emerged and was integrated into the final survey of literature. The most remarkable change noted was an increase in the strength of support for prophylactic use of soft silicone dressings. This measure was not considered for implementation at the time of proposal approval but was integrated into the chart audit and the educational evaluation prior to IRB approval. Vigilant monitoring of the literature facilitated delivery of up-to-date content directly to unit staff practicing at the bedside. Thus, the gap between research and implementation was minimized through this quality improvement project.

#### **Findings Related to the Conceptual Framework**

**Short Term Outcomes.** The first short term outcome from the logic model involved participants reporting increased knowledge of PU staging and prevention strategies. Self-reported knowledge of these topics prior to educational intervention was quite high among RN staff. This finding suggests participants may have been unaware of

what they did not know. Following education, 93% of participants reported an increase in this knowledge. This outcome was both intentional and positive. However, the evaluation could have been better quantified. A suggestion for improvement would, therefore, be the inclusion of a Likert scale in the post intervention evaluation similar to the scale utilized pre-intervention.

The second short term outcome involved the identification of barriers and facilitators to the adoption of evidence based strategies. Time and staffing were indicated with the highest frequency as barriers. These two variables are related and difficult to alter. Improved staffing should theoretically increase the amount of time participants would have for implementation of recommended interventions. However, an increase in workforce would negatively impact the ED budget and potentially offset the anticipated financial gains of preventing HAPUs. The barrier of time for RN staff could be addressed by examining ED processes that directly involve nursing which are time-intensive. In addition, incontinence care and application of preventative dressings could be delegated to nursing technicians. A team based approach to both implementation and documentation of interventions could decrease time-related concerns by RN staff.

The next most commonly indicated barrier was a lack of physical resources needed to accomplish the intervention. To address this concern, protective cream was ordered from central supply and stocked in the nurse-server of every treatment room. This measure allowed staff to quickly lay hands on needed supplies directly at the bedside. This change in availability of resources is reflected in the high utilization rates as determined through inventory analysis. The lower utilization rates of protective dressings can also be related to availability. Due to a relatively higher cost, ED

management opted to retain silicone dressings in the ED central supply room. The placement of this resource a further distance from the bedside, may account for the considerably lower utilization rates. It is therefore recommended that at least one silicone dressing be installed in each nurse-server. Conversely, increased availability of supplies was the most frequently reported facilitator to evidence based practice.

The second most commonly identified facilitator identified by staff was written reminders in the ED newsletter. This finding suggests that participants learn by written delivery of content and repetition. Thus, educational content was briefly summarized in the newsletter at three months following intervention. Another facilitator identified by staff was visual prompts on the unit. Therefore, signage was employed with graphical representation of the recommended intervention. These signs were placed on the bulletin board in the ED personnel station and the nursing charting area. The laminated cards provided to all participants at the time of educational intervention also served as written reminders.

The facilitator indicated with the lowest frequency was improved staffing. As perceptions on staffing were fixed at the time of evaluation completion, this variable was expected to occur in both the barrier and facilitator categories at a similar frequency. Indicated by 64% as a barrier and 32% as a facilitator, staffing remains a concern of the ED personnel. These disparate findings may be the result of tool development. Rather than encouraging open ended responses, participants were provided boxes to check pre-filled options. The sequencing of these options may have also influenced participant's selection.

One of the most important short term outcomes of the project was determination of participant's intention to implement the evidence based strategies. Despite the identified barriers, all strategies were accepted by greater than 70% of participants. These findings suggest participant's intention to embrace prevention as part of evidence-based routine care of elders. Willingness to adopt every two hour repositioning was indicated by more than 90% of participants. This particular measure is consistent with the fundamentals of nursing education and requires minimal physical resources. The availability of pillows to support the patient upon repositioning was mentioned by select staff during the educational meetings. This barrier was overcome by increasing baseline supply of pillows and clarifying storage site.

The final short term outcome involved identification of two skin champions within the ED staff. This goal was not fully achieved. However, the one RN who volunteered will facilitate sustainability of the project. This less than ideal finding may be related to the low amount of credit received in the clinical ladder system for participation in activities of this type. The RN staff may also not perceive upward movement on the clinical ladder or the associated monetary benefits to be significant motivators. This volunteer does serve to connect the ED to the inpatient skin care team. The skin champion can disseminate changes in skin care policies, monitor completion of skin audits on an ongoing basis, and introduce new approved products to team members.

#### **Medium Term Outcomes.**

The difference in frequency of skin assessments, as documented by ED RNs, from before (53%) to after the intervention (83%) was one of the most encouraging findings of this project. This 56.6% improvement can be directly attributed to the skin focused

educational intervention. A portion of the in-service indicated locations in the EHR that were appropriate for skin documentation. RNs also received PU staging guides and a review of anatomical locations on the posterior trunk. While there are specific assessments for skin and PUs in the EHR, partial skin assessments were also found within the cardiac and respiratory assessments. Therefore, data on skin were difficult to mine and measure. Although outside the scope of this project, findings of repeat charts audit at six months and one year following intervention could reveal the level of persistence for observed change in practice and thus indicate sustainability.

ED nursing documentation of PUs on the preliminary chart audit reflected some consistency with inpatient documentation. However, RNs who worked on the units provided much greater detail about number, location, and staging of observed PUs. Despite the relatively recent inclusion of a PU documentation grid in the ED template, it may be that ED RNs were unfamiliar or uncomfortable with recording the specifics of the observed skin breakdown. Inconsistencies between PUs documented in the ED and inpatient persisted in the follow-up audit. Despite, the education and laminated guides provided, the findings suggest that ED RNs continued to need coaching and support with PU documentation. This finding underscores the need to integrate skin champions within the ED staff. It is also recommended that content on PU documentation be included or increased in the ED specific orientation facilitated by the ED nurse educator.

The next medium term outcome under consideration was the documented frequency of PUP measures. Documented repositioning demonstrated a 100% improvement and incontinence care improved by 67% in the follow up chart audit when compared to the preliminary chart audit. The case numbers were too small to compare by



inferential statistics. The largest barrier to measuring these prevention strategies was the ED nursing documentation template. As part of the educational presentation, it was suggested that RNs document protective dressings under the EHRs skin tab, skin devices applied, other. The absence of a specific box to check and the additional time required to manually type in the specific ‘other’ could account for this findings. Utilization of the dressings is evident from supply analysis but absent from documentation in the selected charts.

Similarly, limitations of the documentation template did not allow for convenient recording of the application of zinc based protective lotion commonly known as Z-guard®. Incontinence care was again accomplished at a higher frequency in the follow-up audit, but application of the specific protective lotion was not noted. During the educational event, RNs were requested to document incontinence care under skin, peri-care, and manually record application of Z-guard®. Again, utilization of the product is evident from supply analysis but not reflected from documentation in charts selected for audit.

The effectiveness of efforts directed at intentional limitation of HOB elevation were difficult to capture. Again, the structure of the ED template did not facilitate effortless documentation of this strategy. Review of inpatient templates revealed that HOB elevation was represented as an option under patient activities. Degree of elevation is manually entered by RN or NT staff. If the ED template included a similar item, the frequency of use of this strategy would have been far easier to measure.

The final medium term outcome addressing increased utilization of protective dressings and barrier lotion was previously discussed under barriers to implementation.

The higher than expected rate of lotion consumption (from zero before to 40 units after intervention) is thought to be a factor of both the educational intervention and resource availability. If protective dressings were made available in the nurse-server, usage would most likely increase. Overall, the adoption of these products into regular practice is encouraging.

### **Evaluation of Effectiveness, Feasibility, and Sustainability**

Effectiveness could have been improved by partnering with the implementation site earlier in project development. Due to curricular design, dissertation projects and guiding PICOT questions are determined based upon student interest and experience. Review of literature is conducted prior to immersion in the site. A more ideal tactic would be to partner student interest with community based organizations earlier in the program. Organizational assessment and joint identification of problems of interest in the initial semesters of DNP studies would decrease barriers to students. A disconnect between academia and practice sites can make attainment of administrative support and information technology assistance challenging. A proactive approach to dissertation project development would add value to the organization while also meeting the learning requirements of the student.

A number of unique factors came together to promote feasibility of this project. The topic was coincidentally aligned well with the mission and strategic goals of the organization. Members of the team were strategically located within the organization and demonstrated commitment to student learning and improving patient care. The onsite project champion was prepared at the DNP level and alumni of the participating university. The support of the ED nurse manager proved invaluable. The prior

preparation of the DNP student in gerontology and experience in emergency care enhanced credibility. Overall, the project was smoothly implemented and evaluated. Leaders at the implementation site indicated an ongoing willingness to partner with future DNP students.

Sustainability of the evidence-based interventions will be driven by availability of necessary products, enhancement of the EHR, and commitment of the ED based RN skin champion. Findings of the follow-up chart audit were shared with the ED staff in July of 2014. Through re-visitation of the content and discussion of positive project outcomes, utilization of the evidence-based strategies will be reinforced. The ongoing support of the inpatient skin care team ensured that innovative products and other evidence-based skin protection measures will be disseminated to the ED. There is potential for other DNP students from the same university program to build upon this project and consider other methods for improving geriatric emergency care.

### **Project Alignment with DNP Essentials**

The AANC (2006) identified eight *Essentials of Doctoral Education for Advanced Nursing Practice*. These standards serve as learning guidelines to drive curricular development and expected outcomes for DNP graduates. The manner in which the DNP student implemented this project demonstrates achievement of each of the particular essentials as outline below in Table 6. The DNP is the terminal clinical degree in the profession. DNP prepared nurses are uniquely qualified to translate evidence for best practice and facilitate implementation directly at the clinical level. This process was clearly demonstrated by the dissertation project.

Table 6

*Project Alignment with DNP Essentials-*

AANC Essential	Demonstrated By
1. Scientific Underpinnings for Practice -	Utilization of knowledge from biophysical, organizational, and nursing sciences to develop and evaluate a new practice approach based upon theory.
2. Organizational and Systems Leadership for Quality Improvement and Systems Thinking	Implementation of an evidence-based quality improvement project within a new and complex healthcare system.
3. Clinical Scholarship and Analytical Methods for Evidence-Based Practice	Critically appraisal and synthesis of literature to determine evidence for best practice. Functioned as a practice specialist to improve delivery of care, patient outcomes, and health system outcomes.
4. Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care	Utilized information technology to evaluate the effectiveness of a planned quality improvement activity and transform the manner in emergent care is delivered to elderly patient in the ED.
5. Health Care Policy for Advocacy in Health Care	Advocated for social justice and high quality care in a vulnerable population.
6. Interprofessional Collaboration for Improving Patient and Population Health Outcomes	Collaborated with members of the interprofessional health care team to improve health in an identified population.
7. Clinical Prevention and Population Health for Improving the Nation's Health	Promoted evidence-based clinical strategies to prevent skin breakdown.
8. Advanced Nursing Practice	Guided and mentored other nurses to achieve excellence in professional practice. Utilized experience from current advanced practice and knowledge from DNP education to facilitate optimal emergent

### **Limitations**

This dissertation work was an evidence-based practice project designed to improve quality in one organization and with one population. Thus, findings cannot be generalized to other settings. In addition, there was a lack of precision in measuring improvement in nursing knowledge following the educational intervention. Next, some of the findings were measured and reported as intention to implement evidence-based strategies. While these findings were encouraging, intention does not always result in the desired behavioral activity (Benoit, n.d.). Finally, there was an inability to conduct longer term evaluations of outcomes and determine sustainability of proposed change due to anticipated student graduation.

### **Conclusion**

The observation of a clinical problem lead to development of this dissertation project. A PICOT question was developed to guide literature review and synthesis. An organizational assessment was completed and the most current evidence in PUP was considered for site specific implementation. Multiple theories were used to guide project methodology and evaluation of outcomes. Improvements in the actual delivery of care were found. This venture allowed the DNP student to demonstrate competency in DNP Essentials of advance practice nursing education and represents appropriate collaboration between academia and community partners.

## Appendix A

### Levels of Evidence\*

- I. Evidence from systematic reviews and meta-analysis of randomized controlled trials (RCT) or clinical guidelines based upon these methodologies.
- II. Evidence from one or more RCT.
- III. Evidence from controlled trials lacking randomization.
- IV. Evidence from case-control or cohort studies.
- V. Evidence from systematic review of descriptive and qualitative studies.
- VI. Evidence from a single descriptive or qualitative study.
- VII. Evidence from expert opinion.

\*(Taken from Melnyk & Fineout-Overholt, 2011).

## Appendix B

Final checklist of items to assess quality of randomized controlled trials of nonpharmacological treatment (CLEAR NPT)

Item	Possible answers
1. Was the generation of allocation sequences adequate?	Yes; No; Unclear
2. Was the treatment allocation concealed?	Yes; No; Unclear
3. Were details of the intervention administered to each group made available? <sup>a</sup>	Yes; No; Unclear
4. Were care providers' experience or skill <sup>b</sup> in each arm appropriate? <sup>c</sup>	Yes; No; Unclear
5. Was participant (i.e., patients) adherence assessed quantitatively? <sup>d</sup>	Yes; No; Unclear
6. Were participants adequately blinded?	Yes; No, because blinding is not feasible; No, although blinding is feasible; Unclear
6.1. If participants were not adequately blinded	
6.1.1. Were all other treatments and care (i.e., cointerventions) the same in each randomized group?	Yes; No; Unclear
6.1.2. Were withdrawals and lost to follow-up the same in each randomized group?	Yes; No; Unclear
7. Were care providers or persons caring for the participants adequately blinded?	Yes; No, because blinding is not feasible; No, although blinding is feasible; Unclear
7.1. If care providers were not adequately blinded	
7.1.1. Were all other treatments and care (i.e., cointerventions) the same in each randomized group?	Yes; No; Unclear
7.1.2. Were withdrawals and lost to follow-up the same in each randomized group?	Yes; No; Unclear
8. Were outcome assessors adequately blinded to assess the primary outcomes?	Yes; No, because blinding is not feasible; No, although blinding is feasible; Unclear
8.1. If outcome assessors were not adequately blinded, were specific methods used to avoid ascertainment bias (systematic differences in	Yes; No; Unclear

Item	Possible answers
outcome assessment)? <sup>e</sup>	
9. Was the follow-up schedule the same in each group? <sup>f</sup>	Yes; No; Unclear
10. Were the main outcomes analyzed according to the intention-to-treat principle?	Yes; No; Unclear

- a. The answer should be “yes” for this item if these data were either described in the report or made available for each arm (reference to a preliminary report, online addendum etc.)
- b. Care provider experience or skill will be assessed only for therapist-dependent interventions (i.e., interventions where the success of the treatment are directly linked to care providers' technical skill). For other treatment, this item is not relevant and should be removed from the checklist or answered “unclear.”
- c. Appropriate experience or skill should be determined according to published data, preliminary studies, guidelines, run-in period, or a group of experts and should be specified in the protocol for each study arm before the beginning of the survey.
- d. Treatment adherence will be assessed only for treatments necessitating iterative interventions (e.g., physiotherapy that supposes several sessions, in contrast to a one- shot treatment such as surgery). For one-shot treatments, this item is not relevant and should be removed from the checklist or answered “unclear.”
- e. The answer should be “yes” for this item, if the main outcome is objective or hard, or if outcomes were assessed by a blinded or at least an independent endpoint review committee, or if outcomes were assessed by an independent outcome assessor trained to perform the measurements in a standardized manner, or if the outcome assessor was blinded to the study purpose and hypothesis.
- f. This item is not relevant for trials in which follow-up is part of the question. For example, this item is not relevant for a trial assessing frequent vs. less frequent follow-up for cancer recurrence. In these situations, this item should be removed from the checklist or answered “unclear.”

(Taken from Boutron et. al, 2005)



Appendix C



**Kirkhof College of Nursing  
Grand Valley State University  
Doctor of Nursing Practice Proposal Defense**

This signed form signifies that \_\_\_\_\_ Jennifer Zoeteman \_\_\_\_\_'s Proposed Doctor of Nursing Practice: Practice Inquiry Dissertation has been approved as satisfactory by the Supervisory Chairperson and members of the Committee. It also authorizes the student to submit a Human Research Review Application to the GVSU Human Research Review Committee and related committees for the protection of human subjects. This approval **does not** constitute a FINAL approval of the Dissertation.

This form must be filed with Kirkhof College of Nursing and signed by the Associate Dean for Graduate Programs.

Full Legal Name: Jennifer Lynn Zoeteman \_\_\_\_\_

Student ID: G00029831 \_\_\_\_\_ Email Address: zoetemaj@gvsu.edu

TITLE OF DISSERTATION: Protecting the Skin of Frail Older Adults Through Skin Surveillance and Pressure Ulcer Prevention Beginning in Emergency Services  
\_\_\_\_\_  
\_\_\_\_\_

Supervisory Committee Signatures:  
Chairperson: [Signature: Dan Barry]  
Member: [Signature: Theresa Bacon-Bagatley]  
Member: [Signature: K. J. Brant]  
Member: [Signature: J. J. [unclear]]

Date Approved:  
11/22/13  
11/22/13  
11/22/13  
11/22/13

\_\_\_\_\_  
KCON Associate Dean for Graduate Studies

**Appendix D**

Wednesday, January 29, 2014 1:50 PM

Please note that Grand Valley State University Human Research Review Committee has taken the following action on IRBNet:

Project Title: [546225-1] PROTECTING THE SKIN OF OLDER ADULTS THROUGH SURVEILLANCE AND PRESSURE ULCER PREVENTION BEGINNING IN EMERGENCY SERVICES

Principal Investigator: Jennifer Zoeteman, MSN

Submission Type: New Project

Date Submitted: January 7, 2014

Action: NOT RESEARCH

Effective Date: January 29, 2014

Review Type: Exempt Review

Should you have any questions you may contact Paul Reitemeier at reitemep@gvsu.edu.

Thank you,

The IRBNet Support Team

## Appendix E

SPECTRUM HEALTH

### Evidence-Based Project Proposal

<b>Date Submitted:</b> 1/24/2014	<b>Proposal Sponsor (Director):</b> Káthy VanRhee
<b>Submitted by:</b> Jennifer Zoeteman MSN, GNP (616) 828-8548	<b>Proposal Sponsor (Executive):</b> Shawn Ulreich
<b>Department:</b> GVSU DNP Student	<b>Change Leadership Sponsor:</b> Karen Delrue, Brandon Cook

**1. What is the trigger? (check all that apply)**

<input checked="" type="checkbox"/> <b>Problem-focused</b>	<input type="checkbox"/> <b>Knowledge-focused</b>	<input checked="" type="checkbox"/> <b>Innovation-focused</b>
<input checked="" type="checkbox"/> Identification of clinical problem	<input checked="" type="checkbox"/> New research or other literature	<input type="checkbox"/> New technology
<input type="checkbox"/> Identification of operational problem	<input type="checkbox"/> Philosophies of care	<input type="checkbox"/> Idea
<input type="checkbox"/> Data	<input type="checkbox"/> Compliance / law	<input type="checkbox"/> Opportunity
<input type="checkbox"/> Risk management	<input type="checkbox"/> Organizational standards	<input checked="" type="checkbox"/> <b>Strategic initiative</b>
<input type="checkbox"/> Financial	<input type="checkbox"/> Organizational guidelines	
<input type="checkbox"/> Process improvement	<input type="checkbox"/> National agencies	
<input type="checkbox"/> Internal / external benchmarking	<input type="checkbox"/> Other (specify)	

**Briefly describe the trigger:**

LOS for Blodgett ED patients admitted to inpatient services averaged 269 minutes or 4.48 hours in the past year. The importance of skin assessments was described in the ED Update newsletter in both February and March of 2013. The November 2013 Skin Audit revealed 4 Hospital Acquired Pressure Ulcers (HAPU) at the Blodgett campus. The 2008 announcement by the Centers for Medicare and Medicaid Services eliminated payments to hospitals for care related to preventable complications (including HAPUs). Spectrum Health has identified an operational initiative to reduce preventable complications by 50% in order to accomplish quality and safety goals for the Fiscal Year 2013/2014.

**2. What is being proposed?**

A chart audit will be conducted to quantify current practice in the ED related to skin surveillance and pressure ulcer (PU) prevention. In collaboration with the ED nurse manager, information regarding PU pathophysiology, skin documentation expectations, and evidence-based strategies will be presented to ED nursing staff. The approved Spectrum Health adult skin care/low level wound/pressure ulcer prevention and management brochure will be provided to nurses as a written reference. Skin care products already available in the ED will be reviewed with the staff. The project coordinator will assess motivation of individual RNs to adopt recommendations and assist them to overcome barriers. Aligning with the inpatient PUP program, skin champions will be identified and mentored in order to facilitate sustainability of the recommendations. A repeat chart audit will be conducted at 4-6 weeks post educational meeting in order to measure anticipated increases in the frequency of documented skin assessments and utilization of PUP measures.

**3. Describe the value / benefit to (complete all that apply):**

<p style="text-align: center; margin: 0;"><u>Patients / Family Members</u></p> <ul style="list-style-type: none"> <li>Older adults will receive a higher standard of care during their stay in the ED. The intention is to decrease the risk of hospital acquired skin breakdown and improve patient comfort.</li> </ul>	<p style="text-align: center; margin: 0;"><u>Interdisciplinary Team Members</u></p> <ul style="list-style-type: none"> <li>Nursing staff will be informed of evidence-based strategies for pressure ulcer prevention applicable to the ED environment.</li> </ul>	<p style="text-align: center; margin: 0;"><u>Organization</u></p> <ul style="list-style-type: none"> <li>The organization will serve as an exemplar for excellence in geriatric emergency services.</li> </ul>
--	---	--

Spectrum Health's Strategic Plan

- Spectrum Health Blodgett may demonstrate a decrease in preventable complications related to skin breakdown as published in HCAHP scoring.

You / Your Inquiry Team

- Completion of and evidence-based dissertation project required for DNP degree attainment.

Community / Profession

- Nursing's commitment to EBP will be demonstrated through planned dissemination activities at the Midwest Nursing Research Society annual conference.

**4. What are the expected outcomes?**

- A demonstrated increase in the frequency of documented skin assessments in the ED. An increase in the frequency of documented utilization of PUP strategies in the ED. Identification of skin champions within the ED to ensure project sustainability.

**Describe the forces for the change:**

Potential Driving Forces:

- Proposal is already approved by GVSU Dissertation Committee.
- Implementation has been coordinated with Brandon Cook, ED nurse manager.
- Project has been scheduled for dissemination at a national conference in March 2014.
- Alignment of the ED with inpatient skin care standards.

Potential Restraining Forces:

- ED nurses focus on treatment rather than prevention.

**5. List Identified Stakeholders for this project.**

For decision-making	For information	For assistance
<ul style="list-style-type: none"> <li>• Spectrum Health Executive Leadership</li> <li>• Blodgett ED nurse manager</li> <li>• IRBs from GVSU and Spectrum Health</li> </ul>	<ul style="list-style-type: none"> <li>• Karen Delrue, Application System Analyst and SH preceptor</li> </ul>	<ul style="list-style-type: none"> <li>• Brandon Cook, Blodgett ED nurse manager</li> <li>• GVSU dissertation committee</li> <li>• Kathy VanderLaan, SH Sr. Nurse Researcher</li> </ul>

**6. What resources may the project involve or need to be successful? (Give details if known)**

<input checked="" type="checkbox"/> Money / funding-for dissemination. Partial funding already obtained from the GVSU Center for Scholarly and Creative Excellence.	<input checked="" type="checkbox"/> Computer or technology-data query for chart audits as arranged with Karen Delrue. Utilization of SH on-site computer and server to ensure data security.
<input type="checkbox"/> New construction	<input checked="" type="checkbox"/> Time-presentation is anticipated to require 15 minutes of scheduled monthly ED staff meeting.
<input type="checkbox"/> Regulatory or Compliance	<input type="checkbox"/> Education or development
<input type="checkbox"/> Legal	<input type="checkbox"/> Process improvement

<input checked="" type="checkbox"/> People / Staff-nursing staff attention for educational intervention (15-20) from the scheduled monthly staff meeting.	<input checked="" type="checkbox"/> Change leadership-identification of skin champions from the ED.
<input type="checkbox"/> Facility remodel	<input checked="" type="checkbox"/> Other-Statistical support is being provided by the GVSU Statistical Consulting Center.

**7. Your recommendation about the project:** (Address timing, if desired)

See attached white paper. Chart audit could commence following IRB approval from both sources. Educational intervention could be implemented in late February ED staff meetings. Poster presentation for dissemination is already approved for MRNS at Annual Research Conference (3/27-3/31/14) in St. Louis, MO.

**Comments from Sponsors:**

**Proposal Endorsement**

The undersigned endorse this proposal and recommend that the project be chartered and further planning commence. The project plans and results will be reviewed for further implementation and decision-making.

Kathleen VanRhee \_\_\_\_\_ 1-29-14  
 Director Sponsor: \_\_\_\_\_ Date

\_\_\_\_\_  
 Executive Sponsor: \_\_\_\_\_ Date

## Appendix F

Page 1 of 1 HRP-524

**Human Research Protection Program** Office of the Institutional Review Board 100 Michigan NE, MC 038 Grand Rapids, MI 49503 616.486.2031 irb@spectrumhealth.org www.spectrumhealth.org/HRPP

### NON HUMAN RESEARCH DETERMINATION

February 13, 2014

Jennifer Zoeteman MSN

9378 Tiger Lily Dr.

Caledonia, MI 49316

SH IRB#: **2014-037**

### **PROTOCOL TITLE: Protecting the Skin of Older Adults Through Surveillance and Pressure Ulcer Prevention Beginning in Emergency Services**

Dear Jennifer,

On February 13, 2014, the above referenced project was reviewed. It was determined that the proposed activity does not meet the definition of research as defined by DHHS or FDA. Please be aware when presenting or publishing the collected data that it is not presented as research.

Therefore, approval by Spectrum Health IRB is not required. This determination applies only to the activities described in the IRB submission and does not apply if changes are made. If changes are made and there are questions about whether these activities are research involving human subjects please submit a new request to the IRB for a determination.

Your project will remain on file with the Office of the IRB, but only for purposes of tracking research efforts within the Spectrum Health system. If you should have questions regarding the status of your project, please contact the Office of the IRB at 616-486-2031 or email irb@spectrumhealth.org.

Sincerely,

Jeffrey Jones MD

Chair, Spectrum Health IRB

cc: Karen Delrue

**Appendix G**

Data Collection Form for Chart Audit

1. FIN number \_\_\_\_\_
2. Age \_\_\_\_\_
3. Length of ED Stay \_\_\_\_\_ minutes
4. Length of Hospital Stay \_\_\_\_\_ days
5. Skin Assessment Documented in ED: yes \_\_\_\_\_ no \_\_\_\_\_ (if no, proceed to #5)  
If yes, are Pressure Ulcers (PUs) identified in ED: yes \_\_\_\_\_ no \_\_\_\_\_  
Number of PUs: \_\_\_\_\_  
Ulcer #1 location : \_\_\_\_\_ stage: \_\_\_\_\_  
Ulcer #2 location : \_\_\_\_\_ stage: \_\_\_\_\_  
Ulcer #3 location : \_\_\_\_\_ stage: \_\_\_\_\_
6. Pressure Ulcers identified at time of inpatient admission: yes \_\_\_\_\_ no \_\_\_\_\_  
Number of PUs: \_\_\_\_\_  
Ulcer #1 location : \_\_\_\_\_ stage: \_\_\_\_\_  
Ulcer #2 location : \_\_\_\_\_ stage: \_\_\_\_\_  
Ulcer #3 location : \_\_\_\_\_ stage: \_\_\_\_\_
7. Presence of pre-existing pressure ulcer documented by ED medical provider at time of admission decision? yes \_\_\_\_\_ no \_\_\_\_\_
8. What skin protective interventions are documented in the ED?  
Repositioning: yes \_\_\_\_\_ number of times \_\_\_\_\_ no \_\_\_\_\_  
HOB elevation: yes \_\_\_\_\_ degree \_\_\_\_\_ no \_\_\_\_\_  
Incontinence care:  
brief applied: yes \_\_\_\_\_ no \_\_\_\_\_ number of times changed \_\_\_\_\_  
Application of lotion: yes \_\_\_\_\_ no \_\_\_\_\_ type \_\_\_\_\_  
number of times \_\_\_\_\_

9. If arrived by EMS on backboard: length of time from admission to backboard removal:

\_\_\_\_\_ minutes

10. Prior residential status of the elder as documented by ED physician:

Not indicated \_\_\_\_\_

Home: \_\_\_\_\_

Assisted Living: \_\_\_\_\_

Nursing Home: \_\_\_\_\_

Homeless: \_\_\_\_\_



**Appendix H**

Pre/Post Education Evaluation

1. Please circle the number that best reflects your level of knowledge regarding pressure ulcer identification, staging, and prevention **before** this meeting.

1      2      3      4      5      6      7      8      9      10



2. Please indicate your functional role in the ED by darkening the appropriate circle.

- RN
- Nurse tech
- Support staff
- Physician
- NP
- PA
- Administrator
- Other (please specify) \_\_\_\_\_

3. Are you aware of any skin products appropriate for protection of fragile skin available in the ED?

Yes \_\_\_\_\_ Which products (please list): \_\_\_\_\_

No \_\_\_\_\_

4. Where in the electronic medical record would you document a pressure ulcer observed in the ED?

\_\_\_\_\_

**PLEASE DO NOT COMPLETE THE SECOND PAGE UNTIL THE END OF THE PRESENTATION**

5. Has your level of knowledge regarding pressure ulcer identification, staging, and prevention increased as a result of this meeting and the resources provided?

Yes \_\_\_\_\_ No \_\_\_\_\_

6. Which of the evidence-based pressure ulcer prevention (PUP) strategies do you intend to implement into your professional practice? (check all that apply)

- Every two hour repositioning of vulnerable patients
- Application of moisturizer/skin protective barrier (z-guard)
- Limiting head of bed elevation to less than 30 degrees
- Other (please specify) \_\_\_\_\_
- None

7. What are the barriers or reasons that prevent promotion of optimal skin health and pressure ulcer prevention in the ED? (check all that apply)

- Time
- Staffing
- Lack of physical resources
- Difficulty with documentation
- None
- Other (please specify) \_\_\_\_\_

8. What can be done to facilitate or help you implement skin protection and pressure ulcer prevention measures into your daily routines and care of vulnerable elderly clients? (check all that apply)

- Reminders in the ED update
- Increased availability/access to protective lotions
- Visual prompts on the unit (signs)
- Improve staffing
- Nothing
- Other (please specify) \_\_\_\_\_

9. Would you be willing to serve as a skin champion or resource to other staff regarding pressure ulcer prevention and care of fragile skin among the elderly in the ED?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, please email the project coordinator, Jennifer Zoeteman, at zoetemaj@gvsu.edu

Thank you for taking the time to evaluate this educational endeavor!

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