

Evolution of a skin risk assessment tool:  
determination of reliability and validity

Kathleen D. Wright, BSN, CETN, RNC  
Salisbury State University  
Spring 1997

SALISBURY STATE UNIVERSITY  
DEPARTMENT OF NURSING  
GRADUATE PROGRAM

FINAL THESIS APPROVAL

NAME OF STUDENT: Kathleen D. Wright, R.N., C.E.T.N.

DATE: March 12, 1997

SUCCESSFULLY DEFENDED HER MASTER'S THESIS ENTITLED:

**EVOLUTION OF A SKIN RISK ASSESSMENT TOOL:  
DETERMINATION OF RELIABILITY AND VALIDITY**

MEMBERS OF THESIS COMMITTEE:

*Barbara Kellam*

Barbara Kellam, Ph.D., RN  
Chair

*Ruth Carroll*

Ruth Carroll, Ph.D., RN

*Barbara Wainwright*

Barbara Wainwright, Ph.D.

## Abstract

In the publication, Clinical Practice Guidelines for Pressure Ulcers in Adults, the Agency for Health Care Policy and Research made recommendations to use a validated skin risk assessment tool for the identification of patients at risk for development of pressure ulcers (AHCPR, 1992). Over the past ten years, Nanticoke Memorial Hospital (NMH) has screened all adult inpatients using a tool developed by the facility's Skin Care Committee. A recent prevalence study conducted at NMH by Hill-Rom International found a significantly lower percentage of acquired pressure ulcers at this facility as compared to the regional and national averages. Confident that the NMH Skin Risk Assessment Tool is effective, the researcher initiated a study to determine the degree of reliability and validity exhibited.

Interrater reliability was measured by the completion of the NMH Tool by two certified Enterostomal Therapy Nurses (CETNs) on each patient within the sample ( $n = 30$ ). A Spearman Rank Order Correlation of .89 was found, with a significance level of .000, confirming the research hypothesis that the NMH Tool demonstrates interrater reliability. Determination of content validity involved the completion of a Content Relevance Scale by ten CETN experts. The Overall Content Validity Index (CVI) was calculated at 0.89, surpassing the researcher's pre-set CVI goal of 0.85. Concurrent validity was assessed by completion of the NMH Tool and the Braden Risk Assessment Scale on a second patient sample ( $n = 60$ ). Spearman Rank Order Correlation was -0.93 for the overall paired

scores with a significance level of .000. Based on the data analysis yielding the above CVI and Spearman Rho values, the NMH Skin Risk Assessment Tool was found to demonstrate acceptable levels of interrater reliability, content validity, and concurrent validity.

## Acknowledgments

I would like to thank the following people, who provided me with endless support during my graduate studies and the development of this thesis:

- \*My committee chair, Dr. Barbara Kellam, and committee members, Drs. Ruth Carroll and Barbara Wainwright, for their patience and guidance.
- \*My Enterostomal Therapy colleague and fellow data collector, Becky Bell, CETN, RN, for her mentoring and friendship.
- \*Nanticoke Memorial Hospital's Research and Development Coordinator, Lynne Armiger, MSN., RN, for her assistance in formulation of the beginning stages of this project.
- \*My very understanding husband, Herbert Wright, for "keeping the home fires burning" while encouraging me to move forward toward my professional goals.
- \*My oldest, Dawn Wright, for her boundless interest in the health care field and patient technical support on the computer.
- \*My sons, Phillip and Jeffrey Wright, for their comic relief in this sometimes stressful process.
- \*My youngest, Lisa Wright, for her "elbow-side" companionship during my endless hours at the computer.
- \*My mother, Jeanne Dredge, a role model for dedicated caregiving, and always a source of loving encouragement.
- \*Lastly, my father, Albert Dredge, who inspired all "his girls" to pursue their goals and, I know, is smiling down from above proudly as I complete my Graduate studies.

## Table of Contents

	page
Chapter I	
Conceptual Framework	3
Chapter II Review of the Literature	
The Skin and Its Functions	10
Disruption in Skin Integrity	11
Use of Skin Risk Assessment Tool	14
Skin Risk Assessment Instrument Research	16
Summary	18
Chapter III Methods	
Research Design	20
Hypotheses	20
Study Variable	22
Instrumentation	22
Study Population	24
Study Sample	25
Ethical Considerations	26
Data Collection	27
Chapter IV Data Analysis	
Interrater Reliability	29
Content Validity	31
Concurrent Validity	36
Summary	40

## Table of Contents

	page
Chapter V Summary	
Study Purpose, Hypotheses and Findings	42
Delimitations and Limitations	45
Implications for Future Research	46
Conclusion	47
References	48
Appendix A	
NMH Skin Care Assessment(original format)	54
Appendix B	
NMH Skin Risk Assessment(final format)	56
Appendix C	
Braden Risk Assessment Scale	58
Appendix D	
Content Relevance Scale	60
Appendix E	
Letter permitting use of the Braden Scale	63
Appendix F	
NMH Administrative Approval Letter	65
Appendix G	
SSU Committee on Human Volunteers Letter of Approval	67

## List of Tables

	page
Table 1	
Interrater Reliability Data	30
Table 2	
Content Validity Data	32
Table 3	
Concurrent Validity Data for High Risk Patients	37
Table 4	
Concurrent Validity Data for Moderate Risk Patients	38
Table 5	
Concurrent Validity Data for Low Risk Patients	39



## Chapter I

In the publication, Clinical Practice Guidelines for Pressure Ulcers in Adults, the Agency for Health Care Policy and Research made recommendations that patients be assessed for level of risk for skin breakdown utilizing a validated skin risk assessment tool (AHCPR, 1992). Over the past ten years, Nanticoke Memorial Hospital (NMH) has screened all adult inpatients using a skin risk assessment tool developed by the facility's Skin Care Committee. The NMH Skin Risk Assessment Tool was designed based on a review of literature pertaining to skin risk factors, with input from the nursing staff, at a time when the use of risk assessment tools and preventive measures were not standard practice. Over the last several years, several different skin risk assessment tools have been published with varying estimates of reliability and validity. Chapter II: Review of the Literature will discuss these findings in depth.

It was the opinion of this author that the NMH Tool provided an assessment guide that the hospital's nursing staff used effectively as a first step in a comprehensive preventive skin care program. This opinion was substantiated by a recent prevalence study conducted at NMH by Hill - Rom International that found a significantly lower percentage of acquired pressure ulcers than the regional and national averages for acute care facilities. Hill - Rom is an independent company that provides durable medical equipment to health care facilities nationwide. With a facility's permission, they perform annual data collection to determine prevalence and incidence rates. Hill - Rom maintains a national

data base of this information, enabling comparison of facility specific data to that of the region and the nation. The 1995 Prevalence Survey data found NMH with a 6.8 percent prevalence of pressure ulcers, as compared to a 10.8 percent prevalence in national data, and a 20.5 percent prevalence in the Philadelphia region. At the time of this survey, there was a 0 percent incidence of pressure ulcers at NMH, as compared to a 57.7 percent nationally and 61.8 percent regionally. In a presentation of the Prevalence Survey data to NMH administration, the company representative cited financial data on the average cost of nosocomial pressure ulcers by stage. A study of hospital specific information relative to skin care protocols, the amount of caregiver time and materials used to treat pressure ulcers was conducted by Hill-Rom in 1995. Cost estimates to treat pressure ulcers identified were \$93 for Stage I, \$2,100 for Stage II, \$8,575 for Stage III and \$9,545 for Stage IV. The cost to treat a full thickness wound (Stage III and IV) was found to be more than four times the cost to treat a partial thickness wound (Stage I and II). This difference represented more than \$6,000 on average for the hospitals included in the study, the majority of which is attributed to longer lengths of stay and the greater likelihood of debridement associated with more severe wounds. The study found an average of two incremental days added to the length of stay for patients with Stage II ulcers and five days added for incidences of Stage III and Stage IV ulcers (Hill - Rom, 1995).

Use of the NMH Skin Risk Assessment Tool as the initial piece of a comprehensive preventive skin care program was identified as

successfully minimizing the occurrence of pressure ulcers in the Hill - Rom Prevalence Survey. Confident that the NMH Tool is effective in identifying patients at risk for skin breakdown and motivated to comply with the recommendations of Clinical Practice Guidelines for Pressure Ulcers in Adults (AHCPR, 1992) to use a validated tool, the author embarked on the process of estimating reliability and validity.

#### Conceptual Framework

Nursing conceptual models have come to be recognized as important and useful products in the discipline of nursing. Use of a nursing conceptual model in research can point out the importance of certain phenomena to nursing, or the place of the study within a nursing context (Fitzpatrick & Whall, 1989). Conceptual models inform and transform nursing practice by informing and transforming the way in which nursing is experienced and understood (Dabbs, 1994). The conceptual model chosen for this research was that of Myra E. Levine. Levine (1991) commented that she developed her model as a starting point for the theory development needed to provide the "whys" of nursing activities. Although she did not underestimate the importance of technical skills, she felt the serious study of any discipline requires a theoretical baseline which gives it substance and meaning (Levine, 1991).

Central concepts often described in nursing models include the person, their internal and external environment, and their adaptation to the environment. "Person" is described in the Levine model in terms of wholeness. Levine (1987) believed that each person encounters changes in both the internal environment, i.e.

the cells, organs and systems, and in the external environment. As these challenges occur, the person adapts in an attempt to preserve the wholeness of self. Levine explained that "separate consideration of either the internal or the external environment can provide only a partial view of the complex interaction that is taking place between them. It is, in fact, at the interface where the exchange between the internal and external environments occurs that the determinants for nursing interventions are found" (Fawcett, 1984, p. 121). Adaptation is an important concept in the Levine model, defined as "a process of exchange whereby the individual regains his integrity - his wholeness - within the realities of his environment" (Young, 1987, p. 23). A person is seen in a dynamic interaction with environment; adaptation is the process by which people adjust to the changes within the environment.

Levine recommended the use of the scientific method, now recognized as the nursing process, as a means of selecting essential data to structure nursing intervention, as outlined in the following concepts:

1. "The nurse participates actively in every patient's environment, and much of what she does supports his adjustments as he struggles in the predicament of illness."
2. "Decisions for nursing intervention must be based on the unique behavior of the individual patient."
3. "Individualized nursing intervention can take place only when the nurse has made an accurate assessment of the individual's unique needs, and this in turn is possible only through the,

formulation of all relevant factors that contribute to the patient's predicament at a given time and place."

4. "With nursing intervention, the nurse interposes her skills and knowledge into the course of events that affect the patient" (Fitzpatrick & Whall, 1989, p. 139).

Nursing is described as an interactive process in the Levine model (Young, 1987). A relationship develops between the nurse and a patient as the nurse intervenes to maintain and conserve the patient's integrity. Through this interaction, the nurse acts as an agent to assist the patient in the adaptive process. As a first step in providing care, the nurse assesses the patient's needs and adaptive responses. The nurses' role in intervening with the patient is, in part, to recognize the unique manner in which the patient is affected by factors in the environment. Following identification of the patient's problems, the nurse organizes care; this care is modified to support the patient's individual patterns of adaptation. Levine recognized that nursing interventions may be either therapeutic or supportive (Young, 1987). When interventions lead to successful adaptation and a renewed well-being, these interventions are therapeutic. Supportive interventions are rendered when, as in the terminally ill patient, it is impossible to maintain or improve a patient's health status. For both therapeutic and supportive care, Levine's conservation principles guide the action of the nurse.

Neswick (1997) cited Levine's four principles of conservation as a means to direct holistic therapeutic nursing acts. Levine's four conservation principles are:

1. Conservation of energy:

An individual's life functions require and produce energy. The energy required by alterations in physiologic functions during illness represents an additional demand on the energy production systems. Energy conservation involves the appropriate use of energy and the prevention of energy depletion. The nurse measures and analyzes a patient's energy indicators, e.g. appetite, behavior, and activity level. Nursing actions are planned to support the patient's adaptive mechanisms. Every activity in which the nurse provides energy replenishment or energy mobilization for the patient is an example of energy conservation (Fitzpatrick & Whall, 1989).

2. Conservation of structural integrity:

Structural integrity is defined as the physical aspects of the human body that provide form and function. The body has a number of remarkable processes that come to its defense to protect from such things as infection, loss of body fluids, lack of oxygen supply and lack of function. Structural integrity is the necessary defense of anatomical wholeness and is therefore the basis for a multitude of nursing interventions (Levine, 1991). Therapeutic actions by the nurse to facilitate a patient's successful adaptation to the environment will preserve or restore structural integrity.

3. Conservation of personal integrity:

Personal integrity is the unique sense of self that sets the individual apart from others. Individuals possess a lifetime commitment to the value systems and social patterns of their

subculture affiliations. When a person requires health care intervention, this sense of identity may be threatened, creating a dependence hazardous to self worth. The maintenance of self is essential to the concepts of wholeness and healing. Nursing actions are directed to protect the patient's personal integrity and promote autonomy.

#### 4. Conservation of social integrity:

The relationship of the individual with others is defined as social integrity. An individual's recognition of wholeness is measured against relationships with others. Illness can cause isolation from the persons and activities that give oneself personal relevance to being. Nursing interventions are directed by the recognition of coping patterns and the conservation of the patient's sense of self within society (Marriner-Tomey, 1994).

Conservation of structural integrity for the patient at risk for skin breakdown is the paramount conservation principle addressed by the ET Nurse. A patient's energy level, as it relates to available resources to maintain skin integrity, is measured by evaluation of their nutritional, mental, rehabilitative, and chronic disease status. Assessment for the presence of these potential risk factors for skin breakdown and implementation of appropriate preventive interventions is intended to result in the structural integrity of the patient's integumentary system. Conservation of personal and social integrity occurs with the prevention of body image changes found commonly in a patient with pressure ulcers. The interventions of health care providers required to treat a pressure ulcer may create a sense of dependency

hazardous to self worth. Further, the isolation from persons and activities that may occur with pressure ulcer management can disrupt ones' personal relevance to being. The nurse's goal is to impart knowledge and strength so that the individual can resume a private life no longer a patient, no longer dependent. Cultural and spiritual beliefs play an important part in the patient's sense of well being. An ET Nurse acts to preserve the integrity of the patient by identifying and supporting the patient's adaptive responses.

Levine emphasized the importance of observation (Fitzpatrick & Whall, 1989). Observation allows the nurse to evaluate the patient's condition as well as anticipate the patient's future course of events. An important dimension in observation is the passing of time; observation must be continuous, repetitive, and changing. Because observation is a tool for directing patient care, it must be shared, nurse-to-nurse. Observation is the key to accurate skin risk assessment. It must be repeated on a regular basis to detect changes in the patient's condition. When a significant change is detected, appropriate preventive interventions can be implemented to maintain or conserve the patient's skin integrity.

Levine's conservation principles are vital to the integrity of the individual. "They are not turned on and off in the event of illness. The striving for wholeness in every human being is a process that does not end from birth to death. Every activity requires an energy supply because nothing works without it. Every activity must respect structural wholeness of the individual



because well-being depends upon it. Every activity is chosen out of the abilities, life experience, and desires of the self who makes the choices. Every activity is a product of the dynamic social systems to which the individual belongs. The influence of all four conservation principles must be acknowledged for the wholeness of the person to be sustained" (Levine, 1991, p.10).

Levine's emphasis on the need for recognizing the "whys" of nursing practice support the need for a consistent patient assessment methodology on which to base preventive skin care. In defining central concepts of her nursing framework, Levine acknowledged the impact of the internal and external environment on the wholeness of the person. Recognition of this relationship is the basis of the NMH Skin Risk Assessment Tool, as factors both intrinsic and extrinsic to the patient are assessed in relation to how they may impact on skin integrity. The interface of this internal and external environment provides the determinants for nursing action; the implementation of an individualized preventive skin care program is based on a specific patient's assessed level of risk for skin breakdown. The purpose of this study is to explore the reliability and validity of the NMH Skin Risk Assessment Tool as a basis for identifying level of risk for breakdown.

## CHAPTER II

## REVIEW OF THE LITERATURE

A review of the literature revealed volumes of information about the integumentary system, its functions, factors that impact on its integrity, and the importance of risk assessment. Less information was found to be written on use of an instrument to guide the assessment, and on existing skin risk assessment instrument research. This chapter will summarize the above findings in subgroups to include the skin and its functions, disruption in skin integrity, use of a skin risk assessment tool, and skin risk assessment instrument research.

The Skin and its Functions

Gosnell (1987) stated that the skin is the largest organ in the human body and one of the fastest growing tissues, with total replacement occurring every 4 - 6 weeks. She cited the vital functions of the integumentary system as those of temperature regulation, sensory communication, storage of fat and water, protection, absorption, and provider of physical beauty.

Bryant (1992) noted that the skin is the one organ of the body that is constantly exposed to a changing environment. Skin forms a barrier from this external environment, while maintaining a homeostatic internal environment and preventing excessive loss of fluids and electrolytes. In discussing the skin's functions, she states that the skin provides protection against aqueous, chemical, and mechanical assaults, bacterial and viral pathogens, and ultraviolet radiation. The skin's two primary

thermoregulatory mechanisms are sweating and circulation, i.e. vasodilatation or vasoconstriction. Nerve receptors in the skin are sensitive to pain, touch, temperature, and pressure. When stimulated, the nerve receptors transmit impulses to the cerebral cortex. Synthesis of Vitamin D occurs in the skin in the presence of sunlight; this mineral participates in calcium and phosphate metabolism and is important in the mineralization of bone. The skin over our face plays a role in internal and external assessments of beauty. As an organ of communication working with underlying muscles, facial skin is capable of expressions such as smiling, frowning and pouting. Touch can, through the sensory function of the skin, convey feelings of comfort, concern, friendship, and love (Bryant, 1992).

#### Disruption in Skin Integrity

Pressure ulcers are defined as localized areas of tissue necrosis that develop when soft tissue is compressed between a bony prominence and an external surface for a prolonged period (National Pressure Ulcer Advisory Panel [NPUAP], 1989; Agency for Health Care Policy and Research [AHCPR], 1992). Pressure, shear, friction and excessive moisture are most frequently cited as the extrinsic components in pressure ulcer etiology. Intrinsic conditions named as characteristics that increase susceptibility to pressure ulceration include age, immobility, inactivity, malnutrition, urinary and fecal incontinence, decreased level of consciousness and chronic systemic conditions (Gosnell, 1987; Maklebust & Magnan, 1994; Meijer, Germs, Schneider & Ribbe, 1994; Leigh, 1994; Sparks, 1993; Edwards, 1994; NPUAP, 1989).

Crow and Clark (1990) report that the vulnerability of skin and soft tissue is reflected in the response of skin blood flow under applied loads; below 32 mm Hg is considered to be the generally accepted limit of pressure which tissue can withstand. They further noted, however, that research indicates some groups of patients are more susceptible to the effects of pressure, with individual variation within the groups. They cited cease of blood flow in hemiplegic patients when only 11 mm Hg of pressure was applied, and elderly patients flow occlusion with external pressure as low as 20 mm Hg. Leigh (1994) noted that if pressure is relieved, some tissue damage is reversible, and even short intervals of pressure relief will allow longer resistance to the effect of pressure. Bergstrom (1987) noted that the critical determinants of pressure ulcer formation are the intensity and duration of the pressure, and the tolerance of the skin and its supporting structures for pressure.

Pressure ulcers cost the healthcare industry an estimated \$10 billion annually, with a range of expense to treat each client with a pressure ulcer from \$5,000 to \$40,000, even in facilities using cost effective treatment modalities (Suntken, Starr, Ermer-Selten, Hopkins, & Preftakes, 1996). Significant quality of life issues such as pain, altered body image, lost wages, decreased productivity, and social isolation must be considered, along with a fourfold increase in mortality incurred with the development of a pressure ulcer (Rousseau, 1989). Pressure ulcers have been linked with a 50 percent increase in nursing care time (Kuhn and Coulter, 1992). Lyder (1996) cites a retrospective study of Medicare claims

finding that hospitals lost approximately \$215 million in fiscal year 1987 related to the treatment of pressure ulcers. She further notes a prediction that by the year 2050, approximately 25 percent of all Americans will be older than 65 years; the incidence and prevalence of pressure ulcers are likely to increase as the number of elders in the United States continues to grow.

The Clinical Practice Guidelines on Pressure Ulcers in Adults (AHCPR, 1992) states that both incidence (new cases appearing during a specified period) and prevalence (a cross-sectional count of the number of cases at a specific point in time) of pressure ulcers are difficult to determine due to methodological barriers that prevent generalization from available data. Limitations noted include: (a) difficulty comparing various populations (e.g. data collected in tertiary care hospitals not likely to reflect community hospital populations), (b) data source variance (e.g. ranging from direct patient observation by trained research personnel to retrieval of data from patient records), and (c) study method variance (e.g. confusing incidence and prevalence, including or excluding Stage I ulcers, and/or segments of the institutional population).

The Guidelines reported the incidence of pressure ulcers in hospitals ranged from 2.7 percent to 29.5 percent, and the prevalence by hospital bed from 4 percent to 69 percent. In an extensive study of 177 acute care facilities, Meehan (1994) found the prevalence of pressure ulcers to be 11.1 percent. Special high risk populations identified were quadriplegic patients with a prevalence of 60 percent, elderly patients admitted for femoral

fracture with an incidence of 66 percent, and critical care patients with an incidence of 33 percent. Among persons in skilled care and nursing home facilities, the prevalence rate ranged from 2.4 percent to 23 percent. Incidence was noted to be in a comparable range, increasing with length of stay (Brandeis, Morris & Nash, 1989, 1990).

#### Use of a Skin Risk Assessment Tool

Gosnell (1987) stated that assessment and evaluation are essential nursing responsibilities to maintain skin integrity and that avoiding occurrence of pressure ulcers is far better than restoring and rehabilitating once a pressure ulcer is acquired. She further stated that the process of prevention requires ongoing skilled nursing assessment of skin integrity and a knowledge of risk factors that predispose patients to the development of pressure ulcers. She concluded that, in gathering assessment data, the use of an instrument would help assure that the most pertinent information is gathered in a comprehensive, systematic, and efficient manner.

When allocating resources for pressure ulcer prevention, Bryant (1992) discusses three options: (1) assume all patients are at risk and use preventive resources on all patients, (2) depend on clinicians' clinical judgment and intuitive sense to identify those patients at risk, or (3) use a risk assessment tool to identify patients who are at risk. It was concluded that to treat all patients as being at risk would be a tremendously wasteful approach to care, and that clinical judgment, based on highly variable

individual experience and knowledge, is likely to be much less reliable and consistent than risk scales.

Birchall (1993) stated that a disadvantage of risk assessment tools is that their use may become "task oriented", with nurses calculating the score to ensure the necessary documentation is completed, but failing to implement the necessary preventive care. Braden and Bergstrom (1996) note that as nurses try to cope with the increasing acuity of patients and decreasing levels of professional staffing, more problems compete for their attention and less time is available to collect and analyze data. In this state of "sensory overload" certain basic assessments and interventions are easily overlooked. Braden and Bergstrom (1996) cite studies involving the use of the Braden Scale in a formal risk-based program of prevention, with as much as a 60 percent reduction in institutional incidence of pressure ulcers. At the same time costs associated with prevention are also reduced. A risk assessment tool facilitates prevention primarily by distinguishing those who are at risk for developing pressure ulcers from those who are not. This allows for judicious allocation of resources, and identification of the extent to which a person exhibits specific risk factors, thus prompting the nurse to initiate individualized preventive interventions.

Individuals should be assessed for risk of skin breakdown on admission to acute care and rehabilitation hospitals, nursing homes, and other home care programs. Because the individual's condition is not static, pressure ulcer risk requires routine re-examination. A systematic risk assessment, accomplished by

using a validated risk assessment tool ensures continuity of care and provides a foundation for the skin care plan (AHCPR, 1992).

#### Skin Risk Assessment Instrument Research

Edwards (1994) noted a proliferation of risk assessment tools which have not been subjected to rigorous scrutiny of their reliability and validity. Fullerton (1993) concurred with Edwards and noted that it is the responsibility of the investigator to ensure that the measurement instrument demonstrates these qualities, as it is applied within research. Both the National Pressure Ulcer Advisory Panel (1989) and the Agency for Health Care Policy and Research (1992) recommend the use of a skin risk assessment tool that is reliable and valid.

Reliability refers to the degree of consistency with which the tool measures the attribute it is supposed to be measuring (Towey, 1988). Interrater reliability is a measure of the consistency of findings across subjects when rated by more than one observer (Sparks, 1993). Bates-Jensen, Vredevoe, and Brecht (1992) noted strong interrater reliability of the Bates' Pressure Ulcer Status Tool, with two Enterostomal Therapy Nurses gathering data on a total of 20 pressure ulcers, resulting in a Pearson Correlation Coefficient of .91, and percentage agreement of 86 percent.

Validity refers to the degree to which an instrument measures what it is supposed to measure (Towey, 1988). Mottola (1993) stated that content validity examines the degree to which the individual items included in an instrument are representative of the phenomenon under investigation, with expert professional judgment as integral to content validation of an instrument. She defined



concurrent validity as the degree of correlation of two measures of the same concept at the same point in time, with support for construct validity obtained by examining correlations between the instrument and other instruments purporting to measure the same constructs.

Gosnell (1987) evaluated her own skin risk assessment tool, the Gosnell Skin Risk Assessment Instrument, for content validity using a panel of three content experts. She cited positive results with a content validity index of 0.85. In discussing the content validity of the Bates' Pressure Ulcer Status Tool, Bates-Jensen, Vredevoe, and Brecht (1992) used a panel of nine experts to rate items on a four point rating scale. They noted that the use of a four point scale eliminates the ambivalent middle ratings which often appear with an odd number of categories. All items were judged content valid, as indicated by a Content Validity Index (CVI) of at least 0.78, or seven out of nine experts.

Larson (1986) stated that sensitivity, the ability of the score to predict all those who will contract a pressure ulcer, and specificity, the extent to which the absence of the characteristic is correctly classified, together with the predictive value of the positive and negative tests, are held to be the measures of the validity of the tool. Bridel (1993) claimed the Braden Scale as the most reliable of those reported in the literature. Bostrum (1996) concurred that the Braden Scale is the most popular and well-validated instrument currently in the literature.

Bergstrom (1987) reported interrater reliability testing of the Braden Scale in acute care with 88 percent agreement, and in

long term care, with 46 percent agreement. Bergstrom's validity studies using the Braden Scale cite a sensitivity of 83 percent and specificity of 64 percent. Barnes and Payton (1993) studied the Braden Scale at a large tertiary care facility. With a sample of 361 patients, sensitivity was 73 percent and specificity was 91 percent. Interrater reliability was calculated with Pearson Product Moment correlation, with  $r = 0.86$ . Larson (1986) noted that with the inverse relationship of sensitivity and specificity, it is unlikely that any scale will be 100 percent sensitive and specific.

#### Summary

A review of the literature reveals that the skin performs a variety of vital functions for the human body (Gosnell, 1987; Bryant, 1992). Many intrinsic and extrinsic factors impact on the skin in formation of a pressure ulcer (NPUAP, 1989; AHCPR, 1992; Gosnell, 1987; Maklebust & Magnan, 1994; Meijer, Germs, Schneider and Ribbe, 1994; Leigh, 1994; Sparks, 1993; Edwards, 1994). Formation of a pressure ulcer has a significant impact on the well-being of the individual, along with a major financial impact on the health care industry as a whole (Suntken, Starr, Ermer-Selten, Hopkins & Preftakes, 1996; Rousseau, 1989; Lyder, 1996; NPUAP, 1989; AHCPR, 1992). Statistics on incidence and prevalence indicate that the volume of pressure ulcers occurring in acute and extended care facilities warrants the attention of health care professionals (AHCPR, 1992; Meehan, 1994; Brandeis, Morris & Nash, 1989, 1990). Use of a reliable, valid skin risk assessment tool can help assure accurate identification of those at risk, and

allow judicious allocation of resources for prevention (Gosnell, 1987; Bryant, 1992; Birchall, 1993; Braden and Bergstrom, 1996; AHCPR, 1992). Research on existing risk assessment tools has produced variable measures of reliability and validity dependent upon the environment in which the studies were conducted (Edwards, 1994; Bates-Jensen, Vredoe & Brecht, 1992; Gosnell, 1987; Bridel, 1993; Bostrum, 1996; Bergstrom, 1987; Barnes & Payton, 1993; Larson, 1986). Based on this review of the literature, this researcher will proceed to investigate the degree of interrater reliability and validity of the skin risk assessment tool currently in use at Nanticoke Memorial Hospital, with the intent to further contribute to the nursing's body of knowledge on preventive skin care.

## Chapter III

### Methods and Procedures

#### Research Design

A methodological design was utilized in this study. Burns and Grove (1993) presented methodological studies as those designed to develop the reliability and validity of instruments to measure constructs used as variables in the research. In outlining a study that had used methodological design, they noted "the study involved item development, content validation, and administration, followed by a factor analysis for construct validity. Items were then selected for the final instrument, and factor analyzed. Testing the instrument for reliability and discriminant validity were the final steps of the methodological process" (Burns & Grove, 1993, p. 327). Although modification of the instrument was not the goal of this study, as the NMH Skin Risk Assessment Tool in its original format (Appendix A) had been in use for over a decade, the process of estimating the Tool's degree of reliability and validity resulted in several improvements in wording (Appendix B).

#### Hypotheses

Based on Levine's conceptual framework of four principles of conservation, the importance of using a reliable and valid skin risk assessment tool was confirmed. The researcher proceeded to explore the levels of reliability and validity of the NMH Skin Risk Assessment Tool by testing the following hypotheses:

1. The NMH Skin Risk Assessment Tool will demonstrate interrater reliability.

2. The NMH Skin Risk Assessment Tool will demonstrate content validity.
3. The NMH Skin Risk Assessment Tool will demonstrate concurrent validity.

The purpose of the first hypothesis was to determine the association between identified level of risk upon completion of the Tool by two data collectors on the same sample of patients. A Spearman Rank Order Coefficient was calculated to determine the correlation of the paired ordinal levels of risk.

Determination of content validity, to test the second hypothesis, utilized a Content Relevance Scale (Appendix D) created by the author and completed by ten certified Enterostomal Therapy Nurse (CETN) experts. A pre-set criteria of .85 for the Content Validity Index was determined by the researcher, based on findings in the review of the literature (Gosnell, 1987; Bates-Jensen, Vredevoe & Brecht, 1992).

Determination of concurrent validity, to test hypothesis three, was made by calculating a Spearman Rank Order Correlation on paired ordinal data collected by completion of the NMH Tool and the Braden Risk Assessment Scale (Appendix C) concurrently on patients within the sample. Data were also divided into low, moderate and high risk groups to enable calculation of correlation coefficients for each sub-group within the sample. The Braden Scale was chosen for use in this portion of the study because it was found to most closely parallel the NMH Tool in design and content. Review of the literature found the Braden Scale to be the most reliable and well-validated tool published (Bridel, 1993; Bostrum, 1996).

Reported interrater reliability of the Braden Scale in acute care ranged from 86 to 88 percent agreement. Validity of the Braden Scale ranged, for sensitivity, from 73 to 83 percent, and, for specificity, from 64 to 91 percent (Bergstrom, 1987; Barnes & Peyton, 1993).

#### Study Variable

The independent variable explored in this study is *level of risk for skin breakdown*. For the purposes of this study, this was defined utilizing an ordinal scale on the NMH and the Braden Skin Risk Assessment Tools. Both tools consider the assessed patient's status based on two critical determinants in the development of pressure ulcers. The first is the intensity and duration of pressure; the second is the tolerance of the skin and supporting structures to such force (Ramundo, 1995). The intensity and duration of pressure that a patient experiences is related to mobility, activity, and sensory perception. As Levine's theory suggests, tolerance of the skin and supporting structures is related to the intrinsic factors of nutrition and age, as well as the extrinsic factors of moisture, friction and shear. Both the Braden Scale and the NMH Tool require the nurse to total the scores in each of six risk categories to arrive at a comprehensive total for level of skin risk.

#### Instrumentation

The NMH Skin Risk Assessment Tool was developed by the hospital's Skin Care Committee over a decade ago, following a comprehensive literature review. When completing the NMH Tool, the nurse rates patient status on each of six categories: overall skin

condition, bowel and bladder control, rehabilitative status, mental status, nutritional status, and chronic disease status. These factors were determined during Tool development to be significant in contributing to the formation of a pressure ulcer. The nurse then adds the patient's scores in each category to arrive at a total score. From the total score, a level of risk for skin breakdown is determined, i.e. total score of 0 indicates not at risk for breakdown, total score of 1 - 4 indicates low risk for skin breakdown, total score of 5 - 9 indicates moderate risk for breakdown, and total score of 10 and greater indicates high risk for skin breakdown. Using the NMH Comprehensive Preventive Skin Care Program, the nurse implements protocols specific to the patient's level of skin risk, to promote the conservation of skin integrity during the patient's hospital stay.

In order to examine the interrater reliability of the NMH Skin Risk Assessment Tool, two CETNs with similar educational backgrounds completed the Tool on a sample of the same 30 patients within a 24 hour period. Patient assessment and the patient record were identified as sources for the data collection. Each data collector was unaware of the other's findings until after their assessment and determination of skin risk level was completed.

The content validity portion of the study involved completion of a Content Relevance Scale by ten CETN experts. The Content Relevance Scale was developed by the researcher, herself a CETN, and piloted on a second CETN at NMH, along with the NMH Research and Development Coordinator, prior to distribution to the subject experts.

The construct validity portion of the study involved the completion of the NMH Skin Risk Assessment Tool, along with the Braden Risk Assessment Scale on a second sample of 60 patients. The Braden Tool is a well known Skin Risk Assessment instrument, published by the Federal Agency for Health Care Policy and Research in the Clinical Practice Guidelines for Pressure Ulcers in Adults (AHCPR, 1992). Permission to utilize the Braden Tool for this portion of the study was requested by the researcher, and was received in writing from Barbara Braden prior to initiation of the study (Appendix E).

#### Study Population

For the interrater reliability and concurrent validity portions of the study, the study population consisted of patients in the adult medical surgical unit, the progressive care/step-down unit, and the intensive care unit of Nanticoke Memorial Hospital, a 120 bed acute care facility located in a small, rural community on the eastern shore of Delaware. The population for the content validity portion of the study consisted of certified Enterostomal Therapy Nurses (CETNs) who are members of the Wound, Ostomy and Continence Nurses Society (WOCN). An Enterostomal Therapy (ET) Nurse provides rehabilitative care for people with selected disorders of the gastrointestinal, genitourinary, and integumentary systems. The ET Nurse provides direct patient care to people with abdominal stomas, wounds, fistulas, drains, pressure ulcers, and incontinence. As an educator, consultant, researcher and administrator, an ET Nurse plays a pivotal role in the guidance of optimal patient care. Educational preparation for Enterostomal



Therapy requires a Bachelor's degree in Nursing, along with completion of an accredited Enterostomal Therapy Educational Program. Certification is achieved with successful completion of an examination given by the Certification Board of WOCN. In order to maintain certification, the ET nurse must successfully retake the examination every five years. WOCN is an association of ET Nurses whose purpose is to foster high standards of practice related to the care, teaching, and rehabilitation of persons requiring the management of wounds, ostomies, and incontinence, and to promote the professional and educational advancement of the ET Nurse and specialty nurses involved in the care of persons with wounds, ostomies or incontinence.

#### Study Sample

Two separate patient samples were selected from the study population for the purposes of data collection. The first sample of thirty patients was selected for the interrater reliability portion of the study. A second sample of sixty patients was selected for the concurrent validity portion of the study.

For the interrater reliability portion of the study, a convenience sample of patients (n=30) was selected from the adult inpatient population over a four month period. All patients with charts available on the units at the time of data collection were included in the study until the desired sample size was obtained. Mean age of this sample was 64.50 years with a minimum age of 32, a maximum age of 93 and standard deviation of 16.04 years. Diagnoses for this sample included congestive heart failure, chest pain, and other cardiac-related processes (n = 10); cholecystitis, ovarian

cyst, fracture reductions, and other surgical indications (n = 9); pneumonia, chronic obstructive pulmonary disease and other pulmonary processes (n = 6); diabetes mellitus, cerebral vascular accident, gastroenteritis, oncology and other medical diagnoses (n = 5).

For the concurrent validity portion of the study, patients in a second convenience sample (n = 60) were assessed on the adult inpatient units. As with the previous sampling procedure, all patients with charts available on the units at the time of data collection were included until the desired sample size was obtained. The mean age for this sample was 61.36 years, with a minimum age of 22, a maximum age of 93, and a standard deviation of 18.31 years. Diagnoses for this sample were cardiac related (n = 19), surgical (n = 16), pulmonary related (n = 15), and medical (n = 10).

For the content validity portion of the study, a nonrandom sample of ten experts was asked to rate the NMH Skin Risk Assessment Tool. These experts were selected based on their identification as Board Certified Enterostomal Therapy Nurses (CETNs). Known to the author as knowledgeable and experienced professional colleagues, they are employed as ET Nurses at facilities throughout the United States and are members of the nursing specialty organization, Wound, Ostomy and Continence Nurses.

#### Ethical considerations

Consent for study was obtained from the Administration and Research and Development Coordinator at Nanticoke Memorial Hospital

prior to data collection (Appendix F). The researcher was responsible for preserving the anonymity of the sample and for maintaining the confidentiality of data collected during the study. The anonymity of the sample was protected by assignment of a code number to each member of the sample. The data collected from the study was group analyzed so that no individual data was revealed. Individual patient consent was not deemed necessary as the risk assessment for skin breakdown is part of the nursing standard of care on all patient admissions. Data collection in no way affected care delivered to the sample members. This study was also approved by the Salisbury State University Committee on Human Volunteers (Appendix G).

#### Data Collection

For the interrater reliability portion of the study, two CETNs completed the NMH Skin Risk Assessment Tool on the convenience sample of 30 patients within 24 hours, utilizing the patient records, along with patient assessment. Level of risk for skin breakdown was determined for each patient, by each clinician independently.

For the content validity portion of the study, the Content Relevance Scale was mailed to ten CETN experts, along with a letter explaining the purpose of the study, and a self addressed, stamped envelope for return mailing of the completed forms. Prior to mailing, the CETNs were contacted personally to confirm their willingness to participate in the study.

For the concurrent validity portion of the study, the NMH Tool and the Braden Scale were completed concurrently by one ET

Nurse data collector on the second convenience sample of 60 patients. Level of risk for skin breakdown was determined for each patient, according to both the NMH and the Braden Skin Risk Assessment Tools.

## Chapter IV

### Data Analysis

Data was collected pertaining to each of the study hypotheses and entered in the computer to form data tables. The paired ordinal data of the interrater reliability and the concurrent validity portions of the study were analyzed. The SPSS statistical program was used to determine Spearman Rank Order Correlation Coefficients. For the content validity portion of the study, the CETN experts feedback from the Content Relevance Scale was tabulated and a Content Validity Index was calculated for each risk category and line item.

#### Interrater Reliability

The first hypothesis states that the NMH Skin Risk Assessment Tool will demonstrate interrater reliability. Risk scores obtained upon completion of the NMH Tool by two data collectors were correlated to determine the extent to which the research hypothesis was supported (Table 1). A Spearman Rank Order Correlation ( $\rho$ ) was found to be 0.89, with a significance level of .000. Burns and Grove (1993) stated that reliability exists in degrees, and is usually expressed as a correlation coefficient with a 1.00 indicating perfect reliability and .00 indicating no reliability. A reliability of .80 was considered the lowest acceptable coefficient for a well-developed measurement tool, with .70 acceptable for a newly developed instrument. Based on this range for an acceptable correlation, this portion of the study confirmed

Table 1  
Interrater Reliability Data

PATIENT	SCORER 1 (Score/Risk level)	SCORER2 (Score/Risk level)
1	6 moderate	8 moderate
2	0 low	0 low
3	0 low	2 low
4	8 moderate	13 high
5	14 high	14 high
6	2 low	2 low
7	1 low	2 low
8	0 low	1 low
9	14 high	5 moderate
10	16 high	16 high
11	13 high	16 high
12	13 high	15 high
13	18 high	18 high
14	16 high	19 high
15	12 high	11 high
16	1 low	4 low
17	0 low	5 moderate
18	0 low	1 low
19	1 low	2 low
20	0 low	1 low
21	0 low	0 low
22	11 high	11 high
23	4 low	4 low
24	1 low	2 low
25	10 high	11 high
26	6 moderate	6 moderate
27	16 high	18 high
28	8 moderate	9 moderate
29	6 moderate	8 moderate
30	0 low	5 moderate

Spearman Rank Order Correlation .8997

Significance .000

the first hypothesis that the NMH Skin Risk Assessment Tool demonstrated interrater reliability.

#### Content Validity

The second hypothesis states that the NMH Skin Risk Assessment Tool will demonstrate content validity. Utilizing the Content Relevance Scale created by the author and completed by ten CETN experts, feedback on category relevance was tabulated (Table 2) and Content Validity Index was calculated for each of the categories as follows:

Overall skin condition:	.92
Bowel and bladder control:	.97
Rehabilitative status:	.97
Mental status:	.95
Nutritional status:	.90
Chronic disease status:	1.00
Risk scale:	.72
Overall content validity:	.92

For the purposes of clarity to the reader, the above categories are the items heading each section on the NMH Risk Assessment Tool (Appendix B), with the Risk Scale defined as the portion of the Tool indicating a score totaling 0 = Not at risk for breakdown, 1 - 4 = Low risk for breakdown, 5 - 9 = Moderate risk for breakdown, 10 and greater = High risk for breakdown. Content Validity Index was calculated by first totaling the scores determined by the CETN experts on the Content Relevance Scale (Appendix D), ranging from "1 = Not relevant" to "4= Very relevant and succinct". The totals were then divided by 40, i.e. a perfect

Table 2

## Content Validity Data

## Experts' Ratings on Content Relevance Scale

EXPERT	Overall skin condition	Bowel & bladder control	Rehab. status	Mental status	Nutri- tional status	Chronic disease status	Risk Scale
1	4	4	4	4	4	4	3
2	4	4	4	4	4	4	4
3	4	4	4	4	4	4	4
4	3	4	4	4	4	4	3
5	4	4	4	3	3	4	3
6	4	4	4	4	4	4	3
7	4	4	4	4	3	4	4
8	3	3	3	3	2	4	1
9	4	4	4	4	4	4	2
10	3	4	4	4	4	4	2



score of "4" by each of the 10 experts, with the resultant decimal providing the Content Validity Index.

On the Content Relevance Scale, the CETN experts were also asked to rate the line items in each category, e.g. for the category of "Overall Skin Turgor", line items to be rated separately were "Score 0 = Turgor adequate, skin moist and warm, Score 1 = Poor turgor, skin cold and dry, Score 2 = Areas mottled, red or denuded, and Score 3 = Existing skin ulcer/lesion". For data analysis of this feedback, the researcher followed the process as above, adding up the scores from the CETN experts and dividing by 40 to obtain the Content Validity Index for each line item as follows:

Category-Overall Skin Condition

Turgor adequate, skin moist and warm	1.0
Poor turgor, skin cold and dry	.85
Areas mottled, red, or denuded	.92
Existing skin ulcer/lesion	.87

Category-Bowel and Bladder Control

Always able to ask for bedpan	.90
Incontinence of urine	.97
Incontinence of feces	.97
Totally incontinent	.92

Category-Rehabilitative State

Fully ambulatory	.95
Ambulated with assistance	.97
Chair to bed ambulation only	.92
Confined to bed	.95

Immobile in bed	1.0
Category-Mental State	
Alert and clear	.97
Confused, easily reoriented	1.0
Disoriented, combative	.97
Unresponsive	1.0
Category-Mental State	
Eats all offered	.90
Eats greater than 50%	1.0
Tube feeding/TPN	1.0
Eats very little	.85
NPO/IV/Clear liquids	1.0
Category-Chronic Disease Status	
All line items	1.0
Category-Total Risk Scale	
All line items	.80

Overall content validity index for the line items was 0.93.

Average content validity index, including category and line item scores was 0.925.

As was cited in the review of the literature, items were judged with a positive result with a content validity index of .78 to .85 or greater (Gosnell, 1987; Bates-Jensen, Vredoe, & Brecht, 1992). The value preset by the researcher for an acceptable content validity index was .85. Therefore, the second hypothesis, that the NMH Skin Risk Assessment Tool will demonstrate content validity was supported. The rating of .72 for the Risk Scale category did fall below the researcher's acceptable value,

and acceptable scores found in the review of the literature. However, it was noted that the scoring by the experts for line items under the Risk Scale category produced a content validity index of .80, within the acceptable range found in the review of the literature. A suggested improvement from the CETN experts implemented by the researcher was that the words "for breakdown" be added after the word "risk" for each level, for the purpose of clarity

Based upon other suggestions from the CETN experts, several changes were made to the instrument before proceeding to test the third hypothesis.

These improvements included:

1. Title of the form changed from "NMH Skin Care Assessment" to "NMH Skin Risk Assessment".
2. Bowel & Bladder Control:
  - a. Score 0 - changed from "always able to ask for the bedpan" to "continent".
  - b. Score 2 - changed from "incontinence of urine" to "incontinent of urine".
  - c. Score 3 - changed from "incontinence of feces" to "incontinent of feces".
  - d. Score 4 - changed from "totally incontinent" to "incontinent of urine & feces".
3. Rehabilitative State:
  - a. Title changed from "State" to "Status" for consistency.
  - b. Score 0 - changed from "fully ambulatory" to "ambulates independently".

4. Mental State:

- a. Title changed from "State" to "Status" for consistency.
- b. Score 0 - changed from "Alert and clear" to "Alert and oriented".

5. Nutritional State:

- a. Title changed from "State" to "Status" for consistency.
- b. Score 0 - changed from "Eats all offered" to "Eats 100%".
- c. Score 3 - changed from "Eats very little" to "Eats <50%".

Although the focus of the study was on risk assessment, another change adopted from the experts' suggestions was the use of the NPUAP definitions for staging in the Pressure Ulcer portion of the form.

Concurrent Validity

The third hypothesis stated that the NMH Skin Risk Assessment Tool will demonstrate concurrent validity. Again using the SPSS statistical software program, determination of concurrent validity was made by calculating a Spearman Rank Order Correlation ( $\rho$ ) for the paired ordinal data collected by completion of the NMH and the Braden Tools concurrently on the 60 patients within the second sample (Tables 3 - 5). A negative correlation was expected, as the scores for level of risk in the NMH Tool are higher for high risk patients, while in the Braden Tool the lower the scores are indicative of high risk; the closer the calculated score to -1.0, the higher the correlation between the two Tools. Correlation coefficient calculated for the set of paired NMH and Braden scores ( $n = 60$ ) was  $-.93$ , with a significance level of  $.000$ . In measuring

Table 3

Concurrent validity data for high risk patients

<u>Patient</u>	<u>NMH Rating</u> (score / risk level)		<u>Braden Rating</u> (score / risk level)	
1	11	high	14	moderate
2	17	high	8	high
3	16	high	7	high
4	10	high	15	low
5	18	high	8	high
6	19	high	7	high
7	14	high	12	high
8	13	high	10	high
9	12	high	9	high
10	13	high	11	high
11	14	high	12	high
12	13	high	13	moderate
13	14	high	9	high
14	14	high	11	high
15	16	high	11	high
16	13	high	11	high
17	13	high	10	high
18	18	high	9	high
19	16	high	9	high
20	12	high	12	high
21	11	high	12	high
22	10	high	12	high
23	16	high	9	high

Spearman Rank Order Correlation      -.7608  
Significance                                      .000

Table 4

Concurrent validity data for moderate risk patients

<u>Patient</u>	<u>NMH Rating</u>		<u>Braden Rating</u>	
	(score / risk level)		(score / risk level)	
24	8	moderate	17	low
25	6	moderate	17	low
26	6	moderate	18	low
27	8	moderate	17	low
28	5	moderate	21	low
29	6	moderate	19	low
30	5	moderate	20	low
31	9	moderate	16	low
32	6	moderate	16	low
33	8	moderate	17	low
34	6	moderate	17	low

Spearman Rank Order Correlation      -.7158  
 Significance                                      .013

Table 5

Concurrent validity data for low risk patients

<u>Patient</u>	<u>NMH Rating</u> (score / risk level)		<u>Braden Rating</u> (score / risk level)	
35	1	low	23	low
36	3	low	23	low
37	4	low	20	low
38	2	low	20	low
39	2	low	20	low
40	1	low	23	low
41	3	low	23	low
42	2	low	23	low
43	2	low	23	low
44	3	low	23	low
45	2	low	23	low
46	2	low	23	low
47	0	low	23	low
48	0	low	21	low
49	2	low	19	low
50	1	low	18	low
51	0	low	23	low
52	1	low	23	low
53	0	low	23	low
54	1	low	23	low
55	1	low	23	low
56	0	low	23	low
57	0	low	23	low
58	0	low	23	low
59	4	low	23	low
60	1	low	23	low

Spearman Rank Order Correlation  
Significance

-.1809  
.377

sensitivity, i.e. identification of high risk patients per the NMH Tool (n = 23), the correlation coefficient was -0.76, with a .000 level of significance. The correlation was -0.18, with a .377 level of significance in measuring specificity, i.e. the identification of low risk patients (n = 26). Correlation for the identification of moderate risk patients (n = 11) was -0.71, with a .013 level of significance. As was noted in the analysis of the first hypothesis, coefficients between 0.70 to 0.80 or greater indicate an acceptable level of correlation (Burns & Grove, 1993).

In assessing sample patients at low risk for skin breakdown, the NMH Skin Risk Assessment and Braden Risk Assessment Scale concurred in 100 percent of the cases. The Spearman Correlation Coefficient ( $\rho = -0.18$ , with .377 level of significance) for this portion of the sample was not reflective of these findings. The variance in range of points for low risk on the NMH Tool (0 - 4) versus the range on the Braden Scale (16 - 23) may have impacted the determined correlation to appear as not significant when utilizing the raw scores for data analysis. When the paired low risk scores were recoded making low risk = 3, moderate risk = 2, and high = 1, the correlation coefficient for the low risk group was 1.0, with a significance level of .000. It should be noted that that when the raw scores were recoded as described, the correlation between the NMH and the Braden scores became a positive one, and so the closer the calculated correlation coefficient to 1.0, the greater the correlation of the scores.

#### Summary

Content validity indices and correlation coefficients for



interrater reliability and concurrent validity were calculated. Based on comparison of the calculated values to acceptable parameters delineated in the review of the literature, the three hypotheses tested in this study were supported. The NMH Skin Risk Assessment Tool was found to be an instrument exhibiting interrater reliability and both content and concurrent validity.

## Chapter V

### Summary

This chapter will provide a review of the purpose and research hypotheses for this study. Findings based on the data collected will be summarized, along with limitations and delimitations of the study as identified by the researcher. Lastly, implications for further research in this area will be discussed.

#### Study Purpose, Hypotheses, and Findings

The purpose of this study was to establish the reliability and validity of the NMH Skin Risk Assessment Tool. Use of a validated skin risk assessment tool was recommended by the Agency for Health Care Policy and Research in the Clinical Practice Guidelines for Pressure Ulcers in Adults (AHCPR, 1992).

Additionally, in confirming that the NMH Tool is a reliable and valid means of screening all adult patients admitted to an acute care facility, the researcher can help assure that appropriate, cost effective preventive measures are implemented for those at risk for developing pressure ulcers.

Following a literature review on the integumentary system and its functions, use of skin risk assessment tools and studies of existing tools, the researcher formulated the hypotheses for this study. After data collection was completed to measure interrater reliability, content validity and concurrent validity, results were tabulated and statistical analysis were performed. The NMH Skin Risk Assessment Tool was found to have an acceptable degree of interrater reliability, when completed by two CETNs on a

convenience sample of 30 acute care patients. Content validity was confirmed in the completion of a Content Relevance Scale by a panel of ten CETN experts. Concurrent validity was measured by completion of the NMH Skin Risk Assessment Tool, along with the Braden Risk Assessment Scale on a convenience sample of 60 adult acute care patients. A high correlation coefficient was noted in the moderate and high risk groups. Although the statistical analysis for the low risk patients showed a low correlation when the raw scores were entered, the NMH Tool and the Braden Scale agreed 100 percent in this sample.

It was noted that two elements of the NMH Tool are not considered in the Braden Scale. These categories are "Overall Skin Condition" and "Chronic Disease Status". Note that on the Content Relevance Scale, the experts rated "Overall Skin Condition" with a Content Validity Index of .92, and "Chronic Disease Status" with a Content Validity Index of 1.0, indicating that in the opinion of the experts, both these categories are appropriate areas when considering risk for skin breakdown. Consideration of these intrinsic factors as they impact on a patient's skin integrity is consistent with Levine's conceptual framework of a person's adaptation to their environment.

Literature review also substantiated the significance of these factors. English physician Leigh stated "underlying disease states should be included when risk factors are assessed. General ill health and increased body temperature have been found to increase risk" (Leigh, 1994, p. 269). Clinical nurse specialists Maklebust and Magnan (1994) found peripheral vascular disease,

diabetes mellitus, metastatic cancer, spinal cord injury, and multiple sclerosis as statistically significant risk factors in patients with pressure ulcers. Another physician group investigating "susceptibility to decubitus ulcer formation" in the Netherlands noted that "if a patient suffers from a disease, resulting in an increase in susceptibility and a decrease in mobility, his risk to develop decubitus increases in an accelerated way" (Meijer, Germs, Schneider & Ribbe, 1994, p. 320). In a study of peer identified expert nurses' approaches to risk assessment, Buhrer and Mitchell (1996) noted that chronic illness, local and systemic infection, respiratory disease and diabetes were frequently mentioned as important risk factors. Capobianco and McDonald (1996) also noted the presence of chronic disease as likely to increase the risk of pressure ulcers.

The literature also substantiated consideration of overall skin condition in assessing risk for skin breakdown. Sparks (1992) noted a change in skin elasticity (Score 1 on the NMH Risk Assessment Tool) as a risk factor identified by the North American Nursing Diagnosis Association, and in her own study, validated skin condition as a major risk factor for skin breakdown. Buhrer and Mitchell (1996) also confirmed that the nurse experts in their study cited poor circulation, decreased subcutaneous fat and decreased elasticity as important co-factors in the development of pressure ulcers. Bryant (1992) noted that, at best, the tensile strength of scar tissue is never more than 80% of the tensile strength of nonwounded skin. For this reason, it is important to note that a patient with previous skin breakdown (Score 2 on the

NMH Risk Assessment Tool), is at higher risk for a recurrent disruption in skin integrity than a patient whose integumentary system has remained intact. The implication for nursing care is that areas of previous breakdown be protected from recurrent insult.

#### Delimitations and Limitations

The study took into consideration several delimitations. Care was taken to ensure consistency in data collection. In addressing the expertise of the data collectors, both were certified Enterostomal Therapy Nurses (CETNs) with over three years of clinical experience in their field of expertise. The time interval between completion of the assessment tool on a particular patient by the two data collectors was limited to less than twenty-four hours. Sources for data were the patient record and direct patient assessment.

Limitations were also noted. It was recognized that use of a random rather than convenience samples would make a stronger, more credible study. Although the samples used for the study seemed to adequately represent the acute care population, one has no way of knowing whether those charts and patients who were unavailable for assessment may have provided data that would have produced entirely different statistical results.

The subjectivity of the data collectors in patient assessment, e.g. rating overall skin condition and mental status, was a factor which the researcher could not control. Burns and Grove (1993) cited the Rosenthal effect as a possible source of researcher bias. Defined as "researcher expectancy", the Rosenthal

effect may slant the data as a result of the researcher functioning as a data collector. Although the extent to which the Rosenthal effect influences studies is not known, some researchers are not involved in the data collection process, based on this concern.

The researcher could not control changes in the patient within the twenty-four hours delineated for patient assessment, or changes in the data collectors' environment that may have affected the data collected. When requesting feedback from the CETN subject experts, it was recognized that subjectivity may have impacted their evaluation of the NMH Tool on the Content Relevance Scale. The experts may also have responded to a degree of "researcher expectancy", in evaluating the Tool in the manner that they believed the researcher wanted to hear.

#### Implications for Future Research

Skin risk assessment is an area that can be investigated much further. Research questions that can be posed include:

(a) Are particular risk assessment tools more appropriate for use in specific patient populations? Considerations might include acute care versus long term care versus home care; rural community versus urban tertiary facilities.

(b) Are licensed nursing staff the most appropriate persons to complete skin risk assessments? With the variance in nurse to patient ratio favoring fewer nurses to ever growing patient numbers, methodologies to educate certified nursing assistants to perform this function may be an inevitable and appropriate avenue to explore.

(c) Are the scoring intervals designated for low, moderate and high risk accurate in predicting who will acquire pressure ulcers and appropriate in designating who should receive preventive measures? The financial implications of accurately identifying those patients most at risk for skin breakdown, thus most in need of cost effective preventive measures, is increasingly apparent.

(d) How often should the patient be re-evaluated using the Skin Risk Assessment Tool? Of concern with this research question is the possibility that the busy nurse may complete the task of risk re-evaluation, but will she also implement the appropriate preventive measures when the assessed level of risk indicates the need?

#### Conclusion

In conclusion, the purpose of the study was to measure the degree of interrater reliability, content validity and concurrent validity exhibited by the NMH Skin Risk Assessment Tool. The results of the data analysis supported the hypotheses that the NMH Tool is a reliable and valid instrument for measuring a patient's level of risk for skin breakdown. These findings confirmed that the NMH Skin Risk Assessment Tool is an appropriate initial step in a preventive skin care program that will support Levine's conceptual framework, conserving patients' energy, structural integrity, personal integrity, and social integrity.

## REFERENCES

- Abruzzese, R. (1995). AHCPR treatment guidelines for pressure ulcers, Advances in Wound Care, 8(1), 4.
- AHCPR Panel for the Prediction and Prevention of Pressure Ulcers in Adults (1992). Prediction and Prevention: Clinical Practice Guideline for Pressure Ulcers in Adults, Number 3. AHCPR Publication Pressure Ulcers in Adults No. 92-0047. Rockville MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services.
- Barnes, D. & Payton, R. (1993). Clinical application of the Braden Scale in the acute care setting. Dermatology Nursing, 5(5), 386-388.
- Bates-Jensen, B., Vredevoe, D., & Brecht, M. (1992). Validity and reliability of the pressure sore status tool. Decubitus, 5(6), 20-28.
- Bergstrom, N. (1987). A clinical trial of the Braden Scale for predicting pressure sore risk. Nursing Clinics of North America, 22(2), 417-428.
- Birchall, L. (1993). Making sense of pressure sore prediction calculators. Nursing Times, 89(18), 34-37.
- Bostrum, J. (1996). Preventing skin breakdown: nursing practices, costs and outcomes. Applied nursing Research, 9(4), 184-188.
- Braden, B. & Bergstrom, N. (1996). Risk assessment and risk-based programs of prevention in various settings. Ostomy/Wound Management, 42(10A), 6S-12S.



- Brandeis, G., Morris, J., Nash, D. (1989). Incidence and healing rates of pressure ulcers in the nursing home. JAMA, 2(2), 60-62.
- Brandeis, G., Morris, J., Nash, D. (1990). The epidemiology and natural history of pressure ulcers in elderly nursing home residents. JAMA, 264(22), 2905-9.
- Bridel, J. (1993). The epidemiology of pressure sores. Nursing Standard, 7(42), 25-30.
- Bryant, R. (1992). Acute and Chronic Wounds: Nursing Management. St. Louis, Missouri: Mosby Yearbook, Inc.
- Buhrer, R. & Mitchell, P. (1996). Peer-identified expert nurses' approaches to risk assessment for pressure ulcers. Advances in Wound Care, 9(1), 41-46.
- Burns, N. & Grove, S. (1993). The Practice of Nursing Research. Philadelphia: W. B. Saunders Company.
- Capobianco, M. & McDonald, D. (1996). Factors affecting the predictive validity of the Braden Scale. Advances in Wound Management, 9(6), 32-36.
- Clark, M. & Farrar, S. (1991). Comparison of pressure sore risk calculators. MacMillan Magazine, 158-162.
- Crow, R. & Clark, M. (1990). Current management for the prevention of pressure sores. Pressure Sores-Clinical Practice and Scientific Approach. London: MacMillan Press.
- Edwards, M. (1994). The rationale for the use of risk calculators in pressure sore prevention, and the evidence of the reliability and validity of published scales. Journal of Advanced Nursing, 20, 288-296.

- Fawcett, J. (1984). Analysis and Evaluation of Conceptual Models of Nursing. Philadelphia: F. A. Davis.
- Fawcett, J. (1991). Analysis and evaluation of Levine's conservation model. In K. Schaefer & J. Pond (Eds.), Levine's Conservation Model: A Framework for Nursing Practice. Philadelphia: F. A. Davis.
- Fitzpatrick, J. & Whall, A. (1989). Conceptual models of Nursing: Analysis and Application. Norwalk, CT.: Appleton & Lange.
- Fullerton, J. (1993). Validity and Reliability-concepts and application. Journal of Nurse Midwifery, 38(2), 121-125.
- Gosnell, D. (1987). Assessment and evaluation of pressure sores. Nursing clinics of North America, 22(2), 399-411.
- Hill-Rom (1995). Non-bed costs of nosocomial pressure ulcers. From presentation of a Prevalence Study, October, 1995.
- Kuhn, B. & Coulter, S. (1992). Balancing the pressure ulcer cost and equation. Nursing Economics, 10(5), 353-359.
- Larson, E. (1986). Evaluating the validity of screening tests. Nursing Research, 35, 186.
- Leigh, I. (1994). Pressure ulcers: prevalence, etiology, and treatment modalities. The American Journal of Surgery, 167(1A), 258-308.
- Levine, M. (1989). The conservation principles of nursing: twenty years later. In J. Riehl-Sisca (Ed.), Conceptual Models for Nursing Practice. Norwalk, CT: Appleton & Lange.

- Levine, M. (1991). The conservation principles: a model for health. In K. Schaefer & J. Pond (Ed.), Levine's Conservation Model: A Framework for Nursing Practice. Philadelphia: F. A. Davis.
- Lyder, C. (1996). Examining the inclusion of ethnic minorities in pressure ulcer prediction studies. JWOCN, 23(5), 257-260.
- Maklebust, J. & Magnan, M. (1994) Risk factors associated with having a pressure ulcer: a secondary data analysis. Advances in Wound Care, 11, 25-42.
- Marriner-Tomey, A. (1994). Nursing Theorists and Their Work. St. Louis: Mosby.
- Meehan, M. (1994). National pressure ulcer prevalence survey. Advances in Wound Care, 7(3), 27-38.
- Meijer, J., Germs, P., Schneider, H., Ribbe, M. (1994). Susceptibility to decubitus ulcer formation. Archives of Physiatry and Rehabilitation, 75(3), 318-323.
- Mottola, C. (1993). Exploring the validity of data-gathering instruments, Decubitus, 6(3), 52-56.
- National Pressure Ulcer Advisory Panel. (1989). Pressure ulcer: incidence economics, risk assessment. Consensus development conference statement. Decubitus, 2(2), 24-28.
- Neswick, R. (1997). Myra E. Levine: a theoretical basis for ET Nursing. JWOCN, 24(1), 6-9.
- Ramundo, J. (1995). Reliability and validity of the Braden Scale in the home care setting. JWOCN, 22(3), 128-134.
- Rousseau, P. (1989). Pressure ulcers in an aging society. Wounds, 1, 135-141.

- Sparks, S. (1993). Clinical validation of pressure ulcer risk factors. Ostomy/Wound Management, 39(4), 40-50.
- Suntken, G., Starr, B., Ermer-Selten, J., Hopkins, L., Preftakes, D. (1996). Implementation of a comprehensive skin care program across care settings using the AHCPR pressure ulcer prevention and treatment guidelines. Ostomy/Wound Management, 42(2), 20-32.
- Towey, A. (1988). Validity and reliability of an assessment tool for pressure ulcer risk. Decubitus, 1(2), 40-48.
- Young, W. (1987). Introduction to Nursing Concepts. Norwalk, CT: Appleton and Lange.

Appendix A

NMH Skin Care Assessment Tool

(original format)

## NANTICOKE MEMORIAL HOSPITAL SKIN CARE ASSESSMENT

E.T. Consult Sent \_\_\_\_\_  
Consult written on M.D. order sheet \_\_\_\_\_

OVERALL SKIN CONDITION		BOWEL & BLADDER CONTROL		REHABILITATIVE STATE	
0	Turgor (elasticity) adequate, skin moist & warm	0	Always able to ask for bedpan	0	Fully ambulatory.
1	Poor turgor, skin cold & dry	1	Incontinence of urine.	1	Ambulated with assistance.
2	Areas mottled, red or denuded*	2	Incontinence of feces.	2	Chair to bed ambulation only.
3	Existing skin ulcer/lesions.*	3	Totally incontinent.	3	Confined to bed.
*	Fill out Pressure Ulcer Record			4	Immobile in bed.

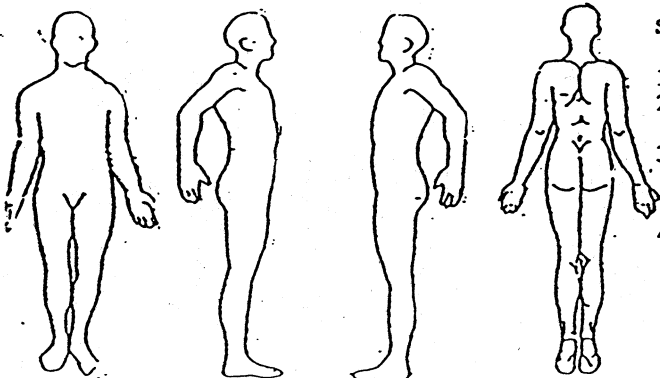
MENTAL STATE		NUTRITIONAL STATE		CHRONIC DISEASE STATUS (i.e., COPD, ASCVD, Peripheral Vascular Disease, Diabetes, Liver or Renal Disease, Cancer, Motor or Sensory Deficits/Elderly, Other)	
0	Alert and Clear	0	Eats all Offered	0	Absent
1	Confused, easily reoriented	1	Eats > 50%	1	One present
2	Disoriented, combative	2	Tube Feeding/TPN	2	Two present
3	Unresponsive	3	Eats very little	3	Three, or more, present
		4	NPO/IV/Clear Liquids		

TOTAL: \_\_\_\_\_

0 = Not at risk  
1- 4 = Low risk  
5- 9 = Moderate risk  
10 and Greater = High risk

### PRESSURE ULCER RECORD

DATE	SIZE	ODOR	EXUDATE	STAGE	LOCATION	TREATMENT



- STAGES:**
1. Reddened Only
  2. Reddened With Skin Break, Vesiculation or Excoriation.
  3. Full Thickness Loss of Skin Which May or May Not Include The Subcutaneous Tissue and Which Produces Serosanguineous Drainage.
  4. Full Thickness Loss of Skin With Invasion of Deeper Tissues.

Appendix B

NMH Skin Risk Assessment Tool

(final format, as revised post study)

# NMH SKIN RISK ASSESSMENT

E.T. Nurse consult sent \_\_\_\_\_  
 Consult written on M.D. order sheet \_\_\_\_\_

OVERALL SKIN CONDITION		BOWEL & BLADDER		REHABILITATIVE STATUS	
0	Turgor (elasticity) adequate, skin moist & warm	0	Continent	0	Ambulates independently
1	Poor turgor, skin cold & dry	1	Indwelling foley catheter	1	Ambulates with assistance.
2	Areas mottled, red or denuded*	2	Incontinent of urine.	2	Chair to bed ambulation only.
3	Existing skin ulcer/lesions.*	3	Incontinent of feces.	3	Confined to bed.
*	Fill out pressure ulcer/wound record.	4	Incontinent urine/& feces	4	Immobile in bed.

MENTAL STATUS		NUTRITIONAL STATUS		CHRONIC DISEASE STATUS (i.e., COPD, ASCVD, peripheral vascular disease, diabetes, liver or renal disease, cancer, motor or sensory deficits/elderly, other)	
0	Alert and oriented	0	Eats 100%	0	Absent
1	Confused, easily reoriented	1	Eats > 50%	1	One present
2	Disoriented, combative	2	Tube feeding/TPN	2	Two present
3	Lethargic	3	Eats < 50%	3	Three, or more, present
4	Unresponsive	4	NPO/IV/clear liquids		

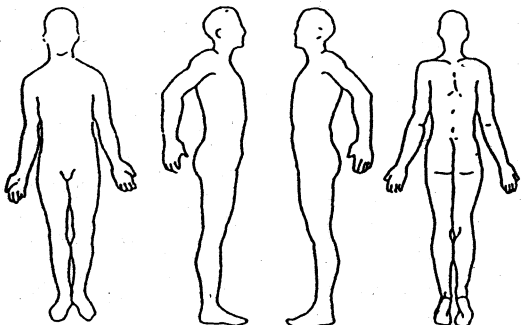
TOTAL: \_\_\_\_\_

0 = Not at risk for breakdown  
 1- 4 = Low risk for breakdown  
 5- 9 = Moderate risk for breakdown  
 10 and Greater = High risk for breakdown

### PRESSURE ULCER/WOUND RECORD

SIZE	ODOR	COLOR	EXUDATE	STAGE	LOCATION	TREATMENT

**STAGES:**



- I. Nonblanchable erythema of intact skin.
- II. Partial thickness skin loss involving epidermis and/or dermis.
- III. Full thickness skin loss involving damage or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia.
- IV. Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone, or supporting structures



Appendix C

Braden Risk Assessment Scale

# Braden Risk Assessment Scale\*1

NOTE: Bed- and chairbound individuals or those with impaired ability to reposition should be assessed upon admission for their risk of developing pressure ulcers. Patients with established pressure ulcers should be reassessed periodically.

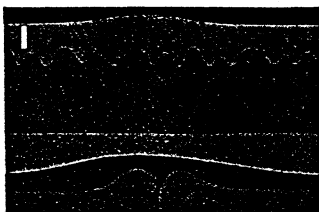
Patient name \_\_\_\_\_

Room number \_\_\_\_\_ Date \_\_\_\_\_

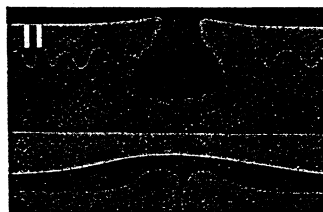
					(Indicate appropriate numbers below)
<b>SENSORY PERCEPTION</b> ability to respond meaningfully to pressure-related discomfort	<b>1. Completely Limited:</b> Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation. OR limited ability to feel pain over most of body surface.	<b>2. Very Limited:</b> Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness. OR has a sensory impairment which limits the ability to feel pain or discomfort over 1/2 of body.	<b>3. Slightly Limited:</b> Responds to verbal commands, but cannot always communicate discomfort or need to be turned. OR has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.	<b>4. No Impairment:</b> Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort.	
<b>MOISTURE</b> degree to which skin is exposed to moisture	<b>1. Constantly Moist:</b> Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.	<b>2. Very Moist:</b> Skin is often, but not always, moist. Linen must be changed at least once a shift.	<b>3. Occasionally Moist:</b> Skin is occasionally moist, requiring an extra linen change approximately once a day.	<b>4. Rarely Moist:</b> Skin is usually dry, linen only requires changing at routine intervals.	
<b>ACTIVITY</b> degree of physical activity	<b>1. Bedfast:</b> Confined to bed.	<b>2. Chairfast:</b> Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.	<b>3. Walks Occasionally:</b> Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.	<b>4. Walks Frequently:</b> Walks outside the room at least twice a day and inside room at least once every 2 hours during waking hours.	
<b>MOBILITY</b> ability to change and control body position	<b>1. Completely Immobile:</b> Does not make even slight changes in body or extremity position without assistance.	<b>2. Very Limited:</b> Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	<b>3. Slightly Limited:</b> Makes frequent though slight changes in body or extremity position independently.	<b>4. No Limitations:</b> Makes major and frequent changes in position without assistance.	
<b>NUTRITION</b> usual food intake pattern	<b>1. Very Poor:</b> Never eats a complete meal. Rarely eats more than 1/3 of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement. OR is NPO and/or maintained on clear liquids or IV's for more than 5 days.	<b>2. Probably Inadequate:</b> Rarely eats a complete meal and generally eats only about 1/2 of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement. OR receives less than optimum amount of liquid diet or tube feeding.	<b>3. Adequate:</b> Eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement if offered. OR is on a tube feeding or TPN regimen which probably meets most of nutritional needs.	<b>4. Excellent:</b> Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.	
<b>FRICION AND SHEAR</b>	<b>1. Problem:</b> Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures or agitation lead to almost constant friction.	<b>2. Potential Problem:</b> Moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	<b>3. No Apparent Problem:</b> Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair at all times.		
NOTE: Patients with a total score of 16 or less are considered to be at risk of developing pressure ulcers. (15 or 16 = low risk, 13 or 14 = moderate risk, 12 or less = high risk)					<b>TOTAL SCORE:</b>

\*Copyright © 1988 Barbara Braden and Nancy Bergstrom. Reprinted with permission. 1. Braden BJ, Bergstrom N: Clinical utility of the Braden Scale for Predicting Pressure Sore Risk. Decubitus 2:44-51, Aug 1989.

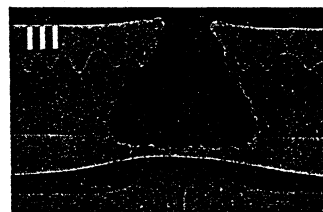
## Pressure Ulcer Staging (Source: National Pressure Ulcer Advisory Panel)



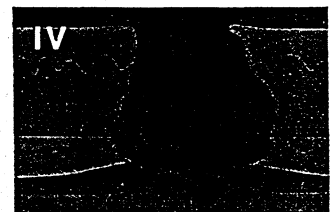
**Stage I**  
Nonblanchable erythema of intact skin; the heralding lesion of skin ulceration.



**Stage II**  
Partial-thickness skin loss involving epidermis and/or dermis. The ulcer is superficial and presents clinically as an abrasion, blister, or shallow crater.



**Stage III**  
Full-thickness skin loss involving damage or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia. The ulcer presents clinically as a deep crater with or without undermining of adjacent tissue.



**Stage IV**  
Full-thickness skin loss with extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures (e.g., tendon, joint capsule).

Appendix D  
Content Relevance Scale

## CONTENT RELEVANCE SCALE

Please review the enclosed Skin Care Assessment Form and rate each category and graded items as outlined below using the following scale:

- 1 - Not relevant
- 2 - Unable to assess relevance without revision
- 3 - Relevant but needs minor revision
- 4 - Very relevant and succinct

ITEM	RATING(please circle)			
Overall skin condition	1	2	3	4
Turgor adequate, skin moist & warm	1	2	3	4
Poor turgor, skin cold & dry	1	2	3	4
Areas mottled, red or denuded	1	2	3	4
Bowel and bladder control	1	2	3	4
Always able to ask for bedpan	1	2	3	4
Incontinence of urine	1	2	3	4
Incontinence of feces	1	2	3	4
Totally incontinent	1	2	3	4
Rehabilitative state	1	2	3	4
Fully ambulatory	1	2	3	4
Ambulated with assistance	1	2	3	4
Chair to bed ambulation only	1	2	3	4
Confined to bed	1	2	3	4
Immobile in bed	1	2	3	4
Mental state	1	2	3	4
Alert and clear	1	2	3	4
Confused, easily reoriented	1	2	3	4
Disoriented, combative	1	2	3	4
Unresponsive	1	2	3	4
Nutritional state	1	2	3	4
Eats all offered	1	2	3	4
Eats greater than 50%	1	2	3	4
Tube feeding/TPN	1	2	3	4
Eats very little	1	2	3	4
NPO/IV/Clear Liquids	1	2	3	4
Chronic disease status	1	2	3	4
Absent	1	2	3	4
One present	1	2	3	4
Two present	1	2	3	4
Three or more present	1	2	3	4
Total risk scale	1	2	3	4
0 = Not as risk	1	2	3	4
1 - 4 = Low risk	1	2	3	4
5 - 9 = Moderate risk	1	2	3	4
10 and greater = High risk	1	2	3	4

Please use this sheet to offer comment re: readability of the instrument and note any suggested revisions.

Readability: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Suggested Revisions: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Other comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

THANK YOU AGAIN FOR YOUR HELP IN THIS VALIDATION PROCESS !!!!

Appendix E

Letter permitting use of the Braden Scale



CREIGHTON  
UNIVERSITY

School of Nursing

June 24, 1994

Kathleen D. Wright, RNC  
Nanticoke Memorial Hospital  
801 Middleford Road  
Seaford, De 19973

Dear Ms. Johnson and Ms. Wright,

The purpose of this letter is to give you permission to use the Braden Scale in your research. I am declining your offer to participate in a panel of judges to critique the content validity of this tool. I have spent the last 10 years in testing the Braden Scale and conducting research into risk factors in pressure sore development. You will have to excuse my lack of enthusiasm for helping people whose intent is to show that the Braden Scale doesn't work as well as some less well conceptualized tool.

Sincerely,

Barbara Braden, Ph.D., R.N.  
Professor  
Gerontological Nursing

Appendix F

NMH Administrative Approval Letter





Kathy Wright, RN, BSN  
Nanticoke Memorial Hospital  
Seaford, De. 19973

It is the goal of Nanticoke Memorial Hospital to incorporate health sciences research into patient care delivery. The validation study of the NMH Skin Risk Assessment Tool supports this goal. In order to conduct this study the data collection methodology and standards for informed consent were reviewed and approved based upon hospital policy.

This study utilized a pre-existing tool routinely administered upon admission to the hospital and at varying points of hospitalization. There was no indication for individualized informed consent as standard of care dictates all patients admitted to the hospital be assessed utilizing the Skin Risk Assessment.

*Lynne A. Armiger MSN RN CCRN*  
Lynne A. Armiger MSN, RN, CCRN  
Research & Development Coordinator

## Appendix G

Salisbury State University's Committee on Human Volunteers  
Letter of Approval

COMMITTEE ON HUMAN VOLUNTEERS

SALISBURY STATE UNIVERSITY

Date 2-6-97

MEMO TO: Barbara Kellam, Ph.D.

FROM: Chairman, Committee on Human Volunteers

SUBJECT: The Evolution of a Skin Risk Assessment Tool:  
Determination of Reliability and Validity  
Title of Study

\_\_\_\_\_  
Grant Application No.  
Sponsoring Agency

Barbara Kellam, Ph.D.

\_\_\_\_\_  
Principal Investigator or Program Director

Kathleen D. Wright

\_\_\_\_\_  
Student Investigator

The Committee on Human Volunteers has considered the above application and, on the basis of available evidence, records its opinion as follows:

- (1) The rights and welfare of individual volunteers are adequately protected.
- (2) The methods to secure informed consent are fully appropriate and adequately safeguard the rights of the subjects (in the case of minors, consent is obtained from parents or guardians).
- (3) The investigators are responsible individuals, competent to handle any risks which may be involved, and the potential medical benefits of the investigation fully justify these studies.
- (4) The investigators assume the responsibility of notifying the Committee on Human Volunteers if any changes should develop in the methodology or the protocol of the research project involving a risk to the individual volunteers.

Stephen Schmitt  
Chairman

KATHLEEN D. WRIGHT, B.S.N., C.E.T.N., R.N.C.

Route 2 Box 85

Delmar, DE 19940

Phone: (302) 846-3646

Professional summary

Twenty years experience in nursing including three years in the Air Force Nurse Corps, attaining a rank of Captain prior to honorable discharge, four years in the medical/surgical/oncology areas, four years in managerial/administrative functions, and over three years as a Board Certified Enterostomal Therapy Nurse, with experience in the following areas:

Patient and staff education, fiscal budget control, inventory management, development and implementation of policies and procedures, development and implementation of Quality Assessment and Performance Improvement monitors and programs, case study projects on newly developed skin care products, presentation and publication of research on reliability and validity of a skin risk assessment tool.

Educational Background

University of Delaware  
College of Nursing  
Newark, DE  
BSN Graduate: May, 1977

Enterostomal Therapy Nursing Education Program  
Albany Medical Center, Albany, NY (didactic)  
Johns Hopkins Hospital, Baltimore, MD (clinical)  
ET Graduate: September, 1994

Salisbury State University  
College of Nursing  
Clinical Nurse Specialist Track  
Salisbury, MD  
MSN Graduate: May, 1997 (anticipated)

### Nursing Employment History

December, 1993 to present

Nanticoke Memorial Hospital, Seaford, DE

Position: Enterostomal Therapy Nurse

Duties: Development, implementation and evaluation of departmental procedures, protocols, and standards. Provision of direct patient care and patient education. Coordination of preventive skin care program, including modifications for care planning to meet individual patient needs. Monitoring and treatment of pressure ulcers and wounds, in collaboration with physicians, and other health care staff. Development and implementation of ostomy management and teaching plans. Provision of contractual ET services for two extended care facilities, a home health agency, and Hospice.

November, 1992 to December, 1993

Nanticoke Memorial Hospital, Seaford, DE

Position: Director of Adult Care

Duties: Twenty-four hour accountability for management of human, financial and material resources of two adult medical/surgical/oncology units, including monitor of fiscal operating budget and inventory control; development, implementation and evaluation of departmental goals and objectives; interview, hire and evaluation of unit staff; monitor of orientation for new staff; liaison between ancillary departments, physicians, nursing staff, patients and their families.

September, 1990 to November, 1992

Nanticoke Memorial Hospital, Seaford, DE

Position: Clinical Nursing Supervisor

Duties: Organizational and administrative management of safe and efficient patient care, with crisis intervention as needed, for an 120 bed acute care hospital.

March, 1988 to September, 1990

Nanticoke Memorial Hospital, Seaford, DE

Position: Staff Nurse

Duties: Administration of patient care on a 26 bed surgical/oncology unit including direct patient care and teaching; initiation of IV therapy; administration of medications and prescribed treatments; infection control practices; assistance with orientation of new staff; charge nurse duties as assigned.

January, 1983 to July, 1984

Harrison House of Delmar, Delmar, DE

Position: Evening Supervisor

Duties: Supervision of LPN/CNA staff in providing care at 120 bed long term care facility. Orientation of LPN staff to facility.

January, 1978 to September, 1980

U.S. Air Force Nurse Corps

Position: Staff Nurse/Team Leader

A. Andrews Air Force Base

Duties: Administration of patient care on a 48 bed surgical unit. Unit inservice coordinator and peer review committee member.

B. Dover Air Force Base

Duties: Administration of patient care on a 40 bed medical/surgical unit. Unit inservice coordinator and Documentation Task Force Committee member.

June, 1977 to December, 1977

Fair Lawn Memorial Hospital, Fair Lawn, NJ

Position: Charge Nurse

Duties: Administration of patient care on a 40 bed medical/surgical unit, with relief in a 4 bed "Special Care" unit and in Emergency Department.

#### Certifications

Medical/Surgical Nursing  
Enterostomal Therapy

#### Professional Memberships

Sigma Theta Tau  
United Ostomy Association  
Crohn's and Colitis Foundation  
Delaware Nurses Association  
American Nurses Association  
Wound, Ostomy and Continence Nurses Society

#### Presentations

September, 1996 (Poster Presentation)

Evolution of a Skin Risk Assessment Tool:  
Determination of Reliability and Validity  
at Clinical Symposium on Wound Management  
Reno, Nevada