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Clean Versus Sterile Wound Care Technique Utilized by Registered Nurses in Acute Care when Dressing a Pressure Ulcer

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CLEAN VERSUS STERILE WOUND CARE TECHNIQUE UTILIZED BY REGISTERED NURSES IN ACUTE CARE WHEN DRESSING A PRESSURE ULCER

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ABSTRACT

CLEAN VERSUS STERILE WOUND CARE TECHNIQUE UTILIZED BY REGISTERED NURSES IN ACUTE CARE WHEN DRESSING A PRESSURE ULCER

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The purposes of this study were to identify the wound care technique practiced by acute care nurses and the deviations made from sterile technique when dressing a pressure ulcer. A descriptive design using a survey methodology was employed. A questionnaire, the Faller Wound Care Technique Survey, was distributed to a convenience sample of 131 acute care nurses. Forty nurses (30%) responded.

The study findings indicate that the typical wound care technique of dressing a pressure ulcer is a combination of sterile and clean procedures and is not consistent with the Agency for Health Care Policy and Research Guideline recommendations to use clean wound dressings and one pair of clean gloves per patient. The number of deviations from sterile technique ranged from two to eleven. Analysis of deviations demonstrated that type of deviation was of greater concern than number. The findings indicate a continuing need to influence wound care practices.

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CHAPTER 1

INTRODUCTION

Escalating costs plague the health care industry. These costs encompass such items as supplies, personnel including nursing, medication and length of stay in hospitals. In the current health care environment, pressure ulcers are an expensive problem. The prevalence of pressure ulcers ranges from 2.7% to 29.5% of patients in acute care settings (U. S. Department of Health and Human Services [USDHHS], 1994a). The estimated cost of healing one ulcer ranges from $5,000 to $40,000 (Kyler, McCormick, & Wysocki, 1998), and the estimated national cost of pressure ulcer treatment exceeds $1.335 billion per year (USDHHS, 1994a). Open wounds extend a patient's hospital stay and often require further skilled nursing care after discharge from the acute care setting. In light of these statistics, health care providers need to promote the most cost effective and therapeutic wound care for clients.

In response to rising costs of health care, some attention has been directed to clean versus sterile techniques of wound care delivery. Historically, the presumed best wound dressing is a sterile dressing applied with sterile technique. Wound care experts do not agree upon this historical assumption and debate as to whether clean or sterile wound care technique is most effective (Faller, 1997; Krasner, 1997; Shewmake, 1996;

VT Enterostomal Therapy [ET] Nurses, 1996). In spite of this debate, few recent experimental research studies have been found to support the preferred method.

Several techniques that are not typical of sterile technique and are considered clean technique are currently being used in practice. Alexander, Gammage, Nichols, and Gaskins (1992) demonstrated that a sterile sponge might be contaminated with bacteria when moistened in its own wrapper and then laid on a bedside table. This moistening technique is a common practice in wound care. Krasner and Kennedy (1994) claim the "no touch technique" of touching only the corners of the backside of the gauze when wearing clean gloves maintains a sterile dressing to the wound bed. As observed by this researcher, this technique is currently being used as an alternative method of sterile application and contrasts to sterile technique taught in nursing schools.

The presence of bacteria in a wound has an effect on wound healing. There is an association between the amount of bacteria present and the occurrence of infection. If a wound has greater than 10^5 bacteria per gram of tissue, it is considered infected (Krizek & Robson, 1975) and a delay in wound healing can be expected. On the contrary, Laato, Lehtonen and Niinikoski (1985) demonstrated that wound healing could be hastened by inoculations of live staphylococci concentrations of 10^2 per gram of tissue. Inoculated specimens had more than 55% of collagen (a matrix of granulation tissue needed for wound healing) than the control. One can deduce that some bacteria can be beneficial to a wound and too much bacteria a detriment. The bacterial burden (i.e., the number of bacterial colonies) within the wound should be kept at a level in which it does not impede wound healing. Caregivers must consider dressing techniques that would not negatively impact the wound's bacterial burden but which may be both clinically and cost effective.

Nurses use their best judgement when deciding which of many wound dressing methods to use. The nursing profession must optimize their skilled care delivery of wound dressings in order to ensure cost effectiveness and time efficiency. Several questions arise. For instance, are sterile techniques always used when they are billed? Are simple, more cost effective procedures available to minimize cost and bacterial burden? The literature examining the benefits of sterile versus clean wound care on the effects of wound healing contain few systemic studies. As an initial step, the clinical practices of Registered Nurses (RNs) in providing wound care need to be identified.

Purpose

The purpose of this study was to evaluate how RNs in an acute care setting are providing wound care. This was a replication of Faller's (1998) study (see appendix A for permission). The Faller Wound Care Technique Survey (see appendix B) provides a pressure ulcer case study, followed by questions for nurse subjects to determine whether they would use clean or sterile wound care delivery. In this study a modified procedure to survey staff RNs in acute care settings, who provide most of the wound care, was used rather than Enterostomal Therapy (ET) Nurses, who are wound specialists. Questions on the Agency for Health Care Policy and Research (AHCPR) guidelines, wound irrigation, wound dressings, scissors, use of gloves during wound care activity, and terms related to clean and sterile wound care technique were included.

CHAPTER 2

CONCEPTUAL FRAMEWORK AND LITERATURE

Conceptual Framework

The focus of this study is evaluation of wound care technique for pressure ulcers by acute care nurses. A pressure ulcer is a localized area of tissue destruction that occurs when skin and muscle are compressed between a bony prominence and an exterior surface (i.e., a bed) for a prolonged period of time (National Pressure Ulcer Advisory Panel [NPUAP], 1989). Prolonged and excessive pressure causes the capillaries to collapse, thereby disrupting the flow of blood with oxygen and nutrients to the skin. This interruption of the blood flow eventually leads to tissue death, which is known as a pressure ulcer. Pressure ulcers heal by secondary intention, a process that occurs when the wound is left open (not surgically closed) to fill in the defect with granulation tissue (collagen) and contraction of the wound (Stotts, 1993). This is a slow process making pressure ulcers a costly problem; therefore health professionals must ensure the delivery of proper care to patients with pressure ulcers.

The Agency for Health Care Policy and Research

The Agency for Health Care Policy and Research (AHCPR) was established in 1989 by the Omnibus Budget Reconciliation Act "to enhance the quality, appropriateness, and effectiveness of health care services" (USDHHS, 1994a, p. 11). Due to the prevalence and cost of pressure ulcers the AHCPR focused the initial

guidelines on the prevention of pressure ulcers in Pressure Ulcers in Adults: Prediction and Prevention (USDHHS, 1992). The panel then developed the Clinical Practice Guidelines for the Treatment of Pressure Ulcers (USDHHS, 1994a). These guidelines are designed to give recommendations to professionals for the treatment of pressure ulcers. The Clinical Practice Guidelines for the Treatment of Pressure Ulcers is broken down into six areas of focus. These focus areas are comprised of assessment, managing tissue loads, ulcer care, managing bacterial infection and colonization, operative repair, and education and quality improvement. These areas of focus will be briefly discussed.

The first area of focus is assessment, which includes the entire person. The assessment provides the basis for planning, treating and evaluating healing. The pressure ulcer is assessed for location on the body, stage of skin damage, size, sinus tracts (a pathway of the wound that could lead to abscess formation), undermining (loss of tissue underlying intact skin along the wound margins), exudate (the wound drainage), necrotic tissue, and the presence or absence of granulation tissue (tissue that fills the wound), and epithelialization (growth of the top layer of skin). The depth of tissue damage is the basis for staging a pressure ulcer as determined by the NPUAP and the Wound Ostomy and Continence Nurses Society (WOCN) and staging is defined in Table 1.

Nutritional status must also be assessed as many studies have associated pressure ulcers with malnutrition. If a patient is found to be malnourished, dietary adjustments are instituted, and vitamin and/or mineral deficiencies are addressed. A high calorie diet along with a high protein diet may enhance pressure ulcer healing in malnourished patients (Breslow, Hallfrisch, Guy, Crawley, & Goldberg, 1993). Supplementation of

vitamin C and zinc may assist with pressure ulcer healing in the patient with these deficiencies (Burr, 1973; Taylor, Rimmer, Butcher, & Dymock, 1974).

Table 1

Pressure Ulcer Staging

Stage	Definition
Stage 1	Nonblanchable erythema or a discoloration of the skin, increased warmth, edema, and or firmness of the local area
Stage 2	A break in the skin causing a shallow crater or a blister
Stage 3	Skin loss involving damage to the subcutaneous tissue
Stage 4	Skin loss with extensive destruction, tissue necrosis, or damage to muscle, tendon, or bone

The second area of focus is managing tissue loads. This consists of "creating an environment that enhances soft tissue viability and promotes healing of the pressure ulcer" (USDHHS, 1994a, p.35). The term tissue load refers to the stress applied to the skin caused by pressure, friction, and shear (damage to the skin caused by tissue layers sliding against each other). One must avoid positioning the patient on a pressure ulcer by using positioning devices to keep the pressure ulcer off the mattress or chair cushion. If a patient with a pressure ulcer is determined to be at risk for developing additional pressure ulcers, a pressure-reducing surface is recommended. There are various mattress overlays, mattress replacements, and chair cushions to choose from when the specific needs of the patient are determined.

Ulcer care is the third area of focus. This involves debridement, wound cleansing, the application of dressings, and possible use of adjunctive therapies. Moist, necrotic tissue supports the growth of bacteria; therefore it is important that it is removed. Methods of debridement include sharp (with a blade), mechanical (pulling off necrotic tissue with a dressing), enzymatic (application of enzymes that break down the devitalized tissue), and autolytic (allowing the body's white blood cells to phagocytize the necrotic tissue). The metabolic waste, necrotic tissue and exudate all need to be removed by cleansing to optimize wound healing. Cleansing needs to be done with minimal mechanical irritation by irrigation. Whirlpool may be used when the wound beds contain necrotic tissue. The wound bed is the base of an open wound containing viable and/or necrotic tissue. Pressure ulcers require a dressing to enhance healing and protection from the environment. The dressing selected should keep the wound bed continuously moist, yet keeping the periulcer skin dry. Adjunctive therapy of electrical stimulation might be used to enhance healing if an ulcer is unresponsive to conventional therapy.

The fourth area of focus of the AHCPR Treatment of Pressure Ulcers is managing bacterial colonization and infection. Stage 2, 3 and 4 pressure ulcers are usually colonized with bacteria. Cleansing and debridement helps to prevent the colonized bacteria from infecting a wound. If an infection is suspected, it is important to perform quantitative bacterial cultures obtained from a tissue biopsy or needle aspiration, not a swab culture. Topical antiseptics (i.e., betadine, Dakin's solution, and hydrogen peroxide) are to be avoided for reducing the bacteria in the wound, as they inhibit the formation of new tissue. Antibiotics are only indicated when systemic signs of infection

are present. Body substance isolation (BSI) precautions should be followed when treating pressure ulcers. "BSI is a system of infection-control procedures used with all patients to prevent cross-contamination" (USDHHS, 1994a, p.63). These include wearing gloves when contact with body fluids is anticipated, and using gowns, masks and /or goggles if splashing is anticipated. One set of clean gloves can be used on the same patient with multiple pressure ulcers, tending to the most contaminated ulcer last. Clean dressings rather than sterile are indicated to dress pressure ulcers. There is no evidence that suggests better outcomes with sterile dressings (USDHHS, 1994a, p.64).

Operative repair of pressure ulcers is the fifth area of focus. This area includes direct closure (suturing the two margins together), skin grafting (taking the top layer of skin from one part of the body and placing it on an ulcer to cover the defect), and a variety of skin and muscle flaps (the rotation of skin and underlying structures to fill a defect). For patients to undergo surgery for skin grafting or flapping, the patient must be medically and nutritionally stable.

Finally, the sixth area of focus is education and quality improvement. Educational programs need to be provided for patients, caregivers, and health care providers. The guidelines recommend quality improvement that involves an interdisciplinary committee to develop and assess quality improvement in pressure ulcer management.

Nursing Theory of Pressure Ulcers/Nightingale

Many nursing theorists address wound care in their literature. Even Florence Nightingale, our first nursing theorist, addressed bedsores. The following is a narrative describing the evolution of wound care technique that specifically addresses the work of

Florence Nightingale "What nursing has to do, is to put the patient in the best condition for nature to act upon him" (Nightingale, 1859/1946, p.75).

Florence Nightingale focused her nursing care on the patient's need for cleanliness, the need for dry and clean bed and bedding, good nutrition, and ventilation and warmth. She saw the importance of modifying the patient's environments to restore health (Nightingale, 1859/1946). Because of this, her philosophy has been portrayed as an "environmental adaptation theory" (Selanders, 1993).

Nightingale believed that when nurses practiced cleanliness, the patient's health would be restored. "It cannot be necessary to tell a nurse that she should be clean or that she should keep her patient clean, --seeing that the greater part of nursing consists in preserving cleanliness" (Nightingale, 1859/1946, p.49). Nightingale believed that the patient's environment had just as much to do with disease as did germs. Although during Nightingale's time germs were thought to be the only focus of disease. She did not support this as the only important focus. Even though sterilizing had not yet been practiced, Nightingale did recognize the importance of keeping patients and their environments clean.

Nightingale also believed that the patient's bed and bedding impacted health. She felt that both the mattress and the linens should be clean and dry. In the 1850s when Nightingale identified a patient with a bedsore, she recognized the need for preventing "dampness" under the patient. She advised not to place blankets under a patient with a pressure sore, as the blanket would retain dampness and organic matter.

Administration of an adequate diet was also fundamental to restoring a patient's health according to Nightingale. The timing of when food was offered was considered

important. Patients need to be offered food when they are ready to eat. "A patient who cannot touch his dinner at two, will often accept it gladly, if brought to him at seven. But somehow nurses never think of these things" (Nightingale1859/1946, p. 38). She viewed milk and preparations made with milk as the most important food articles for the sick (Nightingale, 1859/1946, p.40).

According to Nightingale, the needs for ventilation and warmth were also basic needs of the patient to be provided by the nurse. She believed in clean air and open windows in the hospital room. Because of this, hospital rooms were often cool. "The feet and legs should be examined by the hand from time to time, and whenever a tendency to chilling is discovered, hot bottles, hot bricks, or warm flannels, with some warm drink, should be made use of until the temperature is restored" (Nightingale, 1859/1946, p. 11).

Nightingale's canons of health are still practiced today. These basic concepts can be applied to various aspects of nursing care. Below is an example of how wound care technique with pressure ulcers applies Nightingale's canons of health (see Table 2).

Nightingale's canon of cleanliness applies to wound care practices of pressure ulcers. It is necessary to cleanse a wound of foreign material, necrotic tissue, wound exudate, dressing residue and metabolic wastes in order for healing to occur. This gentle cleansing can be achieved with irrigation or spray cleansers prior to dressing a wound.

Table 2

Nightingale's Canons Compared to Modern Wound Healing Concepts

NIGHTINGALE'S CANNONS	MODERN WOUND HEALING
Cleanliness	Cleanse wounds routinely to remove foreign material, necrotic tissue, wound exudate, dressing residue and metabolic wastes (USDHHS, 1994a)
Bed and bedding	Provide for pressure reduction/relief mattress, allowing the blood flow to the skin Incontinence leads to tissue maceration, which weakens tissue, leaving them prone to tissue breakdown
Taking food	A well balanced diet of calories, protein, vitamins and minerals are needed for tissue repair
Ventilation and warming	A wound bed maintained at 37 degrees C maintains the metabolic process and promotes vasodilatation

(Adapted from Selanders, 1998)

The bed and bedding were important to Nightingale just as they are today when dealing with pressure ulcers. The bed is important. Using a pressure reducing/relieving mattress enables blood, containing neutrophils and macrophages to stimulate healing, to flow to the wound. In regards to bedding, today our focus is in controlling incontinence. It is known that an increase in moisture of the tissue will lead to maceration thereby weakening the tissues leaving them more prone for breakdown. Incontinence also increases the bacteria in the area and changes the pH of the skin, which increases the risk for ulcer formation. Nursing emphasizes the importance of keeping an incontinent person clean and dry.

More is known on the science of nutrition today. A well balanced diet is needed for healthy skin as well as general health. An individual with a wound has to increase

his/her nutritional intake, including protein and calories to meet the metabolic demands (USDHHS, 1994a; and Doughty, 1992). Protein is needed for collagen synthesis to fill the wound bed. Several vitamins and minerals are also essential (Doughty, 1992). Vitamin A promotes collagen synthesis, epithelialization (the cells that form the outer layer of skin), and macrophage function (cells that help to rid the wound of necrotic material) (McLaren, 1997). The B complex vitamins along with iron are needed for protein synthesis (Robson, Burns, & Phillips, 1994). Vitamin C is needed for collagen synthesis and helps to improve the tensile strength of the scar tissue (McLaren, 1997 and Stadelmann, Alexander, Digenis, Gordon, & Tobin, 1998). Finally, zinc is an important mineral, as it promotes collagen synthesis and epitheliazation (McLaren, 1997).

It is important to keep a wound bed warm (37°C). This allows the metabolic processes at the wound bed to be maintained as well as promoting vasodilatation (Rabkin & Hunt, 1987). Wound cleansers/irrigants should be kept at room temperature and the wound needs to be covered and protected from the surrounding environment.

Nightingale's model of nursing practice (see Figure 1) includes a 5-step nursing process: (a) observation, (b) identification of the needed environmental alteration, (c) determination of desired outcomes, (d) implementation of the alteration and (e) assessing the current heath state. Nightingale identified the importance of documentation for every step of the nursing process (Selanders, 1998). Therefore this adds an additional phase to each nursing step. This process is repeated until the goal of an improved health status is achieved.

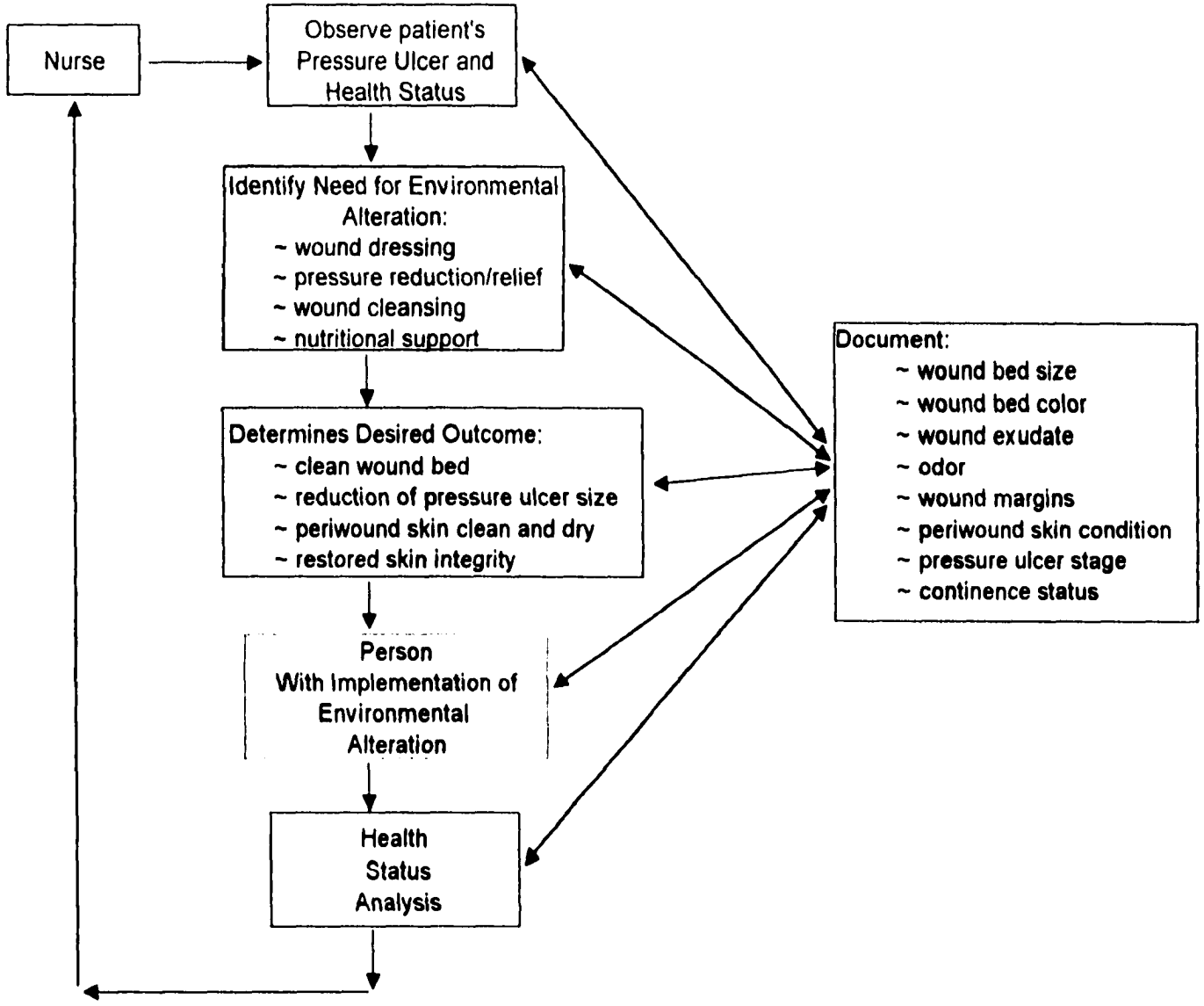


Figure 1: Nightingale's model for nursing practice of wound care (adapted from Selander, 1998)

"What nursing has to do, is to put the patient in the best condition for nature to act upon him" (Nightingale, 1859/1946, p.75). It is remarkable that this statement and Nightingale's canons of 150 years ago still apply today at the millennium. Nursing assists the body to heal itself.

Literature Review

Little research was found that weigh the benefits and disadvantages of clean and sterile wound care products and technique or that defines clean wound care technique. The literature reviewed will include the Agency for Health Care Policy and Research (AHCPR) Clinical Practice Guideline – Treatment of Pressure Ulcers (USDHHS, 1994a) whose panel did a comprehensive review of the literature and did not find many studies on wound dressing technique of pressure ulcers through 1994. Also included in this review are studies after 1994 on wound care products, a wound care technique study, and two surveys of enterostomal therapy (ET) nursing wound care technique. ET nurses are nurses who have specialized in wound, ostomy, and continence nursing care. They have received further education in these areas and are often seen as the nurse experts in these fields. The literature includes general wound care, but the focus of this paper is pressure ulcers. The lack of reported studies done about clean versus sterile wound care delivery justifies the need for this study.

Agency for Health Care Policy and Research Guidelines

The Clinical Practice Guidelines for the Treatment of Pressure Ulcers (USDHHS, 1994a) was designed to give recommendations to professionals for the treatment of pressure ulcers. It was not designed to give recommendations for other types of wounds. The panel made its recommendations after a comprehensive literature search for existing

scientific data and for expert clinical opinion. They intended to recommend interventions that were supported by controlled trials. "In reality, many well-established clinical practices have never been investigated experimentally" (USDHHS, 1994a, p.2). Therefore the panel developed a strength-of evidence rating of A, B, or C to support the intervention. "A" indicates that support is provided by the results of two or more randomized controlled clinical trials on pressure ulcers in humans. "B" indicates that support is provided by the results of two or more controlled clinical trials on pressure ulcers in humans, or when appropriate, indirect support is provided by the results of two or more controlled trials in an animal model. "C" indicates that it requires one or more of the following: (a) results of one controlled trial, (b) results of at least two case studies/descriptive studies on pressure ulcers in humans, or (c) expert opinion.

The treatment guidelines do not use the term "clean wound care technique" nor do they define clean wound care technique. They recommend the use of clean dressings and gloves, rather than sterile dressings and gloves, to treat pressure ulcers. Clean supplies are defined as not sterile but free of environmental contaminants such as "water damage, dust, pest and rodent contaminants, and gross soiling" (USDHHS, 1994, p.107). The guidelines recommend that hands be washed before contact with clean supplies and that only the numbers of supplies necessary for each dressing change are removed from the storage container (USDHHS, 1994a, p. 64). The AHCPR guidelines recommend using clean supplies in acute care, extended care, and home care (USDHHS, pp. 9, 65). Finally, the guidelines recommend using one pair of clean gloves for each patient, even one with multiple wounds, dressing the most contaminated wound last. The strength-of-evidence rating for all of the treatment of pressure ulcers is a level C (USDHHS, 1994a).

Wound Care Technique Products

This section covers studies on supplies used in sterile versus clean wound care. The products include the irrigation solution, gauze dressings and gloves.

Irrigation solution. Angeras, Brandberg, Falk, and Seeman (1992) compared wound irrigation using sterile normal saline to wound irrigation using tap water, as to effectiveness in controlling bacterial counts and wound infection rates. This study included 617 patients with acute soft tissue wounds less than six hours old that came to the emergency department at one city hospital. The wounds were debrided and then randomized to irrigation with either sterile normal saline or tap water prior to closure by suturing. At two weeks when the sutures were removed, the wounds were evaluated for signs of infection, pus and/or delayed closure. The rate of infection was 10.3% in the wounds irrigated with sterile saline, and 5.4% in wounds irrigated with tap water ($p < 0.05$). The majority of these wounds were small and treated soon after injury. This may account for the relative low infection rate. Another factor that may have influenced the study was the temperature of the tap water and saline differed. The tap water was about 37 degrees Centigrade and the sterile saline was room temperature. The temperature of the saline could have caused a local vasoconstriction, impairing wound healing.

It was concluded in this study that there is no advantage in the use of sterile normal saline versus tap water for the treatment of acute soft tissue wounds. The use of tap water for irrigation reduced the cost by half and was easily accessible.

Gauze dressings. A common dressing for wound care is gauze moistened by normal saline. Nurses are observed moistening the gauze while it is still in the paper wrapper, rather than placing the gauze in a sterile basin. This method of moistening the

gauze in the wrapper to maintain sterility however has been refuted. Alexander, Gammage, Nichols and Gaskins (1992) analyzed the transfer of bacteria from a nonsterile surface to a sterile surface. This occurs when sterile gauze dressings are opened, laid on a nonsterile table in their original wrapper, and then moistened with sterile normal saline.

Alexander et al. (1992) studied gauze moistened in both coated and uncoated paper wrappers. An experimental design was used in a laboratory setting. Strike-through contamination (the transfer of bacteria from a surface to the gauze) of a gauze sponge was the dependent variable. This was measured in relationship to the three independent variables: (a) the type of wrapper in which the sponge was packaged (coated or uncoated), (b) the type of bacteria exposed to the wrapper (Staphylococcus epidermidis or Escherichia coli), and (c) the length of time elapsed after saturation of the sponges before contamination occurred (0.5, 1.0, 3.0, 5.0, or 10 minutes after saturation). The gauze sponges and wrapper were placed directly on an agar plate containing colonies of either Staphyloccus epidermidis or Escherichia coli. This method of exposing the packages to the organisms is similar to placing the packages on a surface known to be contaminated with bacteria. Cultures were obtained from gauze in 60 coated package wrappers and 60 uncoated wrappers. It was found that some contamination occurred in 0.5 minute after saturation in all groups. The Fisher's Exact Test was used to cross-classify the type of bacterial contamination and the saturation time. There was no significant difference between the coated and uncoated wrappers used for gauze sponges. Correlation of the length of time of exposure with a quantitative amount of bacterial contamination was not done. It should be noted though that the amount of bacterial colonies exposed to the gauze was not reported. Therefore, different gauze sponges

could have received different amounts of bacteria. This is also a relatively small sample size and a laboratory-controlled environment is not the same as a clinical environment.

Gloves. Wise, Hoffman, Grant and Bostrom (1997) surveyed staff nurses at four San Francisco area hospitals, and one Visiting Nurse Association (VNA) agency. Of the 31 questions, 7 questions were asked of nurses to determine their glove choice (clean versus sterile) for specific wound care situations. Of the 1900 questionnaires only 723 were returned. Acute care nurses (n = 693) indicated they wore nonsterile (clean) gloves 56% of the time when providing wound care to pressure ulcers; whereas home health nurses 9 (n = 30) wore nonsterile (clean) gloves 100% of the time when dressing pressure ulcers. Over all, in providing wound care, the acute care nurses indicated they would use nonsterile (clean) gloves 20% of the time while home health nurses chose to wear nonsterile (clean) gloves 67% of the time. Limitations of this research are that the survey was untested, it was given in only one metropolitan area, and there was a return rate of 38% indicating the findings are not representative.

Wound Care Technique

This section includes a descriptive explanation of clean versus sterile wound care technique. In addition, one study of clean versus sterile wound care technique and two surveys of ET nurses about their wound care practices are reviewed.

Sterile versus clean dressing described. Sterile technique involves the time needed to collect sterile products required for every dressing change. These products include a sterile drape for the dressing field, sterile irrigant, a sterile irrigator, sterile gloves, and a sterile basin to hold the irrigant. The sterile dressings, irrigant in the sterile basin and the irrigator are laid on the sterile dressing field, providing a barrier from

microbes on the dressing table. Sterile gloves need to be applied without touching anything that is not sterile. If in the process of performing the wound care, the sterile gloves become contaminated, one must remove them and apply a new pair. In a pure sterile technique, sterile gloves are used to remove the dressing, and then discarded. A new pair of sterile gloves is then donned to apply the dressing to the wound bed. Once the wound dressing is complete all supplies that have been opened must be discarded.

Deviation from sterile technique is any alteration from the supplies or technique used that is not sterile. This does not mean poor technique is used, rather that it is deviating towards the use of clean technique.

Clean technique involves the use of clean or a combination of sterile and clean supplies. Initially time is spent to collect the wound supplies, but some supplies could be saved and reused thus saving time for the practitioner and decreasing cost for the patient. A bottle of normal saline per patient, if it has been sealed, can be kept and reused. Normal saline may be kept up to one week in a sealed container according to the AHCPR Consumer Guidelines (USDHHS, 1994b, p.15). The study institution allows the normal saline to be saved for 24 hours. Clean gloves are kept in every patient room, which saves time and cost when compared to sterile gloves. The AHCPR Guidelines recommend the use of clean dressings and one pair of clean gloves for wound care of one patient. A towel, the dressing wrapper, or chux (a paper barrier kept in many patient rooms), may be used as a dressing field, adding minimal cost, yet still providing a barrier from microbes that are on the table. Supplies such as the irrigator, container for the irrigant, and dressings can be saved and reused in clean technique after they have been cleansed.

Specific supplies, such as dressing field and irrigator, are not addressed by the guidelines, the implication is to use clean supplies as well.

Clean versus sterile study. Only one study was found comparing clean to sterile technique for wound care. A pilot study by Stotts, Barbour, Griggs et al. (1997) was conducted to determine if there was a difference between the rate of wound healing and the cost of supplies when using clean versus sterile wound care technique.

This study had a sample of 30 patients who had gastrointestinal surgical wounds that were left open to heal by secondary intention. This is often the chosen method of wound closure when wounds are suspected to be heavily contaminated with bacteria, as may happen with gastrointestinal surgery.

In this study, sterile saline moistened gauze was packed into the wound three times a day. Subjects were randomized into two groups, one receiving wound care with clean technique and the other receiving wound care with sterile technique. Sterile dressing change technique was defined as the replacement of the wound dressing with a new dressing by means of aseptic technique with sterile supplies. Clean dressing change technique was defined as the replacement of the wound dressing with a new dressing by means of medical asepsis with clean supplies. Dressing changes were started on the first postoperative day and continued three times a day until discharge.

At the start of the wound care treatment the groups were the same in terms of age, length of surgery, size of the wound and nutrition. Subjects were studied from 3 to 9 days (Stotts, Barbour, Griggs et al., 1997).

The outcome measures were the rate of healing and the cost of supplies. Rate of healing was defined as wound volume change with time. When wound volume decreased

with time, healing was said to increase. Two subjects, one from each treatment group, acquired infection. The subject in the sterile treatment group had wound dehiscence and could not be followed in the study, as wound size could not be measured safely with dental impression material. The subject in the clean group was retained in the study. In comparing the rate of wound healing between clean and sterile technique groups using the Mann Whitney U test, no significant difference was found. The average cost of sterile supplies was $21.97 for a single change. The cost of clean supplies averaged $12.38 for each change. Cost comparison demonstrated that sterile technique was significantly more expensive than clean technique ($p < 0.05$).

A small sample number is one of the limitaitons of the study, as well as no specific methodology of clean or sterile wound care technique given. The subjects were followed for less than a week, there was not any longitudinal follow up, and the only indication of the bioburden of the wound was the indicator of pus, and not a wound culture.

ET nurses' wound technique surveys. Stotts, Barbour, Slaughter and Wipke-Tevis (1993) did a descriptive study of current wound care practices in the United States. A survey was sent to members of the Wound Ostomy and Continence Nurses Society (WOCN), an association of ET nurses. Surveys were sent to an unknown number of ET nurses and were returned by a sample of 240 nurses. ET nurses in acute care were75.1% of the sample, ET nurses in long-term care facilities were 17.3%, and ET nurses in home health care were 7.6%. The ET nurses were questioned regarding the wound care of various types of wounds including, pressure ulcers, vascular ulcers, diabetic ulcers, and open surgical wounds. Clean technique was used in greater than 80% of pressure and

vascular wound dressings. Greater than 60% of diabetic ulcers were dressed with clean technique. More than 66% of the ET nurses used clean technique in caring for patients with coexistent medical conditions of hypoxia, impaired circulation, malnutrition, and those receiving radiation. Patients who were immunocompromised received clean technique only 19% of the time. Clean technique was used 60% of the time with pediatric patients as compared to 38% of the time with the neonatal patient. ET nurses taught patients and families to use clean technique when caring for the wound at home 98 % of the time, no matter what technique was done in the hospital. Patients with open surgical wounds and those with exposed bone, ligament, or tendon received clean wound care technique 22% of the time. The overall mean percent for choosing clean wound care technique was 70%, with a range of 55% to 80%, and a median of 60%. A limitation of this study is that the return rate is not known; therefore we do not know the representative population.

In another survey of ET nurses, Faller (1998) presented a case study about a patient with a pressure ulcer and then questioned them on their wound care practice techniques for this patient. This sample of ET nurses consisted of 1443, with the majority of them being board certified in ET nursing. This survey was designed so that respondents could reply to how the pressure ulcer would be cared for in the acute care setting, in the extended care setting, and in the home, based on where they practiced. The ET nurses were instructed to respond to all that apply. More than 86% of the ET nurses responded for the acute care setting, 59.1% for extended care, and 72.6% in home care. This study examined the type of supplies used for wound care, and if sterile supplies would be used with sterile technique. Faller also questioned the respondents regarding

the conformity of wound care to the AHCPR Guideline. Clean gloves were used about 90% of the time to remove and apply the dressing. Of the ET nurses, 98% would use clean gloves to remove the old dressing, and greater than 81% would use clean gloves to apply the new dressing. Greater than 84% of the ET nurses would use a "sterile irrigant" except in home care, whereas 69.4% would use a "sterile irrigant". Greater than 60% would use a "sterile container" for the irrigant except in home care where the ET nurses would use a sterile container 45.2% of the time. When sterile supplies were used, about 50% would "put the gloves on with sterile technique," and more than 53% would "draw up the irrigant using sterile technique."

Although ET nurse respondents did not comply with the recommendations, over 96% of the ET nurses read the AHCPR guidelines. For example, the AHCPR guidelines recommend the use of one pair of gloves per patient with multiple wounds. Clean gloves were used by 80% of the nurses, but fewer than 30% would use a clean irrigant and a clean primary dressing. Greater than 86% would change gloves at least once, while write in comments on the survey, indicated gloves might be changed more often than that.

Summary

In summary, researchers have looked at some of the supplies needed for wound care. The AHCPR guidelines recommend the use of clean gloves and clean dressings. Only one group of researchers in an experimental study compared tap water and sterile saline for wound irrigation (Angeras et al., 1992). Only one small pilot study compared clean wound care technique to sterile wound care technique (Stotts et al., 1997). Two studies surveyed ET nurses on their wound care technique and the use of clean wound care technique. Clean wound care does seem to be used more often than sterile. It is

difficult to compare these studies as they all had different designs, samples, and measures. The researchers who included cost as an outcome measure indicated that clean technique reduced cost. There were not any reported negative outcomes between clean wound care technique and clean supplies versus sterile wound care technique or sterile supplies.

No studies were found examining the practices of staff nurses in an acute care setting in regards to wound care technique. The staff nurses are the nurses who do the majority of the wound care in many settings. They may have received orders or recommendations for wound care, but as we know, there are many variations to wound care technique. "Foundational research is needed to identify current nursing practice. Before randomized clinical trials can be conducted, the patterns and the vocabulary of wound care technique must be clearly explicated" (Faller, 1998, p.3).

Research Questions

What is the wound care technique of acute care staff RNs in response to a pressure ulcer case study? How do reported practices of RNs in an acute care facility deviate from sterile technique?

Definition of Terms

Acute care staff RN – a registered nurse practicing in a hospital setting.

Clean – containing no foreign material or debris (USDHS, 1994, p.107).

Clean wound care technique – wound care delivery that deviates from sterile technique. The use of sterile and clean procedure and products in various combinations.

Pressure ulcer – localized areas of tissue destruction that occur when skin and muscle are compressed between a bony prominence and an exterior surface (i.e., a bed) for a prolonged period of time (National Pressure Ulcer Advisory Panel, 1989).

Sterile – absence of all microorganisms (Faller, 1998, p.24).

Sterile wound care technique – wound care delivery after the cleansing of hands with an antiseptic soap, application of sterile gloves, with the use of sterile supplies and sterile instruments.

Wound care technique – the choice of dressing supplies and the manner in which they are applied related to a pressure ulcer case study.

CHAPTER 3

METHODOLOGY

Research Design

An exploratory, descriptive design with survey methodology was used to describe the wound care techniques reported by acute care RNs in response to a pressure ulcer case study. This methodology enabled the researcher to collect the information easily and inexpensively. It also allowed for the questions to be focused on clean and sterile wound care technique. The survey method limited the respondent from sharing other potentially useful information (Talbot, 1995, p. 293).

It is possible the results may be due to something other than the nurses' report of knowledge and regular behavior. These may be outside variables such as history and mortality (Talbot, 1995, p. 209). History refers to the occurrence of events that could affect the outcome of the survey. The institution in which this survey was given changed their pressure ulcer risk assessment tool four months prior to the distribution of this survey. This brought more attention to pressure ulcers. As a result of this procedure several changes may have occurred in the nurses response to pressure ulcers. These changes include being more interested in pressure ulcers, reading current literature, and having discussions among their peers. Other nurses might have been tired of the issue of pressure ulcers therefore not willing to fill out the questionnaire.

Mortality is when the respondents drop out prematurely. In a survey design this could include a poor return rate or not answering all of the questions. The researcher sent 131 surveys and received 40 back (30%). There were some unanswered questions, which could have been due to the length of the survey, difficulty understanding the questions, or difficulty understanding the directions to the survey.

Selection of Subjects

This survey was distributed to RNs in a 224-bed acute care facility in southwest Michigan. It has approximately 975 admissions a month. It is in a city with a population of 10,000, serving a rural county with a population of 161,400. This facility utilizes the expertise of ET nurses to assist with complicated wound care and assist with education of the nurses regarding wound care.

Eligible subjects for this study were registered nurses who practice on medical, surgical, oncology, orthopedic, critical care and telemetry units. A total of 131 RNs worked in these units.

Characteristics of the Subjects

The age of the sample (n=40) ranged from 20 to 62 with a mean age of 39.48 (SD = 11.22). The nurses in the sample were educated at all levels. Seventy percent (n = 28) had an associate degree in nursing, 10% (n = 4) had a nursing diploma, 12.5% (n = 5) had bachelors in nursing, and 7.5 % (n = 3) had a master's degree. Two had a Master's degree in nursing and one had a Master's degree in another field. The larger number of associate degree nurses could be due to the fact that two community colleges in the region offer this level of nursing program. Respondents had worked as a RN from

0 to 37 years with 50% of the RNs having worked in nursing 8 years or less. The mean years worked as a RN was 4.22 (SD = 1.69).

Respondents worked on all types of units. One respondent floated among several medical/surgical units. Nineteen respondents (47.5%) worked in critical care exclusively. The others worked exclusively on the following units: 7.5% (n = 3) on the orthopedic unit, 12.5 % (n = 5) on the medical unit, 12.5% (n = 5) on the surgical unit, and 17.5% (n = 7) on a telemetry unit.

All respondents performed general wound care occasionally. Over half (n = 22) of the respondents reported performing wound care daily. Fifteen respondents (37.5%) provided wound care monthly and three (7.5%) perform wound care 2 to 3 times a year.

The respondents were asked if (a) they had read the AHCPR Clinical Practice Guidelines, "Treatment of Pressure Ulcers" (1994) and (b) if the Guidelines changed their wound care technique for pressure ulcers. Nine individuals (22.5%) said they had read the Guideline. Of the seven respondents who answered the second question pertaining the AHCPR Guidelines, 3 responded that it changed their wound care technique. Two stated that they were using a more sterile technique and one individual was using a more clean technique. Four respondents stated they were using the same wound care technique. Of the four who had not changed their technique, one individual still uses the same clean technique and three individuals use the same sterile technique.

Instrument

The Faller Wound Care Technique Survey Tool (Faller, 1998) (see appendix B) includes a descriptive case study of a pressure ulcer with a photo of the wound. This pressure ulcer requires ulcer care as established by the AHCPR guidelines. The

applicable interventions for this wound are cleansing by irrigation and the application of a dressing to keep the wound bed continually moist. The relatively clean wound bed does not require any mechanical debridement, whirlpool or electric stimulation. There are questions regarding the wound care supplies needed for the case study wound care. One question related to terminology and includes seven terms equivalent to clean wound care technique and three terms equivalent to sterile wound care technique.

Respondents were instructed to mark one response for each question related to supplies used for wound care (related to dressing field, gloves, wound cleanser, irrigator, scissors, and primary and secondary dressings). Respondents were instructed to mark one response for all applicable items related to terms used for their wound care and influence of the AHCPR guidelines on "Treatment of Pressure Ulcers" (Faller, 1998).

There were six questions concerning the characteristics of the respondent. Characteristics include questions related to age, years since completing RN education, nursing experience with pressure ulcers, gender, and educational preparation (Faller 1998). Respondents were instructed to fill in the blank or to mark one response for each question related to demographics (Faller, 1998).

Faller (1998) established content validity with a panel of 20 experts and a pilot test of 200 board certified ET nurses. The criteria for choosing the 20 experts were expertise in ET nursing, wound care, research, and/or language. These experts represented a cross section of geography and practice. The experts were asked to comment on clarity, relevance, comprehensiveness, and order of the questions relative to wound care technique. Comments were collated, and the survey tool was revised based on the feedback.

The pilot test consisted of 200 ET nurses randomly selected from the 2215 membership sample of board certified ET nurses (Faller, 1998). They were asked to comment on the clarity of the instructions, the time required for completion, the clarity, relevance, comprehensiveness of the answer, and any other suggestions for additions, deletions, or modifications. Comments were collated and the survey tool was revised based on the feedback. This pilot test also increased content validity of the survey (Faller, 1998). The researcher of this study established test-retest reliability by giving the survey to three ET nurse colleagues twice, one month apart. The percentage of agreement from time one to time two was 94.5%.

Procedure

Permission was obtained to conduct this study from the Human Research Review Committee of Grand Valley State University (see Appendix C). The study hospital agreed to participate (see Appendix D). A list of registered nurses working at the hospital on the medical, surgical, oncology, orthopedic, critical care, and telemetry units was obtained from the department of human resources of the selected hospital. A $50 gift certificate to a local department store was offered as an incentive to participate in the survey and given to one subject selected from the 40 respondents.

When the survey was distributed in the nurses' mailboxes, the researcher included a cover letter (see Appendix E) with the survey. This gave an explanation of the study to explore the wound care techniques practiced by acute care RNs. The survey was distributed with two envelopes. The completed survey was placed in the blank envelope. This envelope was placed in a second envelope with the respondent's name on the return address and mailed to the researcher. This was used to track the surveys as they were

returned. In order to maintain the anonymity of the responding nurses, an uninvolved individual opened the outside envelope and entered the name in a raffle for a gift certificate to a local department store. The researcher only received the blank envelope with the enclosed survey. A thank-you/reminder card (see Appendix F) was placed in the mailboxes of the 131 staff nurses who received the survey regardless of whether they responded or not, midway through the four weeks of the allotted time given to return the survey.

Consent from each nurse was implied with the return of the completed questionnaire. The data were collected over a 4-week period by the investigator.

CHAPTER 4

DATA ANALYSIS

The purpose of this study was to evaluate the wound care technique of RNs in response to a pressure ulcer case study (see Appendix B) and how the techniques used deviate from sterile technique. Data analysis was accomplished utilizing the Statistical Package for the Social Sciences (SPSS).

Wound Care Technique

Descriptive statistics were used to answer the first question, "What is the wound care technique of acute care staff RNs in response to a pressure ulcer case study?" This research question addresses the use of various products for the initial dressing change and how the products are applied. All of the questions were aimed towards clean and sterile wound care techniques. The products include dressing fields, gloves, irrigant, irrigator, scissors, primary dressings, and the use of secondary dressings. The respondents did have the option to skip questions which were not applicable to their wound care plan. (See Appendix G for the frequencies and percents of responses to each question asked on the questionnaire). Percentages reported in the following section are based on the total sample of respondents.

Dressing field.

A dressing field, used to place dressing supplies on, minimizes contamination of supplies prior to application. Thirty-nine (97.5%) of the nurses would use a dressing field and one would not. Twenty-five (62.5%) respondents used a sterile dressing field while 14 (35%) respondents used a clean field. Of the 14 who chose a clean field, six used a chux, five used the glove or dressing package, two used a towel, and one did not answer. The AHCPR Guidelines do not specify the need to use a dressing field.

Gloves.

Clean gloves were used to remove the old dressing by 37 (92.5%) of the respondents and three (7.5%) used sterile gloves. Twenty-four (60%) of the nurses used a new pair of sterile gloves to apply the new dressing, 14 (35%) used clean gloves to apply the dressing and two (5%) used the same gloves to apply the dressing. The use of gloves to remove and apply the dressing is in compliance with the Standard and Transmission Based Precautions (Manian, 1997) although the AHCPR Guidelines recommend the use of one pair of clean gloves for the entire procedure.

Irrigant/irrigator.

Thirty-four (85%) of the RNs used an irrigant, one (2.5%) selected a spray cleanser, and five (12.5%) RNs would not use an irrigant. All 34 respondents using an irrigant would use a sterile irrigant for the first dressing change. Twenty-eight (70%) respondents would pour the irrigant into a sterile container prior to drawing it up and five would not pour it into a container. If a clean container was chosen to pour the irrigant into, four (10%) would use a cup or specimen container, one (2.5%) would use an

irrigation tray, one (2.5%) would use a 50 ml normal saline bottle, and one (2.5%) chose a respiratory therapy vial. Twenty-nine (72.5%) respondents would draw up the irrigant with sterile technique while five (12.5%) would not. The unused irrigant would be saved by 25 (62.5%) of the respondents, nine (22.5%) would throw away the unused portion, and one (2.5%) would open only the size container needed. Thirteen (32.5%) respondents would save the unused irrigant for 24 hours, three (7.5%) respondents would save it for 72 hours, three (7.5%) would save it until it was used up, two (5%) would save it for two to three days, and two (5%) would save it for one to two days and one (2.5%) would save it for two days. Twenty-six (65%) respondents would date the irrigant when it was opened. The policy at the study institution is to save the irrigant for 24 hours. Normal saline may be kept up to one week in a sealed container according to the AHCPR Consumer Guidelines (USDHHS, 1994b, p.15).

Of the 34 nurses using an irrigant only 26 (65%) would use an irrigator while eight (20%) would not. This is a curious inconsistency, causing one to wonder how the irrigant is being applied. A sterile irrigator for the first dressing change was chosen by 24 (60%) of the respondents. The irrigator would be reused by seven (17.5%) of the respondents for 24 hours, by three (7.5%) of the respondents for two days, by two (5%) respondents for 2-3 days, by two (5%) respondents for three days, and by two (5%) respondents indefinitely. The irrigator would not be cleaned between the dressing changes by seven (17.5%) of the respondents. Six (15%) would clean the irrigator with water, one (2.5%) with bleach, and one (2.5%) with an unspecified solution. The irrigator would be stored in its original package by 18 (45%) of the respondents, one would store it in a plastic bag. Two (5%) wrote that they would use a bulb syringe, but

did not address how they would store it. The irrigator would be dated when opened by 20 (50%) of the respondents. The AHCPR Guidelines recommend the use of an irrigator to deliver the correct pressure for effective cleansing but do not address the reuse of the irrigator (USDHHS, 1994a, p.51).

Scissors.

Twelve (30%) nurses would use scissors to cut the dressings while 27 (67.5%) said they would not. Of those using scissors seven (17.5%) would use sterile scissors for subsequent dressing changes, and five (12.5%) would not. When asked if the respondent would reuse the scissors for subsequent dressing changes, four (10%) said no, four (10%) said yes indefinitely, two (5%) said yes for two days, one (2.5%) would use the scissors for 72 hours, and one (2.5%) respondent wrote that he/she would reuse the scissors until they were unable to be cleaned. Four (10%) of the respondents would clean the scissors with alcohol, two (5%) with bleach, one (2.5%) with water and alcohol, and two (5%) would not clean the scissors. When asked how to store the used scissors, five (12.5%) responded that they would store the scissors in the original package, one (2.5%) in a paper bag, one (2.5%) with the other dressing supplies, and one (2.5%) in your pocket. Seven (17.5%) of the respondents would date the scissors when they were opened and two (5%) would not. When asked it these scissors would be used on other patients, nine (22.5%) said no, and one (2.5%) said yes. The relative low number of nurses using scissors could be due to the fact that many wound dressings come presized and gauze can be folded to the correct size. The AHCPR Guidelines do not specifically address the use of scissors.

Primary Dressing and Secondary Dressing.

A sterile primary dressing would be used by 36 (90%) of the respondents on the initial dressing change. Four (10%) respondents would not use a sterile dressing for the first dressing change. Twenty-five (62.5%) of the respondents would moisten the primary dressing in the original package while four (10%) would not. Seven (17.5%) of the respondents said the dressing does not need moistening. Thirty-two (80%) of the respondents would apply the initial primary dressing with sterile technique, while five (12.5%) would not. The unused primary dressing would be thrown away by 21 (52.5%) of the respondents. Fourteen (35%) respondents would open only the size of primary dressing needed, while five (12.5%) respondents would save the unused primary dressing for subsequent changes. Of the five saving the unused primary dressing, two (5%) would save it for two days, one (2.5%) would save it for 24 hours, and one (2.5%) would save it until it was used up. All five (12.5%) of these respondents would store the unused primary dressing in the original package. Six (15%) respondents said they would date the primary dressing when it was opened.

Thirty-five (87.5%) RNs would use a secondary dressing while five (12.5%) would not. Gauze dressings do require a secondary dressing in order to secure them in place. Many other types of wound dressings are adherent and do not require the use of a secondary dressing. Of those using a secondary dressing 25 (62.5%) would use a sterile one, while 10 (25%) would not use a sterile secondary dressing. The secondary dressing would be applied with sterile technique by 21 (52.5%) of the RNs while 14 (35%) would not use sterile technique. The unused secondary dressing was saved by 14 (35%) of the RNs and thrown away by 10 (25%) RNs. Eleven (27.5%) RNs would open only the size

needed of the secondary dressing. When asked how long the unused secondary dressing would be saved, nine (22.5%) RNs answered 24 hours or one day. Three (7.5%) RNs replied it would be saved until it was used up. One (2.5%) would save it if it stayed clean, one (2.5%) would save it if it had been in a container where it had been taped shut, one (2.5%) would save it for 2-3 days, one (2.5%) for 7-10 days while another one (2.5%) would save the unused secondary dressing for an unlimited period of time. The AHCPR Guidelines recommend that clean dressings be used.

In summary, the typical dressing change would be done with a sterile dressing field, clean gloves to remove the dressing and sterile gloves to apply the dressing. The majority would use a sterile irrigant poured into a sterile container prior to drawing it up. The majority of respondents would use sterile technique to draw up the irrigant and save the irrigant for 24 hours. The majority would use a sterile irrigator for the initial dressing change, which would be dated when opened. A sterile primary dressing would be used by the majority and moistened in the original package. Finally the majority would use a sterile secondary dressing on the initial dressing change.

Deviations from Sterile Technique

The second research question, "How do reported practices of the RNs in an acute care facility deviate from sterile technique?" was analyzed using descriptive statistics. Deviations from sterile technique were summarized in the following categories: dressing field (question # 8), gloves (questions #10 –12), irrigant and wound cleanser (questions # 14 – 16), type of irrigator (questions #22 – 23), scissors (questions # 29 - 29), primary dressing (questions # 34 – 37), secondary dressing (questions # 42 – 44).

The number of deviations from a completely sterile procedure ranged from 2 to 11 for individual nurses. The most frequent number of deviations was 3 with 10 respondents reporting this many deviations. The second most frequent number of deviations was 5 (n = 7). And the third most frequent was 4 (n = 7) deviations from sterile technique.

The respondent who deviated from sterile technique 11 times was essentially using clean technique with a slight deviation from the AHCPR guidelines. This respondent chose a clean dressing field, used clean gloves to remove the old dressing, but then applied a new pair of clean gloves to apply the new dressing (AHCPR guidelines recommend one pair of gloves for the entire procedure). This change of clean gloves after removing the dressing is an acceptable deviation from the AHCPR guidelines, as this is not going to harm the patient and the cost is lower than sterile gloves. A sterile irrigator would be use initially, but saved for one day, which would be considered clean for the next dressing change. Sterile irrigation solution was used and drawn up with sterile technique. Clean scissors were used, cleansed with alcohol and stored in the original package indefinitely, considered clean technique. The dressing chosen by this respondent was sterile but did not require moistening. The dressing was applied with clean technique and the unused portion was saved (both aspects of clean technique). A clean secondary dressing applied with clean technique was chosen by this respondent. The unused secondary dressing was saved. This clean wound care technique did not cause any harm to the patient, and would reduce costs due to products and techniques chosen.

Two of the respondents who reported two deviations from sterile technique chose a sterile dressing field, used clean gloves to remove the dressing, and changed into sterile gloves to use sterile technique to apply the dressing. They used a sterile irrigator and irrigant drawn up with sterile technique. Both chose not to save the irrigator. Neither of these respondents used scissors in their dressing plan. They used a sterile primary dressing, which was moistened in the dressing package and applied it with sterile technique. They used a sterile secondary dressing applied with sterile technique. They both would not save unused portions of the primary and secondary dressings. These respondents essentially chose a sterile technique of dressing application but had the potential of doing harm to the patient by applying a potentially contaminated primary dressing due to their moistening technique. The cost of their dressing change procedure is also higher by the use of sterile gloves and not saving the irrigator. Inspite of the chosen sterile wound care technique there was the potential to harm the patient.

Tables 3, 4, 5 and 6 contain the list of techniques in order of frequency by which they were reported as a deviation from sterile. The most frequent deviations from sterile technique were removal of dressing without sterile gloves (n = 37), method of moistening the dressing in the package (n = 25), and the reuse of the irrigator (n = 17). Removal of a dressing with clean gloves is commonly seen unless it is done in the sterile setting of the operating room or protective isolation. Therefore this deviation of not using sterile gloves to remove the dressing is not surprising. Moistening the dressing in the paper packaging can lead to high rates of contamination (Alexander et al., 1992). Reusing the irrigator would be consistent with clean technique, although the guidelines do not specifically address this.

Table 3 gives the number and percentages of complete sterile technique and any deviations from sterile technique in the use of gloves. The deviations include any use of clean gloves, use of a plastic bag to remove the dressing, using the same pair of gloves to remove and apply the dressing and not using sterile technique when applying the sterile gloves. There were not any unacceptable techniques in the use of gloves.

Table 3

Deviations from Sterile Technique: Gloves

Category	Sterile n (%)	Deviation from Sterile n (%)	Unacceptable n (%)
Gloves to remove dressing	3 (7.5%)	37 (92.5%)	-
Gloves for application of dressing	24 (60%)	16 (40%)	-
Use of same gloves	-	2 (5%)	-
Use of plastic bag to remove dressing	-	-	-
Sterile application of sterile gloves	22 (55%)	1 (2.5%)	-

Note. Percentages do not add up to 100% due to missing data or the skip option in the questionnaire.

Table 4 gives the number and percentage of use of complete sterile technique and deviations from sterile technique in the use of dressings and dressing field. Deviations from sterile technique include use of a nonsterile dressing, moistening the dressing in the package, applying either dressing without sterile technique, and saving any of the dressings. Deviations from sterile technique with the dressing field include use of any

field that is not sterile. An unacceptable deviation is the moistening of the dressing in the package, thereby contaminating the dressing prior to application.

Table 4

Deviations from Sterile Technique: Dressings/ Dressing Field

Category	Sterile n (%)	Deviation from Sterile Technique n (%)	Unacceptable Technique n (%)
Moistening of dressing	11 (27.5%)	25 (62%)	25 (62%)
Application of secondary dressing	21 (52.5%)	14 (35%)	-
Save unused secondary dressing	21 (52.5%)	14 (35%)	-
Type of secondary dressing	25 (62.5%)	10 (25%)	-
Application of primary dressing	32 (80%)	5 (12.5%)	-
Save unused primary dressing	35 (87.5%)	5 (12.5%)	-
Type of primary dressing	36 (90%)	4 (10%)	-
Dressing field	25 (62.5%)	15 (37.5%)	-

Note. Percentages do not add up to 100% due to missing data or the skip option in the questionnaire.

Table 5 gives data regarding sterile use of an irrigant and irrigator. Deviations from sterile irrigant include use of tap water or other clean irrigant, pouring the irrigant into a clean container, drawing up irrigant in an unsterile method and saving unused irrigant. Deviations from sterile technique with use of an irrigator consist of using a

nonsterile irrigator and /or reusing the irrigator. Unacceptable technique would be not cleansing the irrigator after use with the plan to reuse it. Irrigation causes a spray in the wound bed, and particles could spray onto the irrigator, thus contaminating it.

Table 5

Deviations from Sterile Technique: Irrigation

Category	Sterile n (%)	Deviation from Sterile n(%)	Unacceptable n (%)
Reuse irrigator	5 (12.5%)	17 (42.5%)	0
Reuse irrigator without cleansing	-	7 (17.5%)	7 (17.5%)
Irrigant container	28 (70%)	5 (12.5%)	-
Method of drawing up irrigant	29 (72.5%)	5 (12.5%)	-
Irrigator for initial change	24 (60%)	-	-
Irrigant	34 (85%)	-	-

Note. Percentages do not add up to 100% due to missing data or due to the skip option on the questionnaire.

Table 6 gives data regarding the use of scissors with sterile technique. Deviations from sterile technique are not using sterile scissors and /or reusing the same scissors. Unacceptable technique would be to store the scissors in the pocket, which would be considered contaminated.

Table 6

Deviations from Sterile Technique: Scissors

Category	Sterile n (%)	Deviation from sterile n (%)	Unacceptable n (%)
Scissors	7 (17.5%)	8 (20%)	-
Reuse scissors	-	5 (12.5%)	-
Storing scissors in pocket	-	1 (2.5%)	1 (2.5%)

Note. Percentages do not add up to 100% due to the skip option in the questionnaire.

Three main areas of deviation from sterile technique are the use of gloves, moistening of the dressing, and use of the irrigator. In strict sterile technique sterile gloves are used in removal of the dressing. In this study thirty-seven (92.5%) respondents did not use sterile gloves to remove the dressing. Twenty-five (62.5%) respondents moistened the gauze in the package, which if it is a paper package contaminates the gauze. Seventeen (43.5%) respondents would reuse the irrigator, which is not sterile technique

While the most notable deviation from sterile technique was the moistening of the gauze in the package, the most significant deviation from clean technique was the use of sterile gloves to apply the dressing. Moistening the gauze in the paper package contaminates the dressing. The use of sterile gloves is more than necessary considering the numerous breaks in sterile technique identified by the nurses in this study. The AHCPR Guidelines recommend the use of one pair of clean gloves for the entire dressing change procedure.

Respondents were asked to define their wound care technique marking all that apply. Twenty-two (55%) labeled it sterile and sixteen respondents (40%) labeled their technique as aseptic. Eight nurses (20%) called it clean technique, two nurses (5%) labeled it non-sterile, and one nurse (2.5%) called it unsterile. Twelve (30%) of the respondents labeled their wound care technique correctly, which in all cases it was clean, nonsterile or mixed wound care technique.

Additional Findings

One subject commented that all wound-dressing changes are very dependent on physician preference. One individual stated that scissors would be cleansed with alcohol prior to use, while another respondent thought the hospital should supply cheap, sterile scissors for each patient use. Two subjects related their wound care technique as to whether the wound was clean or sterile. The first one said, "A clean dressing field would be used unless the pressure ulcer had been surgically debrided, because the ulcer would not be sterile anyway." The second subject said, "If it were sterile, then I would use sterile technique. I usually try a mix between sterile and clean to keep as clean as possible on just clean wounds."

Sterile technique is costly in money and in time. The use of sterile gloves adds significantly to the cost of supplies and time. The RNs surveyed have a 60% use of sterile gloves for the application of the dressing. One pair of sterile gloves cost $0.28 versus $0.04 for a pair of clean gloves (Wise et al., 1997). The sterile dressing field and the sterile basin add a significant cost. The initial cost of reusable products is greater. In addition sterilization prior to each use adds a hidden cost in time and the required sterilization equipment needed.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

The findings will be discussed as follows: comparison to previous research, the relationship to the conceptual framework, the implications for clinical nursing, the implications for nursing administration, the implications for nursing educators, the limitations, and the need for future research.

Relationship of Findings to Previous Research

The results from this study looking at acute care nurses will be compared to Faller's (1998) study. She examined wound care technique delivered by ET nurses, who are specialists in wound care. This study's and Faller's (1998) results were similar in the use of a dressing field (both greater than 90%), saving of the irrigant (62.5% in this study and 50% in Faller's), use of a sterile primary dressing (90% in this study and 86.5% in Faller's), and finally the use of a sterile secondary dressing (62.5% in this study and 62.7% in Faller's). Much of the packaging available for wound dressings is sterile, which would support the similar findings.

The two studies differed in the use of sterile gloves to apply the dressing (60% in this study versus 18.6% in Faller's), the use of a sterile dressing field (62.5% in this study versus 19.8% in Faller's), the use of sterile scissors for subsequent dressing changes

(86.5% in this study versus 21.3% in Fallers), and moistening of the gauze in the package (62.5% in this study versus 30% in Faller's study).

Both studies showed an inconsistency with use of the irrigation solution (85% in this study and 56.3% in Faller's) versus use of an irrigator (65% in this study and 43% in Faller's). One wonders how the nurses apply the irrigant without an irrigator. If it were poured on the wound it would not have adequate force for effective cleaning. The AHCPR guidelines recommend the use of irrigating with a 35 ml syringe and a 19-gauge needle, to deliver the correct pressure for effective cleansing (USDHHS, 1994a, p.51).

The policy of the study institution is that the irrigant (normal saline) may be saved for 24 hours, which was practiced by 32.5% of the nurses. In Faller's study the mean time for saving the irrigant was 3.5 days. The AHCPR Consumer guidelines state that the irrigant may be saved for one week in a sealed container (USDHHS, 1994b, p. 15).

ET nurses in Faller's study moisten the gauze in the paper package less than the acute care nurses in this study. One wonders if the wound experts (the ET nurses) are choosing different products for the wound dressing, or if they are familiar with the studies showing high rates of contamination when dressings are moistened in the package (Alexander et al., 1992).

There was a higher use of sterile dressing products in this sample of staff RNs than in the previous studies utilizing ET nurses. This raises the cost factor in providing pressure ulcer wound care. A sterile dressing field was used 62.5% (19.8% in Faller's) and sterile gloves to apply the dressing were used 60% (18.6% in Faller's). One can only speculate that the advanced education in wound care contributed to this difference. Faller's study (1998) found that a mixture of clean and sterile products and techniques are

used by acute care ET nurses. However, 65.6% of the ET nurses utilize clean technique in the primary dressing application and 73.2% use clean technique in the secondary dressing application. Stotts et al. (1997) found clean wound care technique was used in greater than 80% of pressure ulcers.

Relationship of Findings to Conceptual Framework

This study primarily combined Nightingale's cannon of cleanliness and the AHCPR's areas of focus of ulcer care and managing bacteria colonization and infection. Nightingale's cannons are cleanliness, bed and bedding, taking of food, and ventilation and warming. The AHCPR Guideline's areas of focus are assessment, managing tissue loads, ulcer care, managing bacterial colonization and infection, operative repair, and finally education and quality improvement. Nightingale taught of the importance of keeping the patient's environment clean to improve health. The AHCPR clinical practice guidelines (USDHHS, 1994a) recommend the use of clean dressings and one pair of clean gloves per patient when dressing a pressure ulcer. The guidelines do recognize that institutions have their own infection-control policies and procedures and do not advise nurses not to deviate from their institution's policy. The policy on wound care technique for the institution used for this study was to utilize clean gloves with a "no-touch" technique. "No touch" technique is a method of dressing application where clean gloves are used touching only the edges of the dressing. This allows that only the sterile center of the dressing touch the wound bed. Only one subject reported using clean gloves with the "no touch" technique for the dressing application in this study. This implies that the staff nurses are not familiar with hospital policy for wound care.

Nightingale's cannon of cleansing to improve healing correlates with the AHCPR guidelines which recommend cleansing of the wound at every dressing change. The guidelines also state that effective cleansing cannot be achieved without an irrigator. The AHCPR states that irrigation pressures of 4 to 15 pounds per square inch are needed to enhance wound healing. The recommendation is to use a 35ml. syringe with a 19-gauge needle (USDHHS, 1994a, p. 51). The AHCPR also cautions that coarse cleansing materials such as gauze, cloth or sponges, can traumatize the wound bed, make it more susceptible to infection, and slow healing (USDHHS, 1994a, p. 50). Subjects in this study used an irrigator 65% of the time yet reported the use of an irrigant 85% of the time.

Implications for Nursing

Clinical Nursing

Clean wound care technique versus sterile technique is less time consuming for the staff nurse. One does not have to acquire a sterile dressing field, get a sterile basin for the irrigant, or utilize more than one pair of clean gloves for the entire procedure. The unused products if kept free of contaminants may be reused and could be kept in the patient room.

If standards of clean wound care technique for pressure ulcers were established, there would be continuity in technique from one nurse to the next. This could help to increase the patient's confidence in the nurse's expertise rather than focusing on the many variations of the wound care being performed. Continuity would help ensure patient safety/infection control issues and facilitate education of the patient.

Acute care nurses often have to teach the patient and caregivers how to do wound care following discharge from the hospital. The practice of clean wound care in the hospital would decrease the patient's confusion about caring for a wound in the home setting.

Nursing Administration.

There is a major cost in waste to this institution and the health care system at large in the unnecessary use of sterile supplies. Using sterile supplies with multiple deviations from sterile technique is not cost effective. The use of sterile gloves (60% in this study) has significant implications. Wise et al. (1997) noted a sevenfold increase in cost with the use of a pair of sterile gloves ($0.28) over a pair of clean gloves ($0.04). This has a cost impact on the institution as well as the patient. All of the wound dressing supplies discussed in this survey can be purchased in "clean packaging" at a cost savings. Administrators need to discuss wound care practices with their infection control and ET nurses to establish what barrier (e.g., pieces of aluminum foil like those used in restaurants, or plastic bags) can be used when moistening the gauze in the package and which clean dressing supplies should be utilized.

The study institution has access to ET nursing on a part time consultant basis. The nursing administration may want to consider instituting a full time on site ET nurse. This would allow for an increase in the area of teaching wound care to the staff nurses. The ET nurse would be more visible and able to provide hands on demonstrations. This would lessen the burden of the staff educators in making sure policy is implemented and understood.

Nursing Education.

This researcher questions what nurses are taught in their fundamental nursing classes regarding the wound care techniques of pressure ulcers. With the high percentage usage of sterile products, one wonders if only sterile technique is being taught. The use of sterile gloves is significantly lower among ET nurses who are specifically educated in wound care. The nursing educators need to be updated in clean wound care techniques and the current AHCPR guidelines.

The study institution had only one respondent following their policy of utilizing clean gloves with the "no touch" technique. The nursing staff needs to be educated about this procedure. The study institution needs to evaluate how to more effectively disseminate and implement their policy on wound care.

Limitations

The small sample (n=40) and single institution setting limits the ability to generalize these results. Also past history may have impacted the number of returns in that the nurses were requested to answer three other questionnaires within the past year.

Distribution and having the surveys returned via the mail could have impacted the response rate. A higher return rate might have been obtained if the surveys were personally distributed and collected by the researcher at a staff meeting.

The instrument used for this study is long and divided into many categories. Thirty-eight questions were not answered and could have been overlooked. One wonders if the unanswered questions were due to a poor understanding of the questions or questioning which question to answer in the sequence. The Faller Wound Technique Tool could be revised to eliminate some of the categories of questions, thereby

decreasing the size of the questionnaire and increasing participation. The anonymity of the questionnaire is beneficial allowing more opportunity for honesty.

The instrument does not ask how the irrigant would be applied if an irrigator was not used. One can only speculate what the nurses who did not use an irrigator were doing: pouring the irrigant onto the wound out of the bottle without adequate pressure for effective cleansing, or pouring it onto gauze and then scrubbing the wound which would traumatize to the wound bed and delay healing. If this tool is used again, the researcher may wish to add a question regarding irrigant application.

The instrument does not ask about the gauze packaging. This institution provides two different packaging of gauze that nurses reported moistening in the original package. One is the typical paper packaging, the use of which use could lead to a high rate of contamination. The other is a sterile plastic tub, which could be a sterile basin and maintain sterile conditions. If this study is to be repeated future researchers may want to address the packaging of the gauze and adapt the questionnaire to the product available at their institutions.

Future Research

Suggestions for future research include replication of this study nationwide to enhance generalizability. This study should be delivered to various care settings such as long term care centers and home health agencies as well as acute care settings nationwide. It would be interesting to give this survey to nursing educators to determine their understanding of wound care of a pressure ulcer. A different questionnaire could be delivered to identify what is actually being taught to nursing students regarding wound care of pressure ulcers. Studies of infection rates among various institutions with

established wound care techniques could be obtained to analyze the impact of clean and sterile wound care technique.

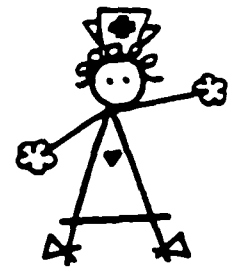
Conclusion

In this institution, there are various methods of dressing pressure ulcers in use. Many use sterile dressing products with multiple deviations from sterile technique. This impacts the cost to the health care system, as sterility is lost when the item is touched by anything that is not sterile and the AHCPR guidelines suggest that a primarily clean technique is adequate. For example, sterile gloves are used for the application of the dressing by 60% of the subjects. This institution could benefit from having the nurses use clean gloves with the "no touch" technique in dressing application, as supported by their procedure guidelines. This would have a significant decrease in cost, and follow the AHCPR guidelines and the institution's policy on wound care. The staff nurses need to be educated on the high contamination rates (100%) when the gauze is moistened in the paper packaging (Alexander et al., 1992). The institution may wish to explore the use of an inexpensive barrier between the table and gauze package (such as aluminum foil or a plastic bag) to use when moistening the gauze in the paper package. Wound care experts at the study institution need to develop standards of practice for utilizing clean wound care technique with pressure ulcers as promoted in the AHCPR guidelines.

APPENDICES

APPENDIX A

FALLER'S PERMISSION LETTER



nancy a. faller, rn, msn, phd, cetn
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mendon, vt. 05701

home (802) 775-1084
work (802) 775-7111
fax (802) 747-1620

email nafaller@aol.com

June 28, 1999

Dear Donna,

I am so flattered that you wish to replicate my doctoral dissertation. You have my blessing. This implies permission to use any or part of the Faller Wound Care Survey Tool. It may be included in your thesis.

I wish you luck in finishing your graduate degree.

Regards,

[redacted]

Nancy A Faller RN MSN PhD CETN

†
JMJ

APPENDIX B

FALLER WOUND CARE TECHNIQUE SURVEY

Faller Wound Care Technique Survey

Demographics: (Please circle your answer or write in on lines to mark ONE response per question.)

1. What was your age as of your last birthday?_____

2. What is the highest degree you hold?
   a. Diploma in nursing
   b. Associate in nursing
   c. Associate in other than nursing
   d. Bachelors in nursing
   e. Bachelors in other than nursing
   f. Masters in nursing
   g. Masters in other than nursing
   h. Doctorate in nursing
   i. Doctorate in other than nursing

3. What year did you become a registered nurse?_____

4. What type of nursing unit do you work on the majority of the time?
   a. Medical
   b. Oncology
   c. Surgical
   d. Orthopedic
   e. Critical care
   f. Telemetry
   g. Other

5. How frequent have you worked with patients with wounds?
   a. 1 time a year b. 2 - 3 times a year
   c. monthly d. weekly to daily

Agency for Health Care Policy and Research Guideline, "Treatment of Pressure Ulcers":
(Please use the boxes or lines to mark ONE response per question.)

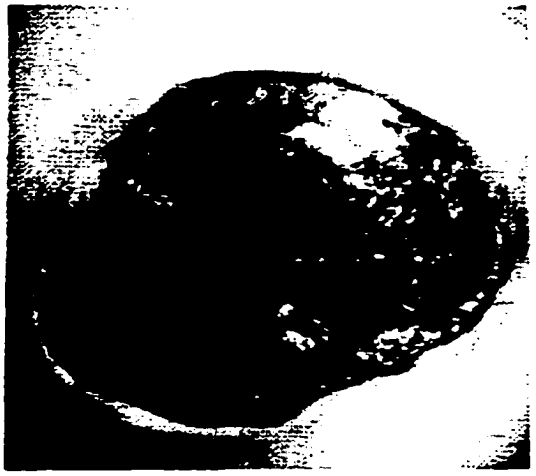
6. Have you read this practice guideline?
   a. Yes
   b. No

7. Did this guideline change your Wound Care Technique for pressure ulcers?
   a. Yes, I now use a more clean / less sterile technique
   b. Yes, I now use a less clean / more sterile technique
   c. No. I still use the same clean technique
   d. No. I still use the same sterile technique
   e. Other _____

Case Study: Wound Care Technique:
Mr. J is 85 years old. Until 2 weeks ago, he was healthy and had never been hospitalized. At that time, he was removing a box from the top of a hutch, when the hutch fell over. He was pinned between the hutch and the floor, unable to move, for 2 days.

Mr. J. sustained no injuries other than a pressure ulcer (pictured here) over his right trochanter. It measures 4.6 X 3.6 X 0.3 cm with no undermining. There are no signs of local or systemic infection.

Mr. J. is now ambulating and eating well. He has no other medical problems. He is nutritionally stable, is on no medications, and has lab values within normal limits.



Mr. J's wound

Questions: Wound Care Technique: (Based on <u>your personal choice of a dressing plan</u> for Mr. J.'s pressure ulcer and on the <u>supplies available to you</u>, please use the letters or lines to mark ONE response per question. There are NO WRONG RESPONSES.)

Please give your opinion about wound care technique for Mr. J.'s pressure ulcer.

Dressing field: wound care technique questions

8. Would you use a "dressing" field for your supplies in your dressing plan for Mr. J.'s pressure ulcer?
   a. Yes, a sterile field *Go to 10*
   b. Yes, a clean field
   c. No *Go to 10*

9. What would you use for the <u>clean</u> "dressing field"
   a. A chux
   b. A towel (paper or cloth)
   c. The dressing/glove package
   d. Other (enter your response)_____

Gloves: wound care technique questions

10. Would you use gloves to remove the old dressing in <u>your</u> dressing plan for Mr. J.'s pressure ulcer?
    a. Yes, sterile gloves
    b. Yes, clean gloves
    c. No, I would use a plastic bag
    d. No

11. Would you use gloves to apply the new dressing?
    a. Yes, I would continue using the same gloves *Go to 13*
    b. Yes, I would use a new pair of sterile gloves
    c. Yes, I would use a new pair of clean gloves *Go to 13*
    d. No *Go to 13*

12. Would you put on the sterile gloves using sterile technique?
    a. Yes
    b. No

Irrigant / wound cleanser: wound care technique questions

13. Would you use an irrigant in your dressing plan for Mr. J.'s pressure ulcer?
    a. Yes
    b. No. I would use a spray wound cleanser *Go to 19*
    c. No. I would not use an irrigant *Go to 27*

14. Would you use a sterile irrigant (i.e. saline) for your first dressing change?
    a. Yes
    b. No. I would use tap water or a shower *Go to 21*
    c. No. I would use other (enter your response)_____ *Go to 21*

15. Would you pour the irrigant into a container before drawing it up?
    a. Yes. I would use a sterile container
    b. Yes. I would use a clean container *Go to 18*
    c. No. I would not use a container

16. Would you draw up the irrigant using sterile technique?
    a. Yes Go to 19
    b. No

17. What would you use for the clean container for the irrigant?
    a. Cup or specimen container
    b. Emesis basin
    c. Irrigation tray
    d. Other (Enter your response)

18. Would you save the unused irrigant from the original container for subsequent dressing changes?
    a. Yes
    b. No. I would throw away the unused portion *Go to 21*
    c. No. I would be careful to open only the size package I needed *Go to 21*

19. How long would you save the unused irrigant / wound cleanser?
    a. Until it was used up
    b. For a specified number of days (how many)_____
    c. Other (Enter your response)_____

20. Would you date the irrigant / wound cleanser when it was opened?
    a. Yes
    b. No

Irrigator: wound care technique questions

21. Would you use an irrigator (i.e. syringe, Irri-Jet, Water Pik) in your dressing plan for Mr. J.'s pressure ulcer?
    a. Yes
    b. No *Go to 27*

22. Would you use a sterile irrigator for your first dressing change?
    a. Yes
    b. No

23. Would you reuse the irrigator for subsequent dressing changes?
    a. Yes. indefinitely
    b. Yes. for a specified number of days (how many)_____
    c. Yes. other (Enter your response)_____
    d. No

24. Would you clean the irrigator between dressing changes?
    a. Yes. with water (with or without soap)
    b. Yes. with a bleach solution
    c. Yes. with other (enter your response)_____
    d. No

25. How would you store the used irrigator?
    a. In original package
    b. In paper bag
    c. In plastic bag
    d. In other (Enter your response)_____

26. Would you date the irrigator when it was opened?
    a. Yes
    b. No

Scissors: wound care technique questions

27. Would you use scissors to cut the dressing in <u>your</u> dressing plan for Mr. J.'s pressure ulcer?
    a. Yes
    b. No. the dressing I would use doesn't need scissors *Go to 34*

28. Would you use <u>sterile</u> scissors for subsequent dressing changes?
    a. Yes
    b. No

29. Would you reuse the scissors for subsequent dressing changes?
    a. Yes. indefinitely
    b. Yes. for a specified number of days (how many) _____
    c. Yes. other _____
    d. No *Go to 34*

30. Would you clean the scissors between dressing changes?
    a. Yes. with water (with or without soap)
    b. Yes. with a bleach solution
    c. Yes with alcohol
    d. Yes. with betadine or other antimicrobial
    e. Yes. with other (Enter your response)_____
    f. No

31. How would you store the used scissors?
    a. In original package
    b. In paper bag
    c. In plastic bag
    d. In your pocket *Go to 33*
    e. With the other dressing supplies
    f. In other (Enter your response)_____

32. Would you date the scissors when they were opened?
    a. Yes
    b. No

33. Would you use the scissors for patients other than Mr. J.?
    a. Yes
    b. No

Primary dressing: wound care technique questions

34. Would your use a sterile primary dressing (the layer against the wound, i.e. alginate, gauze, hydrogel, hypertonic saline, nonwoven gauze) for your first dressing change in your dressing plan for Mr. J.'s pressure ulcer?
    a. Yes
    b. No *Go to 37*

35. Would you moisten the primary dressing in its original package?
    a. Yes
    b. No
    c. No, the primary dressing I would use doesn't need moistening

36. Would you apply the primary dressing using sterile technique?
    a. Yes
    b. No

37. Would you save the unused primary dressing for subsequent dressing changes?
    a. Yes
    b. No, I would throw away the unused portion *Go to 41*
    c. No, I would be careful to open only the size package I needed *Go to 41*

38. How long would you save the unused primary dressing?
    a. Until it was used up
    b. For a specified number of days (how many)_____
    c. Other (Enter your response)_____

39. How would you store the unused primary dressing?
    a. In original package
    b. In paper bag
    c. In plastic bag
    d. In other (Enter your response)_____

40. Would you date the primary dressing when it was opened?
    a. Yes
    b. No

Secondary dressing: wound care technique questions

41. Would you use a secondary dressing in your dressing plan for Mr. J.'s pressure ulcer?
    a. Yes
    b. No, the primary dressing I would use doesn't need a secondary dressing
    Go to 48

42. Would you use a sterile secondary dressing for your first dressing change?
    a. Yes
    b. No

43. Would you apply the secondary dressing using sterile technique?
    a. Yes
    b. No

44. Would you save the unused secondary dressing for subsequent dressing changes?
    a. Yes
    b. No, I would throw away the unused portion *go to 48*
    c. No, I would be careful to open only the size package I needed *go to 48*

45. How long would you save the unused secondary dressing?
    a. Until it was used up
    b. For a specified number of days (how many)_____
    c. Other (Enter your response)_____

46. How would you store the unused secondary dressing?
    a. In original package
    b. In paper bag
    c. In plastic bag
    d. In other (Enter your response)_____

47. Would you date the secondary dressing when it was opened?
    a. Yes
    b. No

Definition: wound care technique question

48. By YOUR definition, which words would you use to describe the wound care technique, which you would use for Mr. J.?

(Please mark ALL responses that apply.)

    a. Aseptic wound care technique
    b. Clean wound care technique
    c. Mixed wound care technique
    d. Medical aseptic wound care technique
    e. Nonsterile wound care technique
    f. No-touch wound care technique
    g. Sterile wound care technique
    h. Surgical aseptic wound care technique
    i. Unsterile wound care technique
    j. Other (Enter your response)_____

Additional comments about wound care technique:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

APPENDIX C

GRAND VALLEY STATE UNIVERRSITY

HUMAN RESEARCH REVIEW COMMITTEE

GRAND VALLEY
STATE UNIVERSITY

1 CAMPUS DRIVE • ALLENDALE, MICHIGAN 49401-9403 • 616/895-6611

October 14, 1999

Donna Pennington
9480 Columbia
Dowagiac, MI 49047

Dear Donna:

Your proposed project entitled **Clean Versus Sterile Wound Care Technique Utilized by Registered Nurses in Acute Care When Dressing a Pressure Ulcer** has been reviewed. It has been approved as a study which is exempt from the regulations by section 46.101 of the Federal Register 46(16):8336, January 26, 1981.

Sincerely,

[redacted]

Paul A. Huizenga, Chair
Human Research Review Committee

APPENDIX D

APPROVAL LETTER – STUDY SETTING

Lakeland Regional
Health System

Grand Valley State University
Kirkhof School of Nursing
Graduate Program
Allendale, MI 49401

June 28, 1999

To whom it may concern,

This letter is written to give Donna Pennington, RN, BSN, CETN, permission to use the Lakeland Regional Health care System nursing staff at the St. Joseph acute care site for her master's thesis. It is understood that Donna will be using the nurses as her sample subjects for data collection and analysis and their anonymity will be maintained. It is further understood that participation is voluntary and the results of the thesis will be shared with me.

Sincerely,

[redacted]

Eileen Willits, RN, MS
Vice President of Operations and Patient Services

APPENDIX E

COVER LETTER

10-28-99

Dear Registered Nurse,

Wound care of pressure ulcers is a major expense and concern in the health care industry. Very little research has been done in regard to wound care practices. This is an exploratory survey designed to look at how acute care Registered Nurses practice wound care. I want to describe what you really do and what works for you when you are taking care of patients with pressure ulcers.

This survey contains a hypothetical pressure ulcer case study and questions about wound care technique. You may use a pen or pencil to complete the survey which may take approximately 30 minutes of your time. There are no right or wrong answers. Your confidentiality will be maintained. I am requesting that you not put your name on the survey. After the survey is completed, place it in the blank envelope. Enclose this envelope in the larger envelope with your name on the return address. If you wish to receive the results of the survey, please let me know on a card, which you may place in the outer envelope. The envelope will be opened by an uninterested party and your name will be entered into a drawing for a $50.00 gift certificate to Elder Beerman. I will receive only the blank envelope.

There are no direct benefits to you, however your completion of this survey will add to nursing's knowledge base for wound care. There are no risks to you when you follow the procedures listed above for returning the survey. Results will be reported in aggregate form. No individual responses will be reported. Return of this survey implies your consent to participate.

I am a graduate-nursing student at Grand Valley State University and have obtained their permission to conduct this survey. If you have any questions or concerns I may be reached via pager # 658-2163 or you may call Paul Huizenga of Grand Valley State University at 616-895-2472.

Please return the survey in the self-addressed envelope by November 14, 1999.

Thank you very much for your participation.

Sincerely,

[redacted]

Donna Pennington, RN, BSN, CETN

APPENDIX F

THANK-YOU/REMINDER LETTER

11-7-99

Dear Registered Nurse,

I'd like to thank you for filling out the questionnaire on wound care technique of a pressure ulcer. If you have not yet filled it out, please take some time to do so. Remember, if you return the completed survey your name will be entered into a drawing for a $50.00 gift certificate to Elder Beerman. If you have questions or concerns please page me at 658-2163 or enclose them on a separate sheet of paper and I will get back to you. If you have lost the survey please contact me at 927-5242 or page me at the above number.

Please return the survey in the self-addressed envelope by November 14, 1999.

Thank you very much for your participation.

Sincerely,

Donna Pennington, RN, BSN, CETN

APPENDIX G

FALLER WOUND CARE TECHNIQUE SURVEY
FREQUENCY AND PERCENTS OF RESPONSES

Faller Wound Care Technique Survey Frequency and Percents of Responses

Frequency and Percents

Demographics: (Please circle your answer or write in on lines to mark ONE response per question.)

1. What was your age as of your last birthday?_____ — 1. 20-62 mean = 39.48

2. What is the highest degree you hold?
   a. Diploma in nursing — 2a. 4. (10%)
   b. Associate in nursing — 2b. 28. (70%)
   c. Associate in other than nursing — 2c. 0
   d. Bachelors in nursing — 2d. 5. (12.5%)
   e. Bachelors in other than nursing — 2e. 0
   f. Masters in nursing — 2f. 2. (5%)
   g. Masters in other than nursing — 2g. 1. (2.5%)
   h. Doctorate in nursing — 2h. 0
   i. Doctorate in other than nursing — 2i. 0

3. What year did you become a registered nurse? [Converted to years worked.] — 3. range = 0 - 37 years mean = 4.22

4. What type of nursing unit do you work on the majority of the time?
   a. Medical — 4a. 5. (12.5%)
   b. Oncology — 4b. 0
   c. Surgical — 4c. 5. (12.5%)
   d. Orthopedic — 4d. 3. (7.5%)
   e. Critical care — 4e. 19. (47.5%)
   f. Telemetry — 4f. 7. (17.5%)
   g. Other (3 or 4 units) — 4g. 1. (2.5%)

5. How frequent have you worked with patients with wounds?
   a. 1 time a year — 5a. 0
   b. 2 - 3 times a year — 5b. 3. (7.5%)
   c. monthly — 5c. 15. (37.5%)
   d. weekly to daily — 5d. 22. (55%)

Agency for Health Care Policy and Research Guideline, "Treatment of Pressure Ulcers": (Please use the boxes or lines to mark ONE response per question.)

6. Have you read this practice guideline?
   a. Yes — 6a. 9. (22.5%)
   b. No — 6b. 31. (77.5%)

7. Did this guideline change your Wound Care Technique for pressure ulcers?
   a. Yes, I now use a more clean / less sterile technique — 7a. 1. (2.5%)
   b. Yes, I now use a less clean / more sterile technique — 7b. 2. (5%)
   c. No, I still use the same clean technique — 7c. 1. (2.5%)
   d. No, I still use the same sterile technique — 7d. 3. (7.5%)
   e. Other _____ — n.a. 32. (80%)
   missing 1. (2.5%)

Case Study: Wound Care Technique:
Mr. J is 85 years old. Until 2 weeks ago, he was healthy and had never been hospitalized. At that time, he was removing a box from the top of a hutch, when the hutch fell over. He was pinned between the hutch and the floor, unable to move, for 2 days.

Mr. J. sustained no injuries other than a pressure ulcer (pictured here) over his right trochanter. It measures 4.6 X 3.6 X 0.3 cm with no undermining. There are no signs of local or systemic infection.

Mr. J. is now ambulating and eating well. He has no other medical problems. He is nutritionally stable, is on no medications, and has lab values within normal limits.

Questions: Wound Care Technique: (Based on your personal choice of a dressing plan for Mr. J.'s pressure ulcer and on the supplies available to you, please use the letters or lines to mark ONE response per question. There are NO WRONG RESPONSES.)

Please give your opinion about wound care technique for Mr. J.'s pressure ulcer.

Dressing field: wound care technique questions

8. Would you use a "dressing" field for your supplies in your dressing plan for Mr. J.'s pressure ulcer?
   a. Yes, a sterile field *Go to 10*
   b. Yes, a clean field
   c. No *Go to 10*

8a.	25. (62.5%)
8b.	14. (35%)
8c.	1. (2.5%)

9. What would you use for the clean "dressing field"
   a. A chux
   b. A towel (paper or cloth)
   c. The dressing/glove package
   d. Other (enter your response)_____

9a.	6. (15%)
9b.	2. (5%)
9c.	5. (12.5%)
n.a.	26. (65%)
missing	1. (2.5%)

Gloves: wound care technique questions

10. Would you use gloves to remove the old dressing in your dressing plan for Mr. J.'s pressure ulcer?
    a. Yes, sterile gloves
    b. Yes, clean gloves
    c. No, I would use a plastic bag
    d. No

10a.	3. (7.5%)
10b.	37. (92.5%)
10c.	0
10d.	0

11. Would you use gloves to apply the new dressing?
    a. Yes, I would continue using the same gloves *Go to 13*
    b. Yes, I would use a new pair of sterile gloves
    c. Yes, I would use a new pair of clean gloves *Go to 13*
    d. No *Go to 13*

11a.	2. (5%)
11b.	24. (60%)
11c.	14. (35%)
11d.	0

12. Would you put on the sterile gloves using sterile technique?
    a. Yes
    b. No

12a. 22. (55%)
12b. 1. (2.5%)
n.a. 14. (35%)
missing 3. (7.5%)

Irrigant / wound cleanser: wound care technique questions

13. Would you use an irrigant in your dressing plan for Mr. J.'s pressure ulcer?
    a. Yes
    b. No, I would use a spray wound cleanser *Go to 19*
    c. No, I would not use an irrigant *Go to 27*

13a. 34. (85%)
13b. 1. (2.5%)
13c. 5. (12.5%)

14. Would you use a sterile irrigant (i.e. saline) for your first dressing change?
    a. Yes
    b. No. I would use tap water or a shower *Go to 21*
    c. No. I would use other (enter your response)_____ *Go to 21*

14a. 34. (85%)
14b 0
14c. 0

15. Would you pour the irrigant into a container before drawing it up?
    a. Yes. I would use a sterile container
    b. Yes. I would use a clean container *Go to 18*
    c. No. I would not use a container

15a. 28. (70%)
15b 0
15c 0
n.a. 6. (15%)
missing 1. (2.5%)

16. Would you draw up the irrigant using sterile technique?
    a. Yes Go to 19
    b. No

16a 29. (72.5%)
16b. 5. (12.5%)

17. What would you use for the clean container for the irrigant?
    a. Cup or specimen container
    b. Emesis basin
    c. Irrigation tray
    d. Other (Enter your response) NS bottle
    di. resp therapy vial

17a 4. (10%)
17b. 0
17c. 1. (2.5%)
17d. 1. (2.5%)
17di. 1. (2.5%)
n.a. 33. (82.5%)

18. Would you save the unused irrigant from the original container for subsequent dressing changes?
    a. Yes
    b. No, I would throw away the unused portion *Go to 21*
    c. No, I would be careful to open only the size package I needed *Go to 21*

18a. 25. (62.5%)
18b. 9. (22.5%)
18c. 1. (2.5%)
n.a. 5. (12.5%)

19. How long would you save the unused irrigant / wound cleanser?
    a. Until it was used up
    b. For a specified number of days (how many) 24 hrs
    bi. 72 hours
    bii. 1-2 days
    biii. 2 days
    biv. 2-3 days
    c. Other (Enter your response)_____

19a. 3. (7.5%)
19b 13. (32.5%)
19bi. 3. (7.5%)
19bii. 2. (5%)
19biii. 1. (2.5%)
19biv. 2. (5%)
n.a. 14. (35%)

20. Would you date the irrigant / wound cleanser when it was opened?
    a. Yes
    b. No

20a. 26. (65%)
20b 0
n.a. 14. (35%)

Irrigator: wound care technique questions

21. Would you use an irrigator (i.e. syringe, Irri-Jet, Water Pik) in your dressing plan for Mr. J.'s pressure ulcer?
    a. Yes
    b. No *Go to 27*

21a 26. (65%)
21b 8. (20%)
n.a 5. (12.5%)

22. Would you use a sterile irrigator for your first dressing change?
    a. Yes
    b. No

22a 24. (60%)
22b 0
n.a 13. (32.5%)
missing 3. (7.5%)

23. Would you reuse the irrigator for subsequent dressing changes?
    a. Yes, indefinitely
    b. Yes, for a specified number of days (how many): 2 days
    bi. 3 days
    bii. 24 hours
    biii. 2-3 days
    c. Yes, other (Enter your response) as long as not contaminated
    d. No

23a 2. (5%)
23b 3. (7.5%)
23bi 2. (5%)
23bii 7. (17.5%)
23biii 2. (5%)
23c 1. (2.5%)
23d 5. (12.5%)
n.a 12. (30%)
missing 6. (15%)

24. Would you clean the irrigator between dressing changes?
    a. Yes, with water (with or without soap)
    b. Yes, with a bleach solution
    c. Yes, with other (enter your response)_____
    d. No

24a 6. (15%)
24b 1. (2.4%)
24c 1. (2.4%)
24d 7. (17.5%)
n.a 16. (40%)
missing 9. (22.%)

25. How would you store the used irrigator?
    a. In original package
    b. In paper bag
    c. In plastic bag
    d. In other (Enter your response)_____

25a 18. (45%)
25b 1. (2.5%)
25c 2. (5%)
n.a. 16. (40%)
missing 3. (7.5%)

26. Would you date the irrigator when it was opened?
    a. Yes
    b. No

26a 20. (50%)
26b 0
n.a. 16. (40%)
missing 4. (10%)

Scissors: wound care technique questions

27. Would you use scissors to cut the dressing in <u>your</u> dressing plan for Mr. J.'s pressure ulcer?
    a. Yes
    b. No, the dressing I would use doesn't need scissors *Go to 34*

27a 12. (30%)
27b 27. (67.5%)
missing 1. (2.5%)

28. Would you use <u>sterile</u> scissors for subsequent dressing changes?
    a. Yes
    b. No

28a 7. (17.5%)
28b 5. (12.5%)
n.a 27. (67.5%)
missing 1. (2.5%)

29. Would you reuse the scissors for subsequent dressing changes?
    a. Yes, indefinitely
    b. Yes, for a specified number of days (how many) 2 days
    bi. Yes, 72 hours
    c. Yes, until unable to clean
    d. No *Go to 34*

29a 4. (10%)
29b 2. (5%)
29bi 1. (2.5%)
29c 1. (2.5%)
n.a. 27. (67.5%)
missing 1. (2.5%)

30. Would you clean the scissors between dressing changes?

a.	Yes, with water (with or without soap)	30a. 0
b.	Yes, with a bleach solution	30b. 2. (5%)
c.	Yes with alcohol	30c. 4. (10%)
d.	Yes, with betadine or other antimicrobial	30d 0
e.	Yes, with other: water and alcohol	30e 1. (2.5%)
f.	No	30f. 2. (5%)
		n.a. 30. (75%)
		missing 1. (2.5%)

31. How would you store the used scissors?

a.	In original package	31a. 5. (12.5%)
b.	In paper bag	31b. 1. (2.5%)
c.	In plastic bag	31c 0
d.	In your pocket *Go to 33*	31d. 1. (2.5%)
e.	With the other dressing supplies	31e. 1. (2.5%)
f.	In other (Enter your response)_____	n.a. 31. (77.5%)
		missing 1. (2.5%)

32. Would you date the scissors when they were opened?

a.	Yes	32a. 7. (17.5%)
b.	No	32b. 2. (5%)

33. Would you use the scissors for patients other than Mr. J.?

a.	Yes	33a 1. (2.5%)
b.	No	33b. 9. (22.5%)

Primary dressing: wound care technique questions

34. Would your use a sterile primary dressing (the layer against the wound, i.e. alginate, gauze, hydrogel, hypertonic saline, nonwoven gauze) for your first dressing change in your dressing plan for Mr. J.'s pressure ulcer?

a.	Yes	34a. 36. (90%)
b.	No *Go to 37*	34b. 4. (10%)

35. Would you moisten the primary dressing in its original package?

a.	Yes	35a. 25. (62.5%)
b.	No	35b 4. (10%)
c.	No, the primary dressing I would use doesn't need moistening	35c 7. (17.5%)
		na 3. (7.5%)
		missing 1. (2.5%)

36. Would you apply the primary dressing using sterile technique?

a.	Yes	36a. 25. (62.5%)
b.	No	36b. 5. (12.5%)
		n.a. 3. (7.5%)

37. Would you save the unused primary dressing for subsequent dressing changes?

a.	Yes	37a. 5. (12.5%)
b.	No, I would throw away the unused portion *Go to 41*	37b. 21. (52.5%)
c.	No, I would be careful to open only the size package I needed. *Go to 41*	37c. 14. (35%)

38. How long would you save the unused primary dressing?

a.	Until it was used up	38a. 1. (2.5%)
b.	For a specified number of days (how many?): 24 hours	38b. 1. (2.5%)
bi.	2 days	38bi. 2. (5%)
c.	Other (Enter your response)_____	n.a. 35. (87.5%)
		missing 1. (2.5%)

39. How would you store the unused primary dressing?
    a. In original package — 39a. 5 (12.5%)
    b. In paper bag — 39b. 0
    c. In plastic bag — 39c. 0
    d. In other (Enter your response)_____ — 39d. 0
    n.a. 34. (85%)

40. Would you date the primary dressing when it was opened?
    a. Yes — 40a. 6. (15%)
    b. No — 40b. 0
    n.a. 34. (85%)

Secondary dressing: wound care technique questions

41. Would you use a secondary dressing in <u>your</u> dressing plan for Mr. J.'s pressure ulcer?
    a. Yes — 41a. 35. (87.5%)
    b. No, the primary dressing I would use doesn't need a secondary dressing — 41b. 5. (12.5%)
    Go to 48

42. Would you use a sterile secondary dressing for your first dressing change?
    a. Yes — 42a. 25. (62.5%)
    b. No — 42b. 10. (25%)
    n.a. 5. (12.5%)

43. Would you apply the secondary dressing using sterile technique?
    a. Yes — 43a. 21. (52.5%)
    b. No — 43b. 14. (35%)
    n.a. 5. (12.5%)

44. Would you save the unused secondary dressing for subsequent dressing changes?
    a. Yes — 44a. 14. (35%)
    b. No, I would throw away the unused portion *go to 48* — 44b. 10. (25%)
    c. No, I would be careful to open only the size package I needed *go to 48* — 44c. 11. (27.5%)
    n.a. 5. (12.5%)

45. How long would you save the unused secondary dressing?
    a. Until it was used up — 45a. 3. (7.5%)
    b. For a specified number of days (how many): 24 hours or 1 day — 45b. 5. (12.5%)
    bi. 2-3 days — 45bi. 1. (2.5%)
    bii. 7-10 days — 45bii. 1. (2.5%)
    c. Other (Enter your response): If the package was taped shut — 45ci. 1. (2.5%)
    ci. If it stays clean — 45cii. 1. (2.5%)
    cii. unlimited — 45ciii. 1. (2.5%)
    45civ. 1. (2.5%)

46. How would you store the unused secondary dressing?
    a. In original package — 46a. 13. (32.5%)
    b. In paper bag — 46b. 1. (2.5%)
    c. In plastic bag — 46c. 0
    d. In other (Enter your response)_____ — 46d. 0
    n.a. 26. (65%)

47. Would you date the secondary dressing when it was opened?
    a. Yes — 47a. 11. (27.5%)
    b. No — 47b. 3. (7.5%)
    n.a. 26. (65%)

Definition: wound care technique question

48. By YOUR definition, which words would you use to describe the wound care technique, which you would use for Mr. J.?

(Please mark ALL responses that apply.)

a.	Aseptic wound care technique	49a 16 (40%)
b.	Clean wound care technique	49b 8 (20%)
c.	Mixed wound care technique	49c 9 (22.5%)
d.	Medical aseptic wound care technique	49d 4 (10%)
e.	Nonsterile wound care technique	49e 2 (5%)
f.	No-touch wound care technique	49f 5 (12%)
g.	Sterile wound care technique	49g 22 (55%)
h.	Surgical aseptic wound care technique	49h 3 (7.5%)
i.	Unsterile wound care technique	49i 1 (2.5%)
j.	Other (Enter your response)_____	49j 0

Additional comments about wound care technique:

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