

# 2003 National Teaching Institute Research Abstracts

Presented at the AACN National Teaching Institute in San Antonio, Tex, 2003.

## RESEARCH ORAL PRESENTATIONS

### *Research Oral Abstract Award Winner*

#### VARIABLES AFFECTING TRAUMA PATIENT OUTCOME FOLLOWING MASSIVE TRANSFUSION

Criddle L, Walker J, Eldredge, D. Oregon Health and Science University, Portland, Ore.

**Purpose:** This study was designed to identify variables contributing to survival following massive blood transfusion (MBT) among major trauma patients admitted to one level 1 trauma center. **Background/Significance:** Although injured patients frequently receive huge volumes of donor blood, the literature contains: 1) no consistent definition of MBT; 2) minimal data regarding outcomes following MBT; and 3) little information about variables (patient or transfusion-related factors) associated with survival. **Methods:** The sample (N=227) for this descriptive correlational study was identified from the institution's trauma registry (1993-2001) and consisted of all patients who received at least 10 units (>2 units for patients 1-14 years old) of packed red blood cells (PRBC). Variables derived from the trauma registry included age, gender, mechanism of injury, Injury Severity Score, and survival status. The facility's blood bank database was used to determine the actual number of units of PRBC, fresh frozen plasma (FFP), platelets, and cryoprecipitate transfused and the administration time frame. The volume of each product given was then categorized as: 1) within 24 hours of injury; 2) between 24 and 48 hours of injury; and 3) during the remaining hospital stay. Data were analyzed using a multivariate logistic regression model. **Results:** The final model was significant (Chi Square = 56.9;  $P < .001$ ) and predicted survival correctly 79% of the time. Controlling for all other variables, persons with blunt injuries were considerably more likely to die (odds ratio = 2.5). In the first 24 hours post-injury, for each additional PRBC unit transfused, patients were 1.1 times more likely to die. However, with each additional FFP unit, patients were less likely (91%) to die. Between 24 and 48 hours, PRBC (.73) and cryoprecipitate (1.2) volumes predicted survival. During the remainder of the hospital stay, PRBC (.88) and FFP (1.2) were predictive of survival.

### *Research Oral Abstract Award Winner*

#### SCHOOL-AGE CHILDREN'S PERCEPTIONS OF THEIR PICU HOSPITALIZATION

Board R. Northeastern University, Boston, Mass.

**Purpose:** The overall aim of this descriptive study was to explore the effects of a PICU hospitalization on criti-

cally ill school-age children. **Background/Significance:** Hospitalization is a very stressful experience for many children and their parents. Yet few studies have examined the impact of the PICU experience on children themselves, and even fewer have focused specifically on school-age children. **Methods:** A convenience sample was recruited of 21 developmentally normal children who were aged 7 to 12 years and had not been hospitalized previously. Children were asked open-ended questions related to their PICU experience. The Schoolagers Coping Strategies Inventory was used to measure the frequency and effectiveness of their coping strategies, and the Child Drawing Hospital tool was used to evaluate the children's emotional status. **Results:** Although not detailed, most children did have some recollection of their PICU stay (67%). People in the PICU were remembered as good, while feelings the children had (tired, hurting) were described as what was bad about the PICU. Forty-three percent of the children felt what helped them most was a nurse. The mean scores of children's coping strategies were very low. Most children (56%) had an average level of anxiety based on analysis of their drawings. There was a significant, negative relationship between the length of intubation and children's coping strategies and between children with no recollections and their anxiety levels. **Conclusions:** Children do have recall of their PICU experience, both positive and negative. Nurses were important to the children and remembered positively by many. Nurses and physicians should never underestimate the effect their behavior and responsiveness has on children. Children's repertoire of coping strategies may be limited by the PICU, especially while intubated. Feasible coping strategies and use of therapeutic play for PICU children should be explored further. **Funding:** American Nurses Foundation/AACN Nurse Scholar, Northeastern University Office of the Provost, Sigma Theta Tau Gamma Epsilon Chapter.

### *Research Oral Abstract Award Winner*

#### USE OF ELECTRONIC COMMUNICATION AIDS IN MEDICAL INTENSIVE CARE

Happ MB, Roesch TK, Garrett K. University of Pittsburgh, Duquesne University, Pittsburgh, Pa.

**Purpose:** This descriptive pilot study explored use of electronic augmentative and alternative communication (AAC) devices with nonspeaking adults in medical ICU. **Background/Significance:** Critically ill patients can experience fear, panic, anger, and insecurity when attempting to communicate nonvocally following

respiratory tract intubation. **Methods:** Observation, event analysis, interviews, and surveys were used to describe: (1) patient characteristics (age, severity of illness, technologic intensity, days with device); (2) quality (ease, satisfaction, frequency) of communication; (3) message content; and (4) barriers to use of electronic AAC devices. **Results:** Eleven MICU patients with respiratory tract intubation, responsive to verbal stimuli, and able to consistently follow simple commands received an electronic voice output AAC device. Study participants ranged in age from 24 to 72 years ( $45.5 \pm 16.0$ ), with an average of  $13 \pm 1.9$  years of education, and  $4.1 \pm 3.4$  days of AAC device use. Severity of illness (APACHE =  $27.5 \pm 16.1$ ) and technologic intensity scores (TISS =  $31.8 \pm 6.7$ ) on entry into the study were moderate. Nonparametric within-case tests applied to the 6 patients able to complete the Ease of Communication Scale at both time points (pre-intervention and post-intervention) showed significantly less difficulty with communication after device use ( $t > 2.62$ ;  $P = 0.047$ ). Almost half ( $n = 5$ ) of the participants demonstrated some independent use of the device. Patients were able to communicate despite treatment with narcotic analgesia ( $n = 5$ ) and/or sedation ( $n = 7$ ). Poor device positioning, deterioration in patient condition, staff time constraints, staff unfamiliarity with the device, and complex message screens were barriers to use. **Conclusions:** This pilot study showed that selected nonspeaking, critically ill adults can use and may benefit from electronic AAC devices. Design improvements, enhanced staff education, individualized AAC assessment, and AAC combination strategies are needed. **Funding:** AACN/Sigma Theta Tau Critical Care Research Grant.

### THE LIVED EXPERIENCE OF CRITICALLY ILL PATIENTS' FAMILY MEMBERS DURING CARDIOPULMONARY RESUSCITATION

Wagner JM. Kent State University College of Nursing, Kent, Ohio.

**Purpose:** The purpose of this qualitative study was to describe the experience, thoughts, and perceptions of critically ill patients' family members during cardiopulmonary resuscitation in the ICU setting. **Background:** During resuscitative efforts, the family is often barred from the patient's room and families may never have the opportunity to see their loved one alive again. Recently, nursing has begun to question the need to ask the family to leave the room. Little is known about family perceptions of cardiopulmonary resuscitation. **Method:** Six family members whose loved ones underwent CPR and survived consented to an audiotaped interview. During these interviews, family members were asked to describe their experience during the resuscitation of a loved one. Interviews were then transcribed by a non-involved typist and analyzed for

relevant themes utilizing Van Manen's thematic analysis. **Results:** One major theme emerged: Should We Go or Should We Stay? Additionally, two sub-themes emerged: What is Going On? and You Do Your Job. A model—The Family's Experience With CPR—was developed to reflect research findings. **Conclusions:** During the period of resuscitation, healthcare professionals neglect to recognize that family members are experiencing crisis, along with the patient, and that coping mechanisms are impaired. Moreover, informational and proximity needs, as identified in this study and previous studies, are often ignored during this time of crisis—CPR of a loved one. It will become increasingly important to address these needs through appropriate nursing interventions as family members begin to remain with their loved one during cardiopulmonary resuscitation. **Funding:** This research was funded by a Clinical Inquiry Grant from the American Association of Critical-Care Nurses and by the Norma J. Shoemaker Grant for Critical Care Nursing Research (2000), awarded by the Society of Critical Care Medicine.

### GROIN BLEEDS AFTER PERCUTANEOUS CORONARY INTERVENTION (PCI): REDUCING THE NUMBERS

Blake P, Gurgiolo T, Enneking J, Holt K, Schmidt T, Watson D, Anderson J, Vollman L, Bogan J. Mount Carmel, Columbus, Ohio.

**Purpose:** The study was conducted to assess increased incidence of groin bleeds related to groin management after percutaneous coronary interventions (PCI). **Background/Significance:** It was noted that patients (post PCI) with a groin bleed have a 2 day higher average LOS compared to patients without a groin bleed. Financial data estimated that the room alone for this additional LOS costs almost \$80,000 per year. The overall bleed complication rate was 3.3%. A control chart analysis showed that during one month the bleed complication rate was 4.5%, significantly higher than the overall average. **Methods:** A chart review over 3 months compared 53 patient groin bleeds versus non-groin bleeds. **Results:** Factors noted to impact groin bleeds included the following: patient age, female gender, catheterization entry site, IV medication, and hemostasis device. The average age of patients with groin bleeds was 65. The highest incidence occurred in the 70 to 79 age group. The majority of groin bleeds occurred in women (66%). Right groin entry site had the highest incidence of groin bleeds, followed by left groin then right wrist. Intravenous bolus medications, such as the following, were compared: Heparin, Reopro, Aggrastat, Integriilin, and Lovenox. Intravenous ReoPro bolus accounted for 69% of groin bleeds. The combination of Heparin and ReoPro accounted for 69% of groin bleeds. The combination of Lovenox and ReoPro accounted for 59% of groin bleeds (90% confidence level). Hemostasis

devices compared Perclose, Angioseal, Femstop, C-clamp, manual pressure, and hemaband. A protocol was developed to increase nursing awareness and to improve management of groins post PCI. After the protocol was implemented, the incidence of groin bleeds decreased from 3.3% to <1.1%. The associated reduction in LOS could save \$50,000 in room costs. **Conclusions:** A nursing protocol for identifying patients at risk for bleeding post PCI significantly decreases groin bleed complications and results in significant savings.

#### *Research Oral Abstract Award Winner*

#### **INTERDISCIPLINARY MANAGEMENT OF NUTRITIONAL RISK IN CRITICAL CARE**

Killough E, Whittier N, Chamberlain A, Deslauriers S, Madden I, Metters A, Schwartz D. Sturdy Memorial Hospital, Attleboro, Mass.

**Purpose:** This study was conducted to assess nutrition management strategies for critically ill patients, with an objective of improving outcomes through the implementation of a data-based protocol to optimize nutrition support. **Background/Significance:** Protein-calorie malnutrition has been identified as a significant problem in critical care and is frequently associated with complications that can contribute to increased morbidity and mortality. **Methods:** A pilot study (n=60) was conducted to identify and evaluate current nutrition management practices. An interdisciplinary protocol was then developed that included standardization of risk assessment, baseline prealbumin testing for all ICU admissions >24 hours, and a management algorithm. Biweekly prealbumin levels and daily progress toward meeting protein/calorie needs were assessed for patients at risk. The intervention sample (n=98) was then compared to the pilot sample. The difference in APACHE II scores for these groups was not significant. **Results:** With protocol management, time to initiation of nutrition support was decreased from 2.95 to .90 days. For the protocol sample, 79.6% met  $\geq 75\%$  of estimated protein-calorie needs by day three (pilot = 31.7%). Mean prealbumin for the protocol group improved from 12.5 mg/dL (moderate depletion) at admission to 18.2 mg/dL (normal). Low prealbumin at discharge was moderately correlated with readmission within 30 days. ICU LOS and total LOS were significantly reduced for protocol-managed patients. **Conclusions:** These findings support the benefits of prompt identification of risk and of timely initiation and close monitoring of nutrition support. Critical care nurses have a central role at each level of intervention. Reliable measures of nutrition status and response to therapy should be incorporated into routine monitoring. Nutrition management should be standardized with quantifiable outcomes clearly communicated to all disciplines involved in patient care. **Funding:** This study

was funded by a Data-Driven Clinical Practice Grant from the American Association of Critical-Care Nurses.

#### **ACUTE MYOCARDIAL INFARCTION:**

Blake P, Gurgiolo T, Anderson J, Vollman L, Bogan J. Mount Carmel, Columbus, Ohio.

**Purpose:** The study was conducted to evaluate the impact of standardized orders and a data collection tool on acute myocardial infarction (MI) patient outcomes. **Background/Significance:** Variations in the treatment of acute MI patients result in inconsistent patient outcomes. **Methods:** A baseline chart review of 250 patients was completed. After implementation of the data collection tool and standardized orders for acute MI patients, 2000 charts were reviewed. **Results:** Patients coded as acute MI with documentation meeting the American College of Cardiology criteria improved from 84% to 96%. Adjunct therapy improved, as noted by the following (eligible patients only;  $P=.001$  in each of the following): aspirin usage increased from 90% to 98%; beta blocker usage increased from 81% to 94%; ACE inhibitor usage increased from 59% to 81%; smoking cessation counseling increased from 2% to 65%; HbA1C values drawn in patients increased from 11% to 53%; and lipid treatment for elevated lipid levels increased from 46% to 91%. **Conclusions:** Several benefits resulted from the implementation of the data collection tool and standardized orders. Best practice protocols for managing the acute MI patient improved. Documentation of the symptoms of acute MI improved, as did documentation of adjunct therapy. Acute MI payments for denials (as deemed not medically necessary) decreased from \$247,000 to \$0 in 2 years.

#### **RELATIONSHIP BETWEEN FLUID BALANCE AND WEANING IN OLDER CRITICALLY ILL SURGICAL PATIENTS**

Epstein CD, Peerless JR, Mohamed HF, Wrenn ER, Kuestner ME. Case Western Reserve University, Cleveland, Ohio.

**Purpose:** This study examined changes in daily fluid balance (DFB), net cumulative fluid balance (CFB), and body weight (BW) in trauma and surgical older adults as they transitioned to long-term mechanical ventilation (LTMV). **Background/Significance:** Little is known about which fluid-based parameters are related to successful weaning. **Methods:** This study is part of a larger project undertaken to identify predictors of readiness to wean in 39 patients (>60 years) admitted to the surgical intensive care unit of a level I trauma center. Changes in DFB, CFB, and BW were monitored for 14 days, and were compared between patients who weaned (PW) and did not wean (NW). Distributions of variables were examined for normality, appropriate stat-

istical tests were used, and results reported as mean values + standard deviation (SD) in liters (L). **Results:** Upon study entry, the DFB of PW (n=28, 72%) was  $-0.394 \pm 1.4L$ , significantly lower than that of NW ( $1.3 \pm 1.6L$ ) ( $T=3.180$ ,  $P=.003$ ). Upon study entry, the net CFB of PW was  $5.6 \pm 9.6L$ , significantly lower than that of NW ( $18.3 \pm 23.8L$ ) ( $Z=3.614$ ,  $P=.0001$ ). While the final net CFB of PW had increased to  $9.4 \pm 10.2L$ , the final net CFB of NW rose to a significantly higher level ( $29.3 \pm 26L$ ) ( $Z=5.08$ ,  $P=.0001$ ). No significant differences in BW between PW and NW were found. The 95% confidence intervals for weight were acceptable, with a medium effect size of .50; however, this study's power was limited by a small sample size. **Conclusions:** Fluid volume overload is present in older surgical and trauma patients who have newly transitioned to LTMV, particularly those who require extended LTMV. While DFB differentiates PW from NW, the net CFB provides a fuller picture of the degree to which fluid volume excess accrues over time. Further study with a larger sample is needed to examine the relationship between body weight and weaning from MV. **Funding:** This study was funded by the Norma J. Shoemaker Grant for Critical Care Nursing Research (2000), awarded by the Society of Critical Care Medicine.

#### LIVING WITH PULMONARY ARTERIAL HYPERTENSION (PAH)

Savage L, Flattery M, Pinson J, Salyer J. Virginia Commonwealth University Health System Medical College of Virginia Hospital and Physicians and Virginia Commonwealth University School of Nursing, Richmond, Va.

**Purpose:** The specific aim of this study was to describe patients' experiences living with PAH. **Background/Significance:** PAH, defined as a mean pulmonary artery pressure of more than 25 millimeters (mm) of mercury (Hg) at rest or 30 mm Hg with exercise (Rubin, 1997), can be classified as either primary or secondary. Treatment options for PAH are limited; however, Epoprostenol (Flolan<sup>TM</sup>) given via a continuous intravenous infusion has greatly improved survival time. It is, however, a complex regimen requiring dedication and changes in lifestyle. New treatments, Bosentan (Tracleer<sup>TM</sup>) and Treprostinil (Remodulin<sup>TM</sup>) are available—all with the hope of improving quality of life. **Method:** The phenomenologic approach was selected to allow patients to freely describe their experience living with PAH. Participants were purposively selected to represent the current spectrum of medical therapy, including calcium channel blockers, Bosentan (Tracleer<sup>TM</sup>) and Epoprostenol (Flolan<sup>TM</sup>). After obtaining written consent, 8 Caucasian participants (6 women, mean age = 57.2) followed at a health sciences center were interviewed. The interviews were recorded, tran-

scribed, and analyzed utilizing Colaizzi's (1978) 7-step process for analysis. **Results:** Analysis of data revealed 2 overarching themes: "coping with uncertainty" and "life after treatment." Uncertainty was related to the meaning of symptoms and life expectancy after diagnosis of PAH was confirmed. Specific coping strategies included "information seeking," "making memories," "humor," "spirituality," "doing what I have to do," and "seeking support." Life after treatment reflected "adjustment to the treatment regimen" and "resuming life's activities." **Conclusions:** This information is essential for critical care nurses caring for patients with PAH. These findings support the nurse in helping patients cope with uncertainty of diagnosis and treatment of PAH. In addition, it supports the role of the nurse in assisting patient's adjustment to a required, and often complicated, therapeutic regimen.

#### A QUANTITATIVE AND QUALITATIVE ANALYSIS OF ADVANCE MEDICAL DIRECTIVES

Westphal, C.

**Purpose:** This study analyzed the number, type, and content of advance medical directives (AMD) presented by adult patients. **Background/Significance:** If an individual does have an AMD but it does not meet statutory requirements or is vague in describing the individual's treatment preferences, complex issues can emerge when attempts are made to implement it. **Methods:** The AMD documents presented by patients admitted to critical care and medical-surgical units of a 600+ bed community teaching hospital over a 6-month period were reviewed by the investigator to determine type of document, compliance with statutory criteria, and specificity of content related to identification of advocate and treatment preferences. A data collection form was developed for the purpose of the investigation. Content validity was established by expert review. **Results:** Data revealed 14% of the patients reported having an AMD; however, only half reported bringing the document with them. The majority of documents (94%) met the statutory requirements for a patient advocate designation (durable power of attorney for healthcare). It was identified that 37% lacked information about how to contact the advocate, and 12% did not provide any clear treatment preferences. Coma, persistent vegetative state, and/or terminal illness were cited as criteria for limiting or withdrawing treatment in 86% of the documents that contained preferences. Approximately half of these also cited "quality of life" or "burdens" as additional criteria; however, personal values related to quality of life or burdens were not described. **Conclusions:** Although advance medical directives may meet statutory requirements, lack of information related to advocates, patient preferences,

and/or personal values can limit the ability to interpret and apply the document. Increased efforts are needed to clarify the content of directives before emergencies occur and educate the community about the significance of clear, values-based directives.

#### COMET DNA ANALYSIS OF THE DIAPHRAGM

Pierce J, Goodyear-Bruch C, Arnett M, Reed G, Clancy R. University of Kansas Medical Center, Kansas City, Kan.

**Purpose:** The study is being conducted to determine the mechanism(s) for dopamine attenuation of diaphragm fatigue. We are examining the percent of DNA damage in diaphragm tissue that is produced by free radical generation, specifically reactive oxygen species (ROS). **Background/Significance:** Thousands of critical care patients suffer from diaphragm fatigue when being weaned from mechanical ventilation. However, even with new modes of ventilation and drugs, we still have difficulty preventing diaphragm fatigue. It is now known that free radicals are generated when the diaphragm fatigues and that free radicals cause DNA damage. Thus, examining DNA damage in the diaphragm is a first step in understanding what occurs to the diaphragm with free radical generation. **Methods:** Using a rat model, we are stimulating the diaphragm in an isolated tissue bath to induce diaphragm fatigue and then removing the tissue to determine DNA damage. This new innovative method of measuring ROS-generated DNA damage allows the investigator to scale the damage based on the amount of fluorescence. **Results:** Diaphragm tissue is isolated and examined for DNA damage before and after diaphragm fatigue. Using the Komet DNA data acquisition package, a scale of 0 to 4 is used to quantify the DNA damage. A scale of 0 indicates no damage, and 4 indicates complete destruction of DNA. This helps to quantify the % of DNA comet tail. **Conclusions:** The use of new methods to determine cellular structure is essential in understanding what causes different health conditions such as diaphragm fatigue. As critical care nurses investigate the effects of interventions on patients, there needs to be not only integrative measures but also cellular measures such as DNA damage. **Funding:** NIH, NINR, 1R01NR05317-01A1.

#### READY TO WEAN? PATIENT PERCEPTIONS, ASSESSMENTS, AND OUTCOMES WHEN WEANING FROM MECHANICAL VENTILATION

Twibell R, Siela D, Mahmoodi M. Ball State University, Muncie, Ind.

**Purpose:** The study sought to evaluate possible correlates of complete weaning outcomes by exploring physiological assessments and subjective perceptions of dyspnea, fatigue, and self-efficacy in patients undergoing initial

weaning from mechanical ventilation. **Background/Significance:** As costs related to mechanical ventilation increase steadily, the need for clear indicators of weaning readiness is accentuated. Little consensus exists on physiological variables that consistently correlate with weaning outcomes. Subjective perceptions have been examined only rarely to determine potential influence on weaning outcomes. **Methods:** In this correlational, prospective study, data were collected from 68 patients who were weaning from mechanical ventilation. Participants were primarily elderly, female, Caucasian, and had required mechanical ventilation for an average of less than 4 days. Physiological variables were measured by Burns Weaning Assessment Program (Burns et al, 1991) and a patient profile at the beginning of an initial weaning attempt. Subjective perceptions were measured by patient responses on 3 visual analogue scales. Weaning outcomes were annotated 24 hours later. **Results:** Participants reported mild dyspnea, moderate fatigue, and high weaning self-efficacy. High PaO<sub>2</sub> levels, low PaCO<sub>2</sub> levels, hemodynamic stability, adequate cough/swallow reflexes, absence of metabolic changes, and absence of abdominal problems were associated with complete weaning ( $P < .05$ ). Subjective perceptions, while not significantly associated with weaning outcomes, were significantly associated with selected physiological variables ( $P < .05$ ). **Conclusions:** Multi-dimensional nursing evaluation of both primary and secondary indicators of weaning readiness is necessary for timely, efficient weaning. Primary assessments include physiological variables related to gas exchange, hemodynamic stability, diaphragmatic expansion, and airway clearance. Secondary assessments include subjective perceptions that are associated with primary physiological variables. Additional research is needed to determine the predictive value of selected physiological variables and perceptions of dyspnea, fatigue, and weaning self-efficacy. **Funding:** American Association of Critical-Care Nurses Clinical Inquiry Grant.

#### THE USE OF EASI 12-LEAD EKG MONITORING FOR ARRHYTHMIAS AND ISCHEMIA IN CARDIAC PATIENTS

Jahrsdoerfer M, Stephen D, Giuliano KK. North Shore University Hospital, Manhasset, NY.

**Purpose:** The purpose of this study was to assess the clinical usefulness of EASI 12-lead EKG monitoring in a cardiac telemetry step-down unit. **Background/Significance:** Cardiovascular disease is the leading cause of morbidity and mortality in the U.S., with approximately 500,000 annual deaths from MI alone. The single most important factor for improved outcomes is early recognition and treatment, yet most routine cardiac monitoring includes only 2 leads, a practice that misses 64% to 80% of ischemic cardiac events.

**Methods:** We implemented the EASI 12-lead EKG monitoring system, and tracked the clinical usefulness of this monitoring in a convenience sample of 64 patients using a data collection tool completed by the monitoring technicians. **Results:** In 75% of the subjects, the EASI 12-lead ECG monitoring information was accessed at least 10 times/shift, giving the clinicians arrhythmia and ischemia information in all 12 leads. In 50% of the subjects, treatment was changed based on the information found using EASI that would not have been found with routine 12-lead monitoring. In 68.8% of the subjects, the interpretation of the rhythm was changed based on the clinical information provided by EASI. In 5 of 64 cases, the use of EASI provided immediate access to the clinical information needed to differentiate between artifact and serious ventricular arrhythmias. **Conclusions:** Continuous ST-segment monitoring provides uninterrupted, real-time information about the occurrence, frequency, and severity of significant arrhythmic and ischemic cardiac events. As shown by the data in this study, the ability to generate both real-time and retrospective 12-lead EKGs resulted in important differences in the clinical management of these patients. These results suggest that there is a clinical benefit to using continuous ST-segment monitoring on all patients in the cardiac step-down area.

#### **RESPONDING TO VULNERABILITY: EXPERT CRITICAL CARE NURSES' PRACTICE IN END-OF-LIFE CONFLICTS**

Robichaux C. The University of Texas Health Science Center at San Antonio, San Antonio, Tex.

**Purpose:** To explore indicators that expert adult critical care nurses describe and communicate about poor patient prognosis and actions taken when their perception of the usefulness of continued aggressive medical interventions differed from family members and/or physicians. **Background/Significance:** Research suggests that end-of-life care in the ICU remains inadequate. Critical care nurses are portrayed as having a limited role in end-of-life conflicts despite having identified prolonging the living/dying process as a profoundly disturbing ethical issue. **Methods:** A qualitative design using both narrative and thematic analysis of interview data was employed. Interviews were conducted with 21 critical care nurses nominated as experts by a colleague from 1 of 7 facilities in the Southwest United States. Responses that had a temporal ordering of events were analyzed using narrative methods. A thematic analysis was conducted on those responses that did not take a narrative form. Three recurrent narrative plots and 3 main themes emerged from the data. **Results:** Often the first to acknowledge poor prognosis, participants integrated elements of clinical, relational, and ethical knowledge. When aggressive interventions were

perceived as not achieving the intended outcome, the nurses endeavored to protect the patient, present a realistic picture, and gain support from a "core group" of peers. The participants consulted resources such as pastoral care and the ethics committee if they were recognized as accessible and useful. Tempering involvement with the patient/family emerged as a self-protective strategy when attempts to advocate were ineffective. **Conclusions:** Responding to situations of extreme vulnerability implies a responsibility to promote or restore patient dignity. The ability to effectively advocate is enhanced by maturity, communication skills, and having personal experience with dying and death. Relational narratives, such as those described by the nurses, may contribute to articulation of an experiential account of expert practice at the end of life.

#### **"DIFUSE ST SEGMENT" ELEVATION: A COMMON FEATURE FOLLOWING MINIMALLY INVASIVE ASD CLOSURE**

Pike N, Vricella L, Ford R, Coady M, Coll A, Black M. Lucile Packard Children's Hospital at Stanford, Palo Alto, Calif.

**Purpose:** The study was conducted to assess ST-segment elevation following minimally invasive pediatric cardiac surgery. **Background/Significance:** Minimally invasive techniques are being employed for many cardiac surgical procedures. The routine correction of atrial septal defect (ASD) closures at Stanford incorporates the hemi-median sternotomy incision, limited pericardiotomy, cardioscopy, and regional anesthesia supplementation. A frequent observation of diffuse ST-segment elevation in this cohort of children in the post-operative period was investigated. **Methods:** Between 1999 and 2001, 55 children underwent a minimally invasive repair of an isolated ASD. Mean age and weight of the 23 boys and 32 girls at operation was  $5.9 \pm 5.0$  years (range: 6 months–19 years) and  $24.4 \pm 18.5$  kg (range: 5.1–92 kg), respectively. The routine monitoring of ST-segment elevation was performed by surface electrocardiography with regional wall motion abnormalities and inspection of possible pericardial effusions completed by echocardiography. ST segments were evaluated for regression at the time of discharge. **Results:** Forty-two (76%) of the children had a secundum ASD, while 13 (24%) had a sinus venosus defect. Mean CPB time was  $57.5 \pm 27.2$  minutes. An aortic cross clamp was applied in 15 children (27%) and fibrillation utilized in 40 (73%), mean  $22.6 \pm 12.2$  minutes. ST-segment elevations were noted in 41 (75%) patients with a mean of  $6.7 \pm 2.4$  hours after surgery and remain independent from the onset of fever. Twenty-five (45%) children had an insignificant pericardial effusion upon discharge. No regional wall motion abnormalities were detected. Fifty-eight percent of ST-segment

elevations returned to baseline prior to discharge. Average length of stay was 2.16 days, with no readmissions or deaths. **Conclusion:** The incidence of ST-segment elevation is common after minimally invasive ASD closure and is consistent with a diffuse and limited acute pericardial inflammatory response and not myocardial ischemia.

#### **NATIONAL SURVEY OF CRITICAL CARE NURSES' PERCEPTIONS OF END-OF-LIFE CARE**

Beckstrand RL, Kirchhoff KT. Brigham Young University, Provo, Utah.

**Purpose:** To measure critical-care nurses' perceptions of both the intensity and frequency of obstacles and helpful behaviors in providing end-of-life care to dying patients. **Background/Significance:** Critical-care nurses care for dying patients since about one fifth of ICU patients die while hospitalized. An understanding of RN perceptions regarding obstacles or helpful behaviors in providing end-of-life care is needed so that interventions that improve end-of-life patient care can be developed and implemented. **Methods:** A geographically dispersed, random sample of 1409 RN members of AACN were sent a 72-item questionnaire asking them to rate (on a provided scale) a list of obstacles and helpful behaviors in providing end-of-life care in ICUs. Nurses were also asked to list suggestions for improving end-of-life care in ICUs. There were 861 responses returned (61%) after 3 mailings. **Results:** Highest obstacles were frequent phone calls to the nurse, families not understanding the term "lifesaving measures," and physicians disagreeing about patient care. The most intense helpful behaviors were allowing the family adequate time alone (after the death), providing a dignified bedside scene, and teaching the family how to act around the dying patient. Other results included nurses wanting patients to experience a "good death," more time for patient care, honest communication to patients, and education in end-of-life care for physicians and nurses. **Conclusions:** Serious deficiencies in end-of-life care continue to exist in ICUs across the nation. Helpful behaviors that occurred most frequently were noted to be items that nurses control. Items seen as both helpful and frequently occurring (high perceived intensity score) were usually in the control of the nurse. Behaviors controlled by physicians received lower perceived intensity scores mainly because they occur less frequently than nurse-controlled behaviors. **Funding:** Partial funding for this research was received from Brigham Young University College of Nursing.

#### **POSTER ABSTRACTS**

#### **BOLD VOICES: DEVELOPING AN EVIDENCE- BASED MODEL FOR HEART FAILURE MANAGEMENT**

Weidner C, Bandos J. Major Hospital, Shelbyville, Ind.  
Dayhoff N. Clinical Solutions, LLC Columbus, Ind.

**Problem:** For healthcare systems to manage complex illness cost-effectively, nurses need to develop innovative effective programs of patient care. From a review of readmission data, the ICU/PCU nursing staff of an 89-bed community hospital found that patients who are readmitted for heart failure (HF) are a particularly challenging group of patients. In analyzing readmission data, the cardiac case manager (CCM) and clinical nurse specialist (CNS) discovered inconsistencies of patient teaching and coaching across the continuum of care, including general nursing units, ICU, outpatients, and medical offices. **Purpose:** The CCM's goal was to develop an innovative program with an evidence-based delivery model that integrated the nursing competencies and role in teaching and coaching across the continuum. **Description:** As part of the hospital's continuing education for nurse leadership development, nurse consultants for developing evidence-based practice conducted a series of seminars focusing on assisting nurses to construct evidence-based practice and programs. The CCM, with the support of the CNS, applied an evidence-based model (Dayhoff Model) to critique existing programs and design solutions to improve outcomes. The model assisted in analyzing and evaluating processes and practices in the development of evidence-based practice across the continuum of care. Based on the evidence, protocols and educational tools for the management of HF patients were restructured. Clinical and financial outcome data were tracked and evaluated for 12 months. **Evaluation and Outcomes:** Improved outcomes were documented, including increased pathway utilization, increased patient education, increased use of ace inhibitors, increased frequency of measurement of ejection fraction, and decreased readmission rates. Data revealed that the HF population was receiving the appropriate level of care and avoiding high-cost hospitalization. Due to the success of redesigning the nursing management of HF patients, the EBP model will be utilized in the development of other disease-management programs.

#### **THE USE OF ISOLATION PRECAUTIONS IN CARDIAC TRANSPLANT RECIPIENTS**

Dietrich D. The University Hospital, Cincinnati, Ohio.

**Purpose:** The objective of this study was to describe the use of strict isolation protocols versus the use of standard universal precautions in transplant centers

nationwide. **Background/Significance:** Previous research has shown little difference in infection rates of cardiac transplant recipients receiving strict isolation compared with those receiving universal precautions. The use of strict isolation increases the cost in terms of supplies and time required for patient care. Patient contact is also threatened by the use of infection control measures. No standard guideline of protective isolation is documented or utilized while caring for recipients of organ transplants, either by the CDC or other governing body. **Methods:** The names and addresses of 108 cardiac transplant centers nationwide were obtained from the United Network for Organ Sharing. A survey was mailed to the coordinators of each transplant center. Descriptive statistics and cross tabulation diagrams were used to provide demographic information and to illustrate relationships with use of isolation precautions, program experience, infection, and survival rates. **Results:** From 2 mailings, a total of 72 (67%) surveys were returned. Sixty-nine of those returned met the inclusion criteria and were analyzed. Hand washing was used 100% of the time, followed by private room (71%), mask (53.6%), and gloves (44.9%). The majority of centers (55%) use 3 or fewer isolation precautions. The precautions least utilized include shoe-cover, head-cover, and gown. Rates of infection and survival rates did not differ significantly in the groups that used 3 or fewer isolation precautions and those using 4 or more. **Conclusions:** More centers are using fewer isolation precautions without affecting infection incidence or survival ratings. Use of the equivalent of standard universal precautions is practiced in the majority of cardiac transplant centers surveyed. **Funding:** A grant from the Greater Cincinnati Chapter of AACN was received to complete this research project and aid in dissemination of the information obtained.

#### **CAN NURSES IMPROVE CARE OF NSTEMI ACS PATIENTS BY ENCOURAGING GUIDELINE ADHERENCE? IMPLICATIONS OF THE CRUSADE INITIATIVE**

Fraulo E, Lytle B, Staman K, Rund M, Aitchinson P, Davis L, Denno M, Draus C, McNamara N, Rose R, Shaddinger D, Sims J, Smith D, Wentz C, Williams J. Duke Clinical Research Institute, Durham, NC.

**Purpose:** To determine the current state of adherence to the ACC/AHA guidelines and to implement quality improvement initiatives to promote guideline recommendations for managing patients with non-ST-segment elevation acute coronary syndromes (NSTEMI ACS). **Background:** The ACC/AHA Guidelines recommend an aggressive, evidenced-based approach for treatment of patients with NSTEMI ACS. In spite of the potential to improve patient care by employing the Guidelines, prior studies and the results of CRUSADE

(Can Rapid Risk Stratification of Unstable Angina Patients Suppress Adverse Outcomes With Early Implementation of the ACC/AHA Guidelines) demonstrate suboptimal adherence to these Guidelines. Nurses have an opportunity to improve Guideline-based care for NSTEMI ACS patients. **Methods:** In 264 U.S. hospitals, nurse coordinators retrospectively collected data for 18 961 patients over a 9-month period. **Results:** Treatment gaps were evident for medical treatment and secondary prevention of NSTEMI ACS patients. For acute therapies (within the first 24 hours), only 90% of patients received aspirin, 76% received a beta blocker, 83% received heparin, and 30% received a GP IIb-IIIa inhibitor. At discharge, 88% of patients received aspirin, 80% received a beta blocker, 58% received smoking cessation counseling, and 67% were counseled about dietary modification. Among high-risk patients (diabetes, EF<40%, or hypertension), only 59% received an ACE inhibitor. Only 77% of patients (LDL>100 mg/dL) who would benefit from a lipid-lowering agent received one. **Conclusions:** As a part of CRUSADE, nurses are spearheading initiatives to develop and implement tools designed to increase adherence to the ACC/AHA Guidelines. Examples include feedback reports, standing orders, and treatment algorithms. Nurses can help ensure that the Guidelines are implemented appropriately.

#### **A PILOT EDUCATIONAL INTERVENTION IMPROVES PATIENT KNOWLEDGE OF SYMPTOMS OF HEART FAILURE**

Howie J, Banks A, Caldwell M, Dracup K. University of California, San Francisco School of Nursing.

**Purpose:** To test the effectiveness of an educational intervention designed to increase symptom recognition and fluid weight management in patients with heart failure (HF). **Background:** Patient education and counseling play an integral part in patient adherence with medical therapies and response to symptoms of worsening HF. While it is known that educating patients about HF symptoms reduces morbidity and recidivism, it is not known if a simplified approach focused on symptom recognition and fluid weight management alone may be effective. **Methods:** A pretest, posttest design with a convenience sample of 23 patients, mean age 64 years, 83% male, 78% Caucasian, NYHA class II or III, was completed. Phase I—A survey of patient knowledge of HF, attitudes, and autonomy about their disease, perceived control, and emotions was completed. Phase II—An educational intervention was presented to the HF patients using a script and pictures. The educational intervention addressed 3 areas: information on HF, emotions as barriers to seeking treatment, and social factors that facilitate reduced delay. Phase III—The same initial survey was administered, and data were analyzed using paired t-tests. Significance was defined as



*P* value of <0.05. **Results:** Patient knowledge of HF and symptoms improved from a mean of 69% to 85%, with a pre-test value of 16.65 (SD 2.79) and posttest value of 20.30 (SD 2.44). **Conclusions:** A simplified educational intervention improved patient knowledge of HF symptoms and attitudes related to care-seeking without increasing anxiety. Perceived control had no statistical change. Further study is needed to determine if these positive changes translate to reduced delay in seeking treatment and ultimately in fewer hospital admissions.

#### **SAFETY AND EFFICACY OF NURSE-INSERTED TRANSESOPHAGEAL DOPPLER PROBE**

Prentice D, Schallom M, Sona C, Iregui M, Kollef M. Barnes-Jewish Hospital, St. Louis, Mo.

**Purpose:** The study was conducted to compare the clinical assessment of cardiac index (CI) with CI measurements obtained from transesophageal Doppler (TED) and to assess the safety of ICU nurses inserting the probe. **Background/Significance:** Significant complications can be associated with the insertion of the pulmonary artery catheter that include arrhythmias, pneumothorax, catheter-associated bloodstream infections, pulmonary artery rupture, pulmonary infarction, and venous thrombosis. Several studies have shown that clinical assessment of hemodynamics by clinicians is correct only about 50% of the time. New, less invasive technology must be evaluated to find a safe and reliable assessment of hemodynamics. **Methods:** A prospective, observation cohort study was conducted in the medical and surgical intensive care units of a university-affiliated tertiary care hospital. Physicians were asked to predict the cardiac index (CI) and the intravascular volume status of patients for whom they determined the need for hemodynamic monitoring. The predictions were compared to the TED readings. Complications of TED insertion were followed. **Results:** A total of 106 mechanically ventilated patients underwent hemodynamic monitoring with the TED. In 1 patient, no adequate Doppler waveform could be obtained. Forty patients (37.7%) required additional sedation during placement of the TED. The physicians correctly predicted CI in 46 (43.8%) patients and correctly predicted intravascular volume status in 31 (29.5%) patients. A change in treatment occurred in 57 (54.3%) patients based on the information obtained from the TED. There were no adverse outcomes related to TED insertion. **Conclusions:** The ability to accurately predict the hemodynamic status of patients is limited. Less invasive, safe devices are needed to decrease the risks associated with hemodynamic assessments. This data suggests that the TED appears to be a safe and effective method of measuring CI and intravascular volume status in mechanically ventilated patients. Critical care nurses can safely and accurately insert the TED.

#### **IV INSULIN MANAGEMENT IN POST-OP CABG PATIENTS**

YJ Moore. Carle Foundation Hospital, Urbana, Ill.

**Purpose:** The focus of the study was to develop a standardized IV insulin therapy. The project evaluated the current IV insulin infusion therapy both within and outside the institution. **Background/Significance:** The hospital did not have standardized IV insulin therapy for the postoperative hyperglycemia. As a result, there were wide disparities in IV insulin practices. The importance of reducing deep sternal infection by maintaining normal blood glucose is well established in the current literature, and the need to develop a safe IV insulin infusion therapy was identified as an ICU-specific performance improvement project. **Method:** The data collection process was completed during a consecutive 3-month period to assess the current status. During this period, there were a total of 80 CABG cases, 21 (26%) of which required IV insulin therapy. **Results:** The initial data collection demonstrated our institution has poor postoperative CABG hyperglycemic management. Eighteen of the 21 patients (86%) were on required IV insulin therapy. Six of 20 patients (29%) received subcutaneous insulin before advancing to continuous IV infusion, while 3 patients (14%) received SQ insulin only. There were also wide variations in the IV insulin titration rate and dose. **Conclusions:** The data collection process and subsequent analysis confirmed disparities in insulin management practices. Specific areas and processes identified as requiring standardization within our institution included: 1) insulin infusion titration rates; 2) frequent monitoring blood glucose; 3) transition to SQ coverage from IV insulin infusion; and 4) overall perioperative hyperglycemic management. This preliminary analysis also identified the need for further research, staff education, and building of an interdisciplinary team. During the second phase of the project, the completion of the standing order for the Portland Protocol for 48-Hour IV Insulin Infusion in Postoperative CABG Patients With Cardiopulmonary Bypass Requirement was established.

#### **THE EFFECT OF LATERAL POSITIONING ON TISSUE OXYGENATION IN CARDIOVASCULAR SURGICAL PATIENTS WITH ANEMIA**

Reed S, Jesurum-Urbaitis J, Kumpula J, Motzer S, Simpson T, Burr R, Gartman D. Swedish Medical Center/First Hill, Seattle, Wash.

**Purpose:** To describe the effects of lateral positioning on tissue oxygenation ( $SvO_2$ ) in anemic cardiovascular surgical patients. **Background/Significance:** Anemic cardiovascular surgical patients may be more susceptible to tissue hypoxia with lateral positioning due to decreased oxygen delivery. **Methods:** A secondary

analysis was performed from a prospective, experimental study on lateral positioning in mechanically ventilated, cardiovascular surgical patients with low oxygen delivery ( $DO_2I < 500$  ml/min/m<sup>2</sup>). Sixteen men and 15 women were randomly assigned to passively rotate from the supine (baseline) position to either the left or right 45-degree lateral position, with 20 head-of-bed elevation. A pulmonary artery catheter measured  $SvO_2$ , and a metabolic monitor measured oxygen consumption ( $VO_2$ ) at baseline and each minute after positioning for 10 minutes.  $DO_2$ , oxygen extraction ( $O_2ER$ ), and cardiac index were collected at baseline, 3, 5, and 10 minutes. Hemoglobin (Hgb) was collected at baseline. **Results:** For the group (N=31), repeated measures analysis of variance (ANOVA) determined there was a significant difference between  $SvO_2$  at baseline and each minute for 10 minutes following lateral positioning ( $F=7.401$ ,  $P<.0001$ ). Subjects were divided into 2 groups based on Hgb: Group I, Hgb  $<9.99$  g/dl (n=14,  $M=9.23$ ,  $SD=.35$ ) and Group II, Hgb  $>10.0$  g/dl (n=17,  $M=11.24$ ,  $SD=.87$ ). Group I had lower mean  $SvO_2$  and  $DO_2I$  values in the supine position, and mean values remained lower for 10 minutes compared to Group II.  $O_2ER$  was higher for Group I at baseline and for all measurements compared to Group II. There was no significant difference in mean  $SvO_2$  between hemoglobin groups at all time points before and after lateral positioning. **Conclusions:** Cardiovascular surgical patients with lower hemoglobin levels have lower  $SvO_2$ ,  $DO_2I$ , and higher  $O_2ER$  before and after lateral positioning.

#### ARE MALES MORE SUSCEPTIBLE TO STRESS-MEDIATED CARDIAC DYSRHYTHMIAS THAN FEMALES?

Teplitz L, Igc R,\* Schwertz D. Dept of Medical Surgical Nursing, University of Illinois, Dept Anesthesiology, Cook County Hospital,\* Chicago, Ill.

**Purpose:** This study was conducted in a rat model to determine whether there is a sex-difference in susceptibility to epinephrine-induced cardiac dysrhythmias. **Background:** Increased stress is associated with negative health outcomes (Kratz and McCeney, 2002). Stress activates the sympathetic nervous system, thereby increasing plasma catecholamine (eg, epinephrine) levels. Cardiac responses to epinephrine are primarily mediated through  $\beta$ -adrenergic receptors ( $\beta$ -AR). Catecholamines have been shown to initiate dysrhythmias (Myerburg et al., 1993). Our previous studies demonstrate that male myocardium has a greater positive inotropic response to  $\beta$ -AR agonists than females, mediated in part through a greater density of myocardial  $\beta$ -AR. **Method:** Epinephrine (10 and 25  $\mu$ g/kg, IV bolus) was administered to anesthetized, mature, age-matched male and female (n=13 each) rats,

while ECG and blood pressure (BP-by carotid artery catheter) were continuously monitored for 60 seconds and again for 10 seconds at 2, 3, 4, 5, 10, 15, and 30 minutes. Comparisons were made by MANOVA followed by post hoc analysis ( $\alpha=0.05$ ). **Results:** Baseline and epinephrine-elicited changes in heart rate, systolic, diastolic, or mean BP did not differ by sex. However, male rats had a significantly higher frequency of premature ventricular contractions, missed and blocked beats than females. The time to onset of dysrhythmias was similar. **Conclusions:** A greater frequency of epinephrine-elicited dysrhythmias in the absence of sex-differences in hemodynamic response suggests that the difference is likely due to direct effects on the heart. From this, we speculate that males are more susceptible to stress-initiated dysrhythmias. Confirmation of these results in humans may lead to sex-optimized interventions for prevention and treatment of cardiac dysrhythmias. **Funding:** ANF/AACN Scholar, Guidant Technologies, Falk Medical Research Trust.

#### CUSTOMPAC™ DURAFLO-TREATED CATHETER: AN ALTERNATIVE VASCULAR ACCESS IN PATIENTS WITH TOTAL MECHANICAL CARDIAC ASSISTANCE AND CONTINUOUS RENAL REPLACEMENT THERAPY

Veloria E, Angeles A, Venturanza M. New York-Presbyterian Hospital, NY, NY.

**Purpose:** The study examined our experience with a CustomPac Duraflo-treated (CPDT) catheter (Jostra Bentley, Irvine, Calif) as an alternative vascular access for continuous renal replacement therapy (CRRT) in patients who are supported with the Abiomed™ (Danvers, Mass) BVS 500 Ventricular Assist Device (VAD). **Background/Significance:** Mechanical cardiac assistance with the BVS 500 has shown to improve survival rate when implanted during the early stages of cardiogenic shock (CS). The externalized cannulae of the BVS 500 offered an alternative access for CRRT in this patient population who are at risk for bleeding because of anticoagulation intra- and postoperatively. **Methods:** Ten patients' charts were retrospectively reviewed for demographic and clinical data. Biochemical markers on days 0, 3, and 5 of the CRRT were noted. **Results:** There were 8 men and 2 women with a mean age of  $53 \pm 14$  years. Mean duration of CRRT via CPDT catheter was 7 days (4-11). Two died from multiple organ failure, and 1 had right VAD explanted on the 4th day of CRRT. Of the 10 patients, 4 (40%) attained normal BUN/creatinine and 5 (50%) had normal lactate levels by the third day of CRRT. Five (100%) of the 5 who had serum  $K^+$  over 5.0 had normal values by the 3rd and 5th days. Two (50%) of the 4 with  $pH < 7.34$  prior to the start of CRRT had normal pH by

days 3 and 5. By day five, 5 (71%) of the remaining 7 patients had normal BUN/creatinine, potassium, and lactate levels. **Conclusions:** The findings support the use of CPDT catheter as a novel and effective alternative access for CRRT. However, further studies are required to determine whether the improvement in renal function was really the effect of CRRT versus the actual improvement in cardiac output and tissue perfusion as a result of the VAD.

### **BELIEVED BENEFITS OF CRITICAL CARE EXPERIENCE FOR UNDERGRADUATE NURSING STUDENTS**

Jenkins JA, Pulcher K, Norwood A. Central Missouri State University, Warrensburg, Mo.

**Purpose:** To explore beliefs concerning learning benefits of a critical care clinical experience for undergraduate nursing students. **Background/ Significance:** Nursing education needs to prepare nurses capable of practice in the future. As patient acuity increases, it is reasonable to predict that the content of curriculums and the clinical skills that are taught at the undergraduate level must reflect the integration of critical care nursing concepts and clinical experience into professional nursing programs. Although faculty who teach critical care have long supported the benefit of this content, students and staff nurses have not completely voiced their beliefs concerning the benefits/no benefits of a critical care clinical experience. **Methods:** A likert scale survey tool was constructed based on a review of the literature. Open-ended questions were also used concerning “greatest benefit” and “least beneficial aspect” of critical care experience. The tool was completed by students/faculty/staff associated with 6 nursing programs throughout the United States. Data were analyzed by frequencies of response and percentages. **Results:** Results support the learning benefits of critical care experiences for undergraduate students. 97.2% of students and 100% of faculty and staff believed undergraduate students should have a critical care rotation. Students ranked “understanding pathophysiology,” “development of physical assessment skills” and “understanding laboratory and/or diagnostic procedures” as especially beneficial. Student positive comments dealt with importance of “positive role models,” “putting it all together,” and “organization.” Negative comments included: “not feeling prepared,” “do not know enough,” and “inability to do everything.” **Conclusions:** Supports the inclusion of critical care rotations in undergraduate education. Critical care experience is believed to benefit critical thinking skills and to provide positive role models. Faculty needs to ensure that students are well prepared and that staff fully support and understand the learning objectives in order for the experience to be of optimal benefit.

### **KIN INTERFACE PRESSURE ON THE NATO LITTER**

Bridges E, Schmelz J, Mazer S. 59th Medical Wing, Lackland Air Force Base, San Antonio, Tex.

**Purpose:** To determine if padding on the NATO litter and body position affect the peak skin interface pressure and body area exposed to interface pressures >30 mm Hg. **Background/Significance:** In military, humanitarian, or aeromedical evacuation (AE) operations, the NATO Litter, which is a canvas stretcher, is the transport surface, bed, and operating table. Little was known about the interface pressure on the litter; a risk factor for pressure ulcers. **Methods:** A repeated-measures/modified Latin square design was used. Independent variables were 4 support surfaces—litter, litter plus double-folded military wool blanket, litter plus AE mattress, and a Maxifloat™ mattress—and 3 positions: supine with 0° backrest, supine with 40° backrest, and 30° lateral position with 0° backrest. Dependent variables: peak interface pressure—highest pressure over each body region (eg, occiput) and surface area exposed to interface pressure >30 mm Hg. Interface pressure was measured noninvasively using the XSensor™ System. **Results:** Eighteen women and 14 men, aged 18 to 55, were selected using a stratified sampling scheme. Peak pressures progressively decreased for all body areas between the litter, litter plus AE mattress and Maxifloat (RANOVA  $P < .01$ ). Peak pressures on the litter and the litter plus blanket were not significantly different. The AE mattress significantly decreased pressures for all body regions in all positions, although peak pressures were >30 mm Hg. **Conclusions:** Peak pressures on the litter exceeded 30 mm Hg—a risk for pressure ulcers. The blanket did not decrease peak pressure on any body region in any position and should not be considered a pressure reduction measure. If feasible, the AE mattress, which decreased pressure, should be used for high-risk patients. Regardless of the surface preventive nursing interventions are necessary, particularly for the heels. **Funding:** Funded by the TriService Nursing Research Program.

### **CRITICAL CARE NURSES ARE ACTIVE IN THE DIAGNOSIS AND TREATMENT OF SEVERE SEPSIS**

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**Purpose:** To elucidate the role that ICU-based critical care nurses (CCNs) play in sepsis diagnosis and treatment in the United States. **Background/Significance:** Physicians recognize CCNs as important to the treatment of severe sepsis (SS) (Physician Awareness and Usage Study), a disease that is fatal in 30% to 50% of cases. Drotrecogin alfa (activated), recombinant human acti-

vated protein C, resulted in a 19.4% reduction in relative risk of death and more rapid resolution of organ dysfunction versus placebo in patients with SS. **Methods:** Fifty full-time, day-shift nurses were interviewed regarding their role in diagnosis and treatment of SS. **Results:** Nurses cared for 2 patients at a time who typically spent two weeks in the ICU. 96% of nurses “always” or “frequently” bring symptoms of sepsis to the physician’s attention. Hypotension (86%), fever (64%), tachycardia (38%), and dyspnea (30%) were the most commonly recognized symptoms of SS. 32% of nurses identified the lung as a primary source of infection followed by the genitourinary system (22%), and instrumentation and surgical sites (both 8%). COPD (56%), diabetes (50%), and chronic renal failure (36%) were frequently identified underlying disorders associated with SS. 49% of CCNs perceived suggesting treatment as a primary role, and 94% reported being “likely” or “extremely likely” to recommend a new treatment. Patient safety (80%), safe administration (76%), ease of monitoring side effects (68%), and administration ease (60%) were important features for any new treatment. All nurses recognized SS as a major cause of morbidity and mortality, but 48% of CCNs reported that current therapies are inadequate. **Conclusions:** CCNs both identify symptoms and recommend treatments for SS. Despite the high mortality rate with SS, approximately one half of CCNs felt that current standards of care were adequate. Awareness of new treatments like drotrecogin alfa (activated) as a possible adjunct to current standard of care for SS should be increased.

#### **PARENTAL CONCERNS AND STRESSORS FOLLOWING A PRESCHOOL CHILD’S HEAD INJURY**

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**Purpose:** To investigate factors related to parents’ reactions to their preschool child’s head trauma and compare mothers’ and fathers’ reactions. **Background/Significance:** When a preschool child sustains a head injury and is suddenly hospitalized, parents experience a variety of emotions and fears. **Methods:** Ninety-one mothers and 30 fathers of 91 preschool children were recruited at 24 to 48 hours after the child’s hospital admission. Inclusion criteria were as follows: 1) history suggesting possible head trauma with *one* of the following: loss of consciousness, positive CT scan or X-ray, symptoms of head injury in children (vomiting, drowsiness, seizures, neurologic deficits, CSF or bloody discharge from ears or nose); 2) injured child living with at least one biologic/adoptive parent; 3) parent(s) understand English; 4) child free of chronic illness except asthma; and 5) little experience with hospitaliza-

tion. Exclusion criteria were as follows: 1) severe cognitive deficits prior to injury, 2) suspect injury due to child abuse, 3) being evaluated with brain death criteria, 4) parent(s) hospitalized concurrently with major injury or death of parent(s) in injury event. Data were collected in the hospital after obtaining informed consent. **Results:** Parental stressors were greater for mothers with a child in the PICU and for white mothers. Mothers’ stress levels were related to perceived severity of child’s illness, likelihood of child’s survival, and the mothers’ psychological distress. Fathers’ stress levels were related to perceived severity of child’s illness and his psychological distress. Mothers’ and fathers’ psychological well-being was related to perceived social support. Mothers reported more support from friends than fathers reported; however, mothers’ and fathers’ ratings of stressors, concerns, mental health, and the child’s likelihood of survival, severity of illness, and health did not differ significantly. **Conclusions:** Mothers and fathers reported similar perceptions of their child’s situation. Although important for their mental health, fathers may perceive less social support. **Funding:** Funded by grant #R01 NR04430 from the National Institute of Nursing Research, NIH.

#### **AN INNOVATIVE EDUCATIONAL INITIATIVE IMPROVES CRITICAL CARE NURSES’ KNOWLEDGE OF HEMODYNAMIC MONITORING**

Schell H, Howie J. University of California, San Francisco, Medical Center and School of Nursing.

**Purpose:** The purpose of this study was to assess and improve critical care nurses’ knowledge of hemodynamic monitoring. **Background:** Hemodynamic monitoring using a pulmonary artery (PA) catheter is essential to surveillance by critical care nurses, yet the literature repeatedly reports inadequate knowledge of hemodynamic monitoring. In fact, the Pulmonary Artery Catheter Consensus Conference (1997) recommended intensified training related to PA catheter use. **Methods:** A pre-test, post-test design was utilized. A 31-question hemodynamic monitoring survey was completed by 103 nurses from 3 adult critical care units. An educational intervention with a 4-hour didactic course and self-directed study modules was undertaken. Hemodynamic monitoring reference cards were developed for each patient’s bedside. The same survey was completed by 112 nurses 3 months after the didactic course. Data were analyzed using paired t-tests, ANOVA with *P* value <0.05. **Results:** A total of 179 nurses participated, with 103 (66%) completing the baseline survey and 112 (57%) the follow-up survey. The mean score increased from 18.7 (59%) to 22.76 (73%). A subgroup of 38 (21%) completed both surveys. Their mean score improved from 18.76 to 24.5, which was statistically

significant ( $P=0.003$ ). Of the subgroup, 33 (87%) completed the hemodynamic review course and study module. In the total group, no significant differences between test scores and career/per diem status, percentage worked, certifications and education were found. The only significant difference between test scores was that nurses who utilized the PA catheter more frequently scored higher than did less frequent users ( $P=0.001$ ). **Conclusions:** An innovative educational initiative will improve nurses' knowledge of hemodynamic monitoring. Since competency also requires clinical skills, the relationship between knowledge and skill requires further investigation.

#### **CLINICAL UTILITY OF BLOOD CULTURES DRAWN FROM CENTRAL VEIN CATHETERS AND PERIPHERAL VENIPUNCTURE IN CRITICALLY ILL MEDICAL PATIENTS**

Prentice D, Mayfield J, Buetz M, Fraser V, Kollef M, Sherman G. Barnes-Jewish Hospital, St. Louis, Mo.

**Purpose:** To determine the sensitivity, specificity, and positive and negative predictive values of blood cultures obtained through a central vein catheter compared with peripheral venipuncture. **Background/Significance:** Bloodstream infections (BSI) are a serious nosocomial infection for patients in the intensive care unit (ICU). Prompt diagnosis and treatment are necessary to decrease the morbidity and mortality of BSI. The majority of patients in the ICU have central vein catheters (CVC) in place. These catheters predispose patients to BSI; however, they are necessary for administration of certain medications and can provide an easy access for obtaining blood samples. Mixed data exist about the validity of obtaining blood culture specimens from CVC due to the potential of specimen contamination. **Methods:** A prospective cohort study was performed in the medical ICU of a university-affiliated teaching hospital. Three hundred paired samples were obtained from 119 patients (2.52 paired samples per patient). **Results:** Thirty-four (11.3%) paired cultures were accepted as true positives representing a true bacteremia. The sensitivity of catheter draw and peripheral venipuncture samples was 82.4% and 64.7%, respectively, and their specificity was 92.1% and 96.2%. **Conclusions:** In medical ICU patients, the negative predictive value of blood samples obtained by catheter draw or peripheral venipuncture for suspected BSI is good. The sensitivity, however, of blood samples obtained by either catheter draw or peripheral venipuncture alone is not adequate to recommend the elimination of blood samples from the other site. Clinicians also should be aware that additional blood samples might be necessary when interpreting positive blood cultures for common skin or central vein catheters contaminants.

#### **PAIN MANAGEMENT, OBESITY, AND CRITICAL CARE**

Gallagher S. SIZEWise Rentals, Ellis, Kan.

**Purpose:** The aim of this descriptive pilot study is to better understand the unique needs of the critical care nurse in caring for the morbidly obese patient experiencing pain. To better understand barriers to assessment, identify the process of an interdisciplinary approach, and to describe intervention strategies in acute and postoperative pain, with attention to analgesic and non-analgesic intervention. **Background/Significance:** Despite decades of pain management research, 50% of patients who experience pain experience sustained, moderate to severe pain. Pain is often a subjective phenomenon that holds moral, cultural, and physical misunderstanding. Little is known about the application of pain management theory to the obese population. **Methods:** A 7-item survey tool was used to collect quantitative and qualitative data. The questionnaire was completed by a convenience sample of 25 critical care nurses. Morbid obesity was defined as those patients weighing greater than 320 pounds. Consent was implied by returning the completed tool. **Results:** One hundred percent of respondents reported that the pharmacist was not involved in selecting the medication, route, or dosage. Forty-eight percent of respondents reported that assessment tools were inadequate ( $n=12$ ). Of the options offered for non-analgesic pain management strategies, the only ones cited were massage 12% ( $n=3$ ) and relaxation breathing techniques 32% ( $n=8$ ). Challenges were reported in delivering pain medication via the following routes: rectal suppository 20% ( $n=5$ ), intramuscular 24% ( $n=6$ ), intravenous 40% ( $n=10$ ), and transdermal 28% ( $n=7$ ). **Conclusion:** Critical care nurses are faced with the pain management challenges of bariatric patients and with few resources to handle these challenges. Opportunities for further research exist in this area of pain management in the critical care setting.

#### **OBSERVABLE PAIN INDICATORS USED BY PHYSICIANS AND CRITICAL CARE NURSES TO ASSESS PAIN IN CONSCIOUS AND UNCONSCIOUS INTUBATED ADULT PATIENTS**

Gelinas C, Viens C, Fortier M, Fillion L, Puntillo K\*. Nursing Faculty, Laval University, Quebec City, Quebec, Canada. \*Department of Physiological Nursing, University of California in San Francisco (UCSF), San Francisco, Calif.

**Purpose:** The aim of this study was to identify observable pain indicators deemed important to physicians and critical care nurses for their pain assessments of conscious and unconscious intubated adult patients. **Background/Significance:** Pain is a subjective multidimensional concept that is complex to assess.

Little research has been done on pain in critical care especially with intubated patients. Many tools developed to assess pain are difficult to use when patients cannot communicate verbally. In this situation, focused observation of pain indicators may improve pain assessment. **Methods:** A qualitative approach was designed for this study. Semi-structured interviews were conducted with physicians and focus groups with critical care nurses. Participants were recruited in 2 healthcare centers in Quebec City. Data were tape-recorded and transcribed, and NUDIST software was used for subsequent analysis. **Results:** Twelve physicians and 48 critical care nurses participated. Observation of indicators identified for pain assessment were clustered into 2 dimensions: physiological and behavioral. Physiological indicators considered important for both conscious and unconscious patients were vital signs and ventilator's respiratory parameters. The ventilator was also discussed as a behavioral indicator, specifically patient's compliance with mechanical ventilation. Facial expression, movements, and rigid posture were also identified as important behavioral indicators. Different movements were identified for conscious and unconscious patients. Difficulties regarding pain assessment in critical care and future recommendations were discussed. Difficulties were related to the patient's condition, the organization, and health professionals' communication and education. Recommendations were advanced to solve those difficulties. For example, the development of a multidimensional pain assessment tool that could be scored was recommended to facilitate interdisciplinary communication. **Conclusions:** Many pain indicators are observed in ICU clinical practice. Development of a research-based, multidimensional pain assessment tool may improve pain assessment and management in critical care. *Acknowledgment to Heart and Stroke Canadian Foundation for financial support.*

#### **CRITICAL CARE NURSES' PERSPECTIVES ON DELIRIUM IN THE ICU**

Truman B, Stephens R, Ely EW. Vanderbilt University Medical Center, Nashville, Tenn.

**Purpose:** To determine nurses' perspectives on ICU delirium. **Background/Significance:** Delirium occurs in 80% of intensive care unit (ICU) patients, and it is associated with morbidity, mortality, and prolonged length of stay. There are no published data on how nurses monitor and manage delirium. The 2002 SCCM guidelines include delirium as 1 of the 3 issues of patient comfort and recommend that all critically ill patients be monitored daily with a standardized delirium assessment tool (ie, the CAM-ICU). **Methods:** An 11-point survey was distributed to medical and surgical critical care nurses at a series of nationwide educational lectures from July 2001 to July 2002. **Results:** 103 sur-

veys were completed. The majority of respondents (55%) thought that delirium occurred in 26% to 75% of ICU patients, yet only 9% of respondents thought that the prevalence was over 75%. All respondents reported that delirium was a problem; 58% felt delirium was a significant problem, while an additional 33% thought it was a serious or very serious problem. However, only 42% stated they routinely screen for delirium. Of those who screen, only 4% report using a delirium-specific assessment tool. The top 3 risk factors identified were hypoxemia, age, and dementia. The most serious complications associated with delirium were patient self-injury (including self-extubation), prolonged mechanical ventilation, hypoxemia, and increased length of stay. Delirium was considered important in the outcome of old critically ill patients by 75% of respondents. **Conclusions:** Critical care nurses consider delirium in the ICU a significant or serious problem, although few actually monitor for this condition. These data reveal significant discrepancies in the literature and public opinion. These data indicate a need for education both locally and nationally. They also imply obstacles in the implementation of the SCCM guidelines.

#### **ACHIEVING NORMOTHERMIA IN FEBRILE SUBARACHNOID HEMORRHAGE PATIENTS: FEASIBILITY AND SAFETY OF A NOVEL INTRAVASCULAR COOLING CATHETER**

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**Purpose:** The purpose of this study was to see if the subarachnoid hemorrhage (SAH) patient with fever could be kept normothermic using the Intravascular Cooling Catheter (ICC), (Celcius Control™ System, Innercool Therapies, San Diego, Calif). **Background/ Significance:** Fever is common and difficult to control in subarachnoid hemorrhage (SAH) patients. Clinical studies strongly indicate there is a relationship between fever and the outcome of subarachnoid patients. It is often difficult to maintain normothermia in this population with traditional methods (ie, cooling blanket, ice packets, tylenol, etc). **Method:** This was a prospective research trial in which 9 SAH patients underwent temperature management using an intravascular cooling catheter (ICC) to restore and maintain 24 hours of normothermia (36.5±0.2°C). Enrollment occurred after development of a fever of at least 38.3°C within 7 days of SAH that was refractory to acetaminophen treatment. A bladder temperature probe was inserted prior to use of the ICC, and body temperature was documented q1h by the nursing staff. Shivering was controlled with Demerol IVP and IV continuous drip. **Results:** Normothermia was achieved in 7 of the 9 treated patients (78%). Shivering was observed to be an obstacle in reaching normothermia goal. Seven of 9 (78%) were treated pharmacologically for shivering. Nor-

mothermia was well tolerated and not discontinued due to discomfort or adverse events. No unanticipated adverse events occurred. **Discussion:** We have demonstrated that fever can be safely and effectively controlled in SAH patients for at least 24 hours using an ICC and shivering can be controlled.

#### **PATIENTS' REPORTS OF FRUSTRATIONS AND HEALTHCARE PRACTITIONER INTERVENTIONS DURING MECHANICAL VENTILATION**

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**Purpose:** This study was conducted to identify the level of frustration experienced by mechanically ventilated patients, to describe methods used by healthcare practitioners to meet the communication needs of the mechanically ventilated patient, and to evaluate patients' perceptions of the helpfulness of a communication board. **Background/Significance:** Patients who are mechanically ventilated experience an intensified need to communicate while their ability to do so is compromised. Practitioner interventions often include interpreting patient's non-verbal forms of communication such as mouthing, gesticulating, nodding, and reading patients' writing. Such non-verbal methods require excess energy and are fatiguing and emotionally draining. Limited research exists on the patients' perception of the helpfulness of healthcare practitioner interventions to enhance communication. **Method:** Twenty-nine critically ill patients who were extubated within the last 72 hours were included in this descriptive study using qualitative and quantitative methods. Subjects participated in a 30-minute audio-taped interview session. Transcripts were analyzed by question and for overall themes. **Results:** Sixty-two percent (n=18) of patient's reported a high level of frustration in communicating their needs while being mechanically ventilated. Patients cited healthcare practitioner behaviors, characteristics, and attributes that both facilitated communication and impeded their ability to communicate. There was a significant difference in patients' perceived levels of frustration in communicating needs with and without a communication board ( $P<0.05$ ). **Conclusions:** Mechanically ventilated patients experience a high level of frustration when communicating their needs, and healthcare providers have a significant impact on the patient's experience while being mechanically ventilated. A communication board may be effective in decreasing patient frustration and facilitating communication. Further research is needed to explore other methods of facilitating communication with respect to increasing patient satisfaction, reducing patients' anxiety, and achieving adequate and appropriate pain management.

#### **THE VISITING PREFERENCES OF PATIENTS IN THE INTENSIVE CARE UNIT COMPARED TO PATIENTS ON A GENERAL CARE UNIT**

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**Purpose:** The purpose of this study is to examine patient's preferences for visitors in the intensive care unit (ICU) and on a general care unit (GCU). **Background/Significance:** As knowledge of environments that support family-centered care evolved, changes were made in visiting practices for pediatric units, but adult care units have been slow to change visiting guidelines. Research has confirmed that patients desire some flexibility in having visitors, but there is no clear evidence to predict whom and for how long visitors should be present. **Methods:** A 25-item questionnaire, developed by Simpson and revised by investigators, assessed perceived benefits, stressors, and outcomes of visiting. The questionnaire was completed by interview with 62 patients (31 ICU patients and 31 GCU patients). Patients who met the criteria of being cognitively intact and able to speak English were approached. There were 36 men and 25 women with a mean age of 60 years who agreed to interviews while in the hospital in either ICU or GCU. **Results:** Patients rated visiting as a non-stressful experience, because visitors offered moderate level of reassurance, comfort, and calming effects. Thirty-seven percent preferred unlimited visiting hours while, 35% wanted visitors limited to once a day for 30 minutes. The majority (60%) wanted visitors limited to adults, and 58% preferred no more than 3 visitors per visit. Comparing ICU to GCU patients, the ICU patients worried more about visitors traveling for visit, but felt visitors were most helpful with interpreting information, sharing the patient's coping skills, and were very satisfied with contracted visiting hours in the ICU ( $P<0.05$ ). **Conclusions:** These data provide a patient's voice in the ongoing discussion regarding visiting practices. Patient's clearly identify the value in visitation and are very satisfied with a visiting guideline that is as flexible to meet their needs and those of their visitors.

#### **CRITICAL CARE NURSE PERSPECTIVES ON PUBLIC POLICY ISSUES**

Truman B, Carno M, Mark D, Weber J. Vanderbilt University Medical Center, Nashville, Tenn.

**Purpose:** To determine the importance of current health policy issues to critical care nurses. **Background/Significance:** A priority of AACN is to serve as a conduit of vital and timely information between critical care nurses and government officials. These survey results give voice to the current front-line issues and have the potential to shape the future of critical care. **Methods:** In 2001, a Public Policy Issues Survey was mailed to

62,000 AACN members. The survey asked respondents to rate a list of issues according to the importance to them and to identify relationships with members of Congress. **Results:** Of the 12000 surveys returned, a total of 6606 had valid data and were analyzed. Of those who indicated their job description, 69% were staff nurses. Over 90% rated the issues of nursing shortage (96.9%), staffing ratios (95.3%), medical errors (94.7%), patients' rights (93.1%), and end-of-life/pain management (92.9%) as fairly or very important. Over 80% rated the issues of mandatory overtime (89.6%), whistleblower protection (87.0%), workplace violence (86.0%), and medical records privacy (83.8%) as fairly or very important. Over 50% ranked nursing shortage (63%) as the number one concern, while work place environment (30%), medical errors (30%), and patients' rights (32.0%) were ranked second, third, and fourth, respectively. There was no significant difference in how the nurses ranked the importance of the issues based on their job category. **Conclusions:** The survey respondents ranked the most important issues related to nursing care. The nurses' ability to provide care and the effects of poor care were ranked as top issues, even in the face of increasing public demands (and legislative initiatives) in the areas of end of life and medical record privacy. These top priorities need to be addressed so that all parties involved in healthcare can speak with 1 voice.

#### **THE RELATIONSHIP OF PATIENT IDENTIFICATION FOR ROTATIONAL THERAPY (PIRT) VARIABLES, KINETIC THERAPY AND PNEUMONIA OUTCOME**

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**Purpose:** The purpose of this study was to look at the relationship between individual patient identification for rotational therapy (PIRT) variables (type of case, temperature, mean arterial pressure, heart rate, respiratory rate, a/A ratio, ventilator settings, arterial pH, creatinine, hemoglobin, white blood cell count, albumin, glasgow coma scale, age, and chronic health) kinetic therapy and pneumonia outcome. **Background:** Nosocomial pneumonia is a common complication of immobilized patients in the critical care unit (CCU). Estimates of nosocomial pneumonia in the CCU are as high as 10 cases per 1000, with a 20-fold increase in patients who are mechanically ventilated. Statistics suggest an incidence rate of ventilator-associated pneumonia (VAP) as high as 65%, with mortality approaching 55%. Kinetic therapy (KT) has been shown to positively impact lung function and significantly reduce the incidence of VAP; however, an instrument to identify patients for KT has not been established. To date, the PIRT tool is the only tool specifically developed to identify patients for KT. **Methods:** A descriptive,

correlational design was used. Patients (N=156) were recruited from medical-surgical CCU's in two community-based hospitals in a metropolitan area. Data were collected concurrently by trained staff and the Trauma Clinical Nurse Specialist. Individual patients were assessed for KT using the PIRT tool. KT usage was tracked and pneumonia outcome measured using CDC criteria. Results: Age was the only variable to have a significant correlation to KT ( $r2=.179$ ,  $P=.026$ ) in the total population. Stratification of the trauma/surgical population (N=37) was necessary to yield further correlations. Two variables, a/A ratio and hemoglobin, had significant correlations with KT ( $r2=-.325$ ,  $P=.050$  and  $r2=-.390$ ,  $P=.017$ ). Creatinine was significantly correlated to pneumonia ( $r2=.341$ ,  $P=.039$ ). **Conclusions:** Absence of significant relationships between PIRT variables, KT, and pneumonia demonstrate that this tool is not an appropriate clinical indicator for KT.

#### **THE EFFECT OF ETERNAL NUTRITION REGIMENS ON GASTRIC MUCOSAL PERFUSION MEASUREMENTS IN THE CRITICALLY ILL PATIENT**

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**Purpose:** This study assesses the effects of enteral nutrition on gastric mucosal perfusion measurements (pHi). **Background:** Optimizing gastric mucosal perfusion has become an important aspect in the care of critically ill patients to assess end organ perfusion. Gastric tonometry (pHi) has become a means of measuring gastric mucosal perfusion. Policy at present states that to achieve accurate pHi measurements, enteral nutrition must be held 1 hour prior to sampling and the gut must be emptied. This enteral nutrition regimen requires higher rates of feeding and a decreased chance of patient tolerance. If continuous enteral nutrition has no effect on sampling, patients can be fed at slow and steady rates to improve tolerance. **Methods:** This study is quasi-experimental, simple interrupted time series design. The sample size includes 53 pHi samples from 7 patients. Patients being sampled for continuous samples were fed without interruption of sampling. When patients were sampled for the intermittent sampling, tube feeds were held and gastric residual was obtained and wasted 1 hour before sampling. Inaccurate samples are defined by an increase in gastric  $PO_2$  over arterial  $PO_2$  by more than 1 mm hg. **Results:** This study revealed that of the continuously fed patients, 5 samples were inaccurate and 20 samples accurate. Of the patients for whom tube feeds were held for an hour, 11 samples were inaccurate and 17 were accurate. Accuracy was increased by more than 50% in the continuously fed group. **Conclusion:** The use of gastric tonometry has been found to be very time consuming for nurses with many varying aspects to accurate sampling.



The sample size of this study is very small, yet it does reveal a noticeable difference between the 2 groups. More research should be done in this area to make gastric tonometry more reliable and nurse friendly.

### IS THERE STANDARDIZATION WITH THE INITIATING OF AN INSULIN PROTOCOL IN THE ICU?

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**Purpose:** The primary objective of this retrospective study is to determine practices associated with initiating an insulin protocol. **Background/Significance:** Research shows that efficacious use of an insulin protocol results in decreased morbidity and mortality in the critically ill. Standardizing the initiation of an insulin protocol to treat hyperglycemia is essential to ensure best clinical practice. **Methods:** All blood glucose levels (BG) obtained in the medical/surgical intensive care unit (M/SICU) were retrospectively reviewed for 259 consecutively admitted patients without a history of requiring insulin for diabetes from 4/1/02–7/1/02. Patients who had 2 consecutive BG  $\geq$ 180 mg/dl were entered into the data set. Dates and times of initiation of current insulin protocol were recorded. BG just prior to initiation was identified as the reason for initiating protocol. **Results:** Of 259 admissions reviewed, 30 patients had no BG drawn while in M/SICU. Seventy-two patients had BG  $>$ 180 mg/dl while in the M/SICU. Forty-two percent (30/72) of patients had elevated BG that did receive an insulin drip, with an average starting BG level of 263 mg/dl. However, a significant number (58%, 42/72,  $P=.002$ ) of patients had BG exceeding 180 mg/dl, with average elevated BG of 250 mg/dl, without receiving insulin treatment. **Conclusion:** There is variance in the initiation of an insulin protocol. Strategies must be developed to emphasize the importance of strict glucose control in those critically ill. Standardizing the initiation of insulin protocol in the ICU is one step toward improving practice in the early treatment of hyperglycemia in the critically ill.

### EFFECT OF THE DIFFERENT INCENTIVES ON CRITICAL CARE NURSES' SURVEY RESPONSE RATES

Beckstrand RL, Clarke MC. Brigham Young University, Provo, Utah.

**Purpose:** To test a theory of immediacy (Christensen) by comparing the effect of 3 different incentives on critical care nurses' survey response rates. **Background/Significance:** Mailed questionnaire is the most common avenue for data collection in educational research and in

nursing. Studies about improving mailed survey response rates from nurses are almost nonexistent. Christensen's theory proposes that when a respondent perceives a sense of immediacy, immediacy will dictate the urgency and speed of response to the mailed questionnaire. **Methods:** An experimental, posttest-only, control group design was used. The geographically dispersed, random sample consisted of 4 groups of 375 critical care nurses who were members of AACN. Three of the groups received either a \$2 bill, offer for a \$1 charity donation to AACN, or the chance to win \$100 (lottery). A 2-way contingency table analysis was conducted to evaluate if any one of the 3 incentives significantly improved that group's response rate compared to the control group. **Results:** The 2 variables included in the analysis were type of incentive (4 levels) and whether the questionnaire was returned (yes or no). The \$2 incentive and questionnaire returned (yes) were found to be significantly associated, Pearson  $\chi^2$  (3,  $N=1500$ ) = 30.17,  $P=.0001$ . A Cramér's V statistic showed that the strength of the relationship among group members and return rate was low ( $\phi=.14$ ). No significant relationship was found between the other groups and return of the questionnaire. **Conclusions:** The \$2 incentive was the only one found to be associated with significantly improving response rates. The theory of immediacy did help explain the outcome of the response rates. Partial funding for this research was received from Brigham Young University College of Nursing.

### EVIDENCE-BASED SKIN CARE PRACTICE: INVOLVING THE BEDSIDE NURSE POSITIVELY IMPACTS PATIENT OUTCOMES

Flynn MB, Fink, R. University of Colorado Hospital, Denver, Co.

**Purpose:** The purpose of this study is to examine the effectiveness of a multifaceted research based intervention on nurses' beliefs of skin care, documentation patterns, and prevalence of pressure ulcers (PU). **Background/Significance:** Annually, more than 2 million patients develop PU creating pain, complications, and increasing costs. Skin assessment, prevention, and treatment of PU are within the scope of nursing practice. The American Nurses' Association considers the absence of PU as a quality indicator for nursing care. Research-based tools for assessing, preventing, and treating PU are available. However, bedside nurses may not incorporate research findings into practice. Nurses practicing from a scientific-research base are essential for positive patient outcomes. Studies suggest that nurses believe practice should be based on research. Despite the knowledge of its value, translating research into practice is a challenge. **Methods:** A quantitative descriptive pre- and post- intervention study was conducted. A random registered nurse sample

(n=115 pre and n=95 post) was surveyed. PU prevalence data (n=173 pre and n=190 post) and nurse documentation patterns were collected. **Results:** Data revealed that nurses' knowledge improved significantly and PU prevalence decreased from 9% to 4% postinterventions. However, there continues to be a high prevalence of PU in ICU areas. An interdisciplinary, multidimensional educational plan, implemented by champion nurses, included case exemplars, revision of documentation forms, development a skin care algorithm, and treatment guide. **Conclusions:** An evidence-based practice skin care team can provide leadership and positively impact skin care outcomes.

### LARGE-SCALE IMPLEMENTATION OF DELIRIUM AND SEDATION MONITORING IN THE ICU

Truman B, Shintani A, Ely EW. Vanderbilt University Medical Center, Nashville, Tenn.

**Purpose:** To determine the feasibility of implementation of sedation and delirium monitoring and evaluate the challenges of modifying RNs practice styles. **Background/Significance:** We prospectively investigated the large-scale implementation of the 2002 SCCM guidelines for Sedation and Analgesics monitoring delirium and sedation. **Methods:** Unit-wide nursing documentation was changed to accommodate the new instruments: Richmond Agitation Sedation Scale (RASS) and Confusion Assessment Method for the ICU (CAM-ICU) scales. Simultaneously, a series of introductory in-services were performed. Graded, staged educational interventions then occurred at 1-, 3-, and 6-month time points. Data was collected daily for compliance, and a random 40% of nurses/day were chosen to perform accuracy spot checks. A questionnaire on the tools and their use was distributed at the 6-month interval. **Results:** The implementation included 35 critical care nurses managing 268 critically ill patients. The RASS charting compliance was 85.6%, 88%, and 89.7%, while the CAM-ICU charting compliance was 88.8%, 93%, and 91% (both for 1, 3, and 6 months, respectively). The

accuracy of the CAM-ICU was 80% ( $\kappa=0.69$ , 95% CI 0.45 to 0.94), 91.9% ( $\kappa=0.87$ , 95% CI 0.82 to 0.93), and 97.4% ( $\kappa=0.96$ , 95% CI 0.93 to 0.99) for 1, 3, and 6 months, respectively. The interclass correlation coefficient of the RASS was 0.56 (95%CI 0.24 to 0.79), 0.79 (95%CI 0.59 to 0.9), and 0.82 (95%CI 0.65 to 0.92) for 1, 3, and 6 months, respectively. The most important barrier (68% of responses, n=29) to implementation was physician buy-in. **Conclusions:** The implementation of both validated delirium and sedation monitoring tools is feasible. These data reveal that with minimal training, the compliance and accuracy with the use of delirium and sedation tools is very high in critical care setting. Through a staged implementation process using periodic reinforcement, the tools were implemented to 97% accuracy by 6 months.

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