# 2004 National Teaching Institute Research Abstracts

Presented at the AACN National Teaching Institute in Orlando, Fla.

## RESEARCH ORAL PRESENTATIONS

### Anxiety Is Not Manifested By Elevated Heart Rate and Blood Pressure In Acutely Ill Cardiac Patients

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**Purpose:** The purpose of this study was to determine whether heart rate and blood pressure were related to level of anxiety at the time of measurement in patients with chronic advanced heart failure (HF), patients with acute myocardial infarction (AMI), and healthy individuals. **Background/Significance:** Patients with AMI and HF are often anxious. Anxiety after AMI may cause increased mortality and in-hospital complications such as ventricular tachycardia or fibrillation, ischemia, and reinfarction. Clinicians often use heart rate and blood pressure as indicators of anxiety; however, little is known about whether these measures accurately reflect anxiety in acutely ill patients. **Methods:** For purposes of this descriptive, correlational investigation, we combined data from 2 studies: 1) study of anxiety among patients experiencing AMI and 2) study of the impact of a biofeedback-relaxation intervention in patients with HF. Anxiety, heart rate, and blood pressure were measured in the same manner in each group of participants. State anxiety was measured in all participants using the anxiety subscale of the Brief Symptom Inventory. Heart rate and blood pressure data were collected immediately prior to the anxiety assessment. **Results:** There were no correlations between anxiety and heart rate or diastolic blood pressure. Higher anxiety was associated with lower systolic blood pressure in patients with AMI ($r$=–.23, $P$<.05) and in healthy individuals ($r$=–.27, $P$<.05). Mean systolic blood pressure, diastolic blood pressure, and heart rate were similar for patients in high and low anxiety subgroups among all types of patients. **Conclusions:** Elevated heart rate and blood pressure do not accurately reflect level of anxiety, as reported by patients with HF or AMI and healthy individuals, and thus cannot be used to assess anxiety in acutely ill patients. Clinicians who use changes in heart rate or blood pressure as indicators of anxiety may fail to recognize and treat anxiety, placing their patients at high risk for both immediate and long-term complications. **Funding:** This research was funded by grants from the American Heart Association (Established Investigator Award) and the American Association of Critical-Care Nurses (AACN Sigma Theta Tau Research Grant).

### Critical Care Nurses' Knowledge, Attitudinal, and Experiential Survey on Advanced Directives (KAESAD)

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**Purpose:** Describe critical care nurses' knowledge of, attitudes toward, and experiences with advance directives (ADs). **Background/Significance:** Since the 1991 enactment of the Patient Self-Determination Act (PSDA), the number of patients executing ADs has not increased. Intensive care units are the site of much end-of-life decision making. Critical care nurses are in an optimal position to assist patients/families with ADs. Analysis of knowledge, attitudinal, and experiential data is essential before interventions can be designed to inform critical care nurses how best to meet this need. **Methods:** A 115-item survey was sent to 1,000 randomly selected critical care nurse members of the American Association of Critical-Care Nurses living in New York State. Reliability and validity of the KAESAD instrument were established by an expert panel and a test/retest pilot study. **Results:** Two hundred and ten (21%) critical care nurses responded to the survey. One hundred and thirty-five (65%) had formal AD instruction at their work place. The total knowledge mean score was 59%. Most respondents had attitudes supportive of advocating for patients and families regarding end-of-life decisions, and most had cared for patients (98%), counseled patients/families (85%), and initiated discussion about ADs (83%). Agreement was low that patients are approached early enough to make informed decisions about end-of-life care. **Conclusions:** Nurses were moderately knowledge-able about ADs in general but not very knowledgeable about the PSDA or NYS law governing ADs. Despite low knowledge scores, nurses were moderately confident in their ability to assist patients and families in end-of-life and AD decisions. Nurses were experienced in assisting patients with AD completion, and their attitudes toward patient self-determination and advocacy are positive. Interventions aimed at increasing nurses' knowledge about ADs and strategies to support nurses in their patient advocacy role are warranted.

### Pain and Coexisting Symptoms in Critically Ill Patients Receiving Mechanical Ventilation

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**Purpose:** The study evaluated critically ill patients' perceptions of: 1) pain intensity (PI) related to mechanical

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ventilation, 2) the intensity of 8 distressing symptoms (dyspnea, thirst, nausea, hunger, tire/fatigue, anxiety, generalized discomfort, depressed feelings), and 3) the relationship of pain and coexisting symptoms. **Background/Significance:** The significance of pain in ICU patients is clearly documented. A range of distressing symptoms has been suggested as consequences of mechanical ventilation and critical illness. Yet, the coexisting nature of pain and these symptoms is not well understood. This query provides directions to improve pain and symptom management. **Methods:** In a descriptive study evaluating the multidimensions of pain and symptom experience and comparing the recall in 15 medical and surgical ICU patients receiving mechanical ventilation, patients' self-reports of PI and symptom intensity were assessed by a numeric rating scale (0=none, 10 worst possible) while the patient was intubated. Descriptive statistics and Pearson correlation coefficients were computed between PI and the intensity of 8 symptoms. Significance level was 0.05. **Results:** Patients reported mild pain, anxiety, hunger, and depressed feelings (mean=2.6-4.5), and moderate levels of thirst, fatigue, and generalized discomfort (mean=5-5.8) while intubated. Significant correlations were found between thirst, hunger, fatigue, anxiety, and generalized discomfort, and between discomfort and pain. Surgical patients had higher levels of pain and symptoms than did medical patients. There was no gender difference on symptom perception. **Conclusions:** Substantial levels of pain and discomforting symptoms existed in ventilated ICU patients. There was evidence of associations among several discomforting symptoms. Further research using a larger sample is needed to evaluate and validate the relationships among these symptoms. There is an implication that improving patient comfort requires attention to multiple symptoms. **Funding:** This study was supported by a T32 NRSA training grant to UCSF School of Nursing.

### Prolonged Mechanical Ventilation and Weaning: A Patient Profile

Gavaghan S, Carroll D. Massachusetts General Hospital, Boston, Mass.

**Purpose:** The purpose of this study was to describe the patients admitted to a respiratory acute care unit (RACU) for the goal of ventilatory weaning (VW) in order to identify parameters that could assist and predict successful weaning. **Background/Significance:** In an attempt to address the issue of cost, quality of care, and improved outcomes, a VW unit was opened at a large teaching hospital. Research on VW has focused on protocols, outcomes, nurse-managed care units, multidisciplinary approaches to care, and development of VW models. To date research has not described the VW patient by examining criteria for entry into RACU. A profile of the successful VW patient would identify appropriateness, cost of care, resources, and move to a model that would be more predictive with positive patient outcomes. **Methods:** Utilized an investigator-developed data form that included Glasgow, Braden and Apache II scales, and Burns Wean Assessment (BWAP). Data were collected on admission and discharge. **Results:** A sample of 126 medical records were reviewed, with 85 subjects (76%) having successful VW and 27 subjects (24%) not having a successful VW. Mean age was 63.7 years, 54% males and 42% females, with 39% from medical intensive care units and 43% from surgical intensive care units. Mean BWAP on admission was 66.5% (<64% predictive of an unsuccessful VW) and 78.8% on discharge. Those with successful VW had a BWAP of 83.5% versus 65.6% for those not VW at discharge ($t$=4.47, $P$<0.001). The lack of COPD, renal disease, severe respiratory co-morbids, and respiratory muscle weakness was found to be positively associated with VW and explained 29% of the variance. The time from hospital admission to admission to RACU was positively related to length of stay. The more ICU days before transfer the greater the total length of stay ($r$=.78, $P$<0.000). **Conclusions:** This study begins to describe a non-VW group and assists in identifying appropriate patients for a VW program. **Funding**: Yvonne Munn Nursing Research Award at Massachusetts General Hospital.

### Measuring Self-Efficacy for Home Weight Monitoring in Heart Failure Patients

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**Purpose:** Heart failure is a leading cause of mortality, morbidity, and hospital readmission in older adults. Accurate, daily monitoring of weights and other key symptoms can provide the early warning signs of fluid overload to avoid rehospitalization. **Background/Significance:** A change in total body weight is the best way to quantify fluid retention in heart failure patients. An early marker for fluid retention is an increase in weight of 2 or more pounds in 2 days. **Methods:** An experimental design was used to assess the relationship between self-efficacy enhancing education for heart failure patients and perceived self-efficacy for home self-weights. Data were collected by using the Self-Efficacy Weighing Scale (SEWS) and Minnesota Living with Heart Failure Questionnaire (LHFQ). Questions were administered prior to the teaching intervention, between 1 and 3 days after the intervention, and 1 month later. **Results:** During the 1-year study period, 50 subjects participated. There was no statistically significant difference between groups for self-efficacy scores over time. However, outcome scores, patients' beliefs that weighing themselves would

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improve their quality of life and help manage their illness, improved significantly ($P<.05$). Self-efficacy outcome scores showed subjects believed that daily home self-weighing and monitoring their symptoms could keep them out of the hospital. However, their confidence that they could weigh them-selves every day did not improve. **Conclusions:** This study showed that self-efficacy may influence the subject's beliefs, but it did not change their confidence in their behavior. Continued efforts to identify additional interventions to improve patient's behavior to weigh themselves and monitor their symptoms are indicated. **Funding:** This project was funded by a Clinical Inquiry Grant from the American Association of Critical-Care Nurses.

### Nurse-Administered Mouth Care and Oral Hygiene Status In Endotracheal Intubated and Ventilated Patients

Taylor-Piliae R. University of California San Francisco, San Francisco, Calif. Fung Y, Kwok L, Yiu L, Li W, Kai S, Leung M, Law L, Watt C. Kwong Wah Hospital, Kowloon, Hong Kong.

**Purpose:** To compare 2 different methods of nurse-administered mouth care (traditional or toothbrush) on oral hygiene status and oropharyngeal colonization (OPC) in endotracheal intubated (ETT) patients and patients receiving mechanical ventilation. **Background/Significance:** Dental plaque colonization has been associated with nosocomial respiratory infections among ETT and ventilated patients. Further, dental plaque can be controlled by both chemical and mechanical methods. However, nurses in critical care settings do not routinely use toothbrushes when providing mouth care. **Methods:** A 2-group experimental design was used. Subjects admitted to the intensive care unit, requiring ETT and ventilation for longer than 48 hours were randomly allocated to either the traditional (n=19) (metal forceps and cotton wool balls dipped into a 1:3 solution of Thymol gargle) or the toothbrush method (baby soft toothbrush with fluoride toothpaste) of nurse-administered mouth care. Oral hygiene status was assessed using the Oral Assessment Guide (OAG). Sputum cultures were used to assess OPC. Data were collected at baseline and every 3 days until subjects were extubated, expired or developed nosocomial pneumonia (NCP). **Results:** There were no baseline group differences. Four subjects developed NCP (traditional=1, toothbrush=3). Subjects receiving traditional mouth care had a 25% increase in OPC on day 3, while subjects receiving toothbrush care had a 10% increase. TISS on admission was associated with OAG on day 3 ($r$=0.45, $P$=0.005, n=37) and day 6 ($r$=0.64, $P$=0.005, n=17). There was a significant change in OPC over time (F2,28=3.24, $P$=0.05), but not between groups. **Conclusions:** Sicker subjects on admission were more likely to have poorer oral hygiene status on subsequent days, and OPC increased the longer that subjects required endotracheal intubation and mechanical ventilation. However, no statistically significant difference in OAG or OPC was found between the 2 methods of mouth care. The results were likely affected by the small sample. **Funding:** This study was sponsored by Kwong Wah Hospital, Tung Wah Group of Hospitals, Hong Kong.

### The Experience of an Adult Child Who Has Implemented an Advance Directive for a Critically Ill Parent

Given P. Long Island University School of Nursing, Brooklyn, NY.

**Purpose:** The purpose of this inquiry was to explore the experience of an adult child who has implemented an advance directive for a critically ill parent. **Background /Significance:** End-of-life decision making has always been an imperative consideration in health care, but has received heightened national attention since the passage of the Patient Self-Determination Act (PSDA) by congress in 1990. In this rapidly evolving era of technology, these crucial decisions are often being made in critical care units, adding greatly to the confusion and distress of the patients and their families. Most often, the family member involved is the patient's spouse or adult child. **Methods:** Interpretive phenomenology was used to contribute to the understanding of the meaning of this experience for the adult children who lived it. An interpretation of the meaning of this experience was derived from a synthesis of the transcribed texts of in-depth, unstructured interviews with 6 adult children. **Results:** The interpretation of the texts revealed shared practices and common meanings among the participants, which had previously been concealed. As reflected in the themes, the narratives revealed how the experience held profound meaning for each of the participants. The experience was a journey, beginning with hope, characterized by a series of heralding events, and embodied in reflections of what quality of life meant for their parents as well as dealing with their own internal strife in being able to honor their parents' wishes, which may not have been in harmony with their own. **Conclusions:** The findings of this study have important implications for nursing. For years, we have been grappling with these issues, as have our physician colleagues, yet we have made little progress in improving the overall scenario. This study will lend insight as to what the decision makers actually go through, in order to enhance our understanding of a complicated and sensitive issue. We in healthcare now need to foster dialogue with our patients and their families on these issues sooner, more openly, and in a more informative yet supportive manner.

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### Incorporation of Guided Imagery and Relaxation into the Care of Patients Undergoing Cardiac Catheterization

Bradley E, Bucher L, Collins M, Sarcone K, Strong J, Waterhouse J. Christiana Care Health System, Newark, Del.

**Purpose:** This research utilization study was designed to incorporate guided imagery (GI) into the routine care of patients undergoing cardiac catheterization and interventional procedures. **Background/Significance:** Current research and the American Association of Critical-Care Nurses support and encourage incorporation of complementary therapies into patient care practices. Evidence exists that complementary therapies, such as GI and relaxation, can reduce procedural pain, anxiety, and length of procedure. **Methods:** Pre-procedure, all patients were invited to participate in GI. Patients who agreed to participate were provided with a cassette player, GI tape, and disposable headset. Outcomes were collected on 50 participants and 50 nonparticipants pre- and post-procedure. Patient satisfaction with the GI program and the catheterization procedure, and pain were measured using a 0-10 Likert scale. Anxiety was measured using the Spielberger State Anxiety Inventory. **Results:** Approximately 2 out of every 3 patients approached chose to participate in the GI program. Participants reported high levels of satisfaction with the GI program (8.75/10), with higher levels reported by participants undergoing their first catheterization procedure (9.3/10). Both groups reported high levels of satisfaction with the catheterization procedure. Pain was rated low (0-1) in both groups; however, significantly more patients using GI still had femoral sheaths in when completing the post-procedure survey. All patients reported significantly less anxiety post-procedure. **Conclusions:** Evaluation of this evidence-based practice change supports the expansion of the GI program. Future outcome studies to evaluate the use of GI in other acutely and critically ill patient populations are planned. Staff support of the program was greatly enhanced by allowing staff to experience GI prior the practice change. **Funding:** This project was funded by an Evidence-Based Clinical Practice Grant from AACN and SePA Chapter of AACN and a Practice Grant from the University of Delaware.

### Attitudes of Critically Ill Filipino Patients and Their Families Toward Advance Directives

McAdam J, Stotts N, Puntillo K, and Padilla G. University of California, San Francisco, School of Nursing, San Francisco, Calif.

**Purpose: T**o understand the attitudes of critically ill Filipino patients and their families toward advance directives (ADs). **Background:** ADs are an important tool in critical care but are often underused. Healthcare professionals need to understand how culture impacts attitudes toward ADs to improve knowledge and completion of ADs. **Methods:** A descriptive, correlational, cross-sectional study was completed on a convenience sample of 22 Filipino patients and 22 Filipino family members at a West Coast Medical Center. All patients were admitted for either cardiac surgery or cardiac interventions. Participants were interviewed using the previously validated Advance Directive Attitude Survey (ADAS) and Short Acculturation Scale for Filipino Americans (ASASFA). Data were analyzed with *t* test and Pearson's Product Moment Correlation. **Results:** The overall attitudes toward advance directives (AD) were positive. Family members' scores were significantly more positive than the scores of patients on the ADAS ($P$=.014). Family members were more American acculturated than the patients ($P$=.001). Those with more education had more positive attitudes toward ADs ($P$=.018). Only 2 patients completed and had prior knowledge of an AD before the study. No family members completed an AD before the study, and only 26% had prior knowledge of an AD. **Conclusions:** The completion rate and knowledge of ADs in this study was low, but the overall attitudes of the Filipino patients and their family members toward ADs were positive. Critical care professionals need to understand Filipino's cultural perspective regarding ADs. Further research is warranted to understand how to enhance AD completion rates in the Filipino population.

### Effect of Solid Food on Patient Blood Pressure and Heart Rate after Femoral Arterial Sheath Removal

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**Purpose:** To determine the effect of solid food on patient blood pressure and heart rate (HR) after femoral arterial sheath removal. **Background/Significance:** Percutaneous transluminal coronary angioplasty (PTCA) is an established procedure that is still not without adverse effects. One complication is hypotension, with or without bradycardia. Researchers have described vasovagal reactions after femoral sheath removal, but other factors that cause hypotension may need to be explored. It was observed that patients who did not eat solid food for at least 1 hour before femoral arterial sheath removal had more stable blood pressure after the procedure than did patients who ate. **Methods:** A comparative, repeated measures design was used. A convenience sample of 57 patients was assigned to groups based on the clinical practice of the nurse. Eight repeated measurements of blood pressure and HR via automated cuff were recorded. Blood pressure measurements were computed to mean arterial pressure (MAP) to compare groups over time. **Results:** Patients ranged in age from 48 to 86 years (x=67, SD=9). The majority of patients were

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male (61%). There were no differences between groups on variables such as age, gender, MAP before PTCA, type of compressor device, pain medications, and time of sheath pull. Repeated measures analysis of variance indicated a significant interaction effect of group differences by time for MAP ($F$=6.97, $P$<.001). There also was a significant main effect over time for MAP ($F$=10.86, $P$=<.001) and HR ($F$=5.74, $P$=.003). **Conclusions:** The group that ate solid foods one hour before femoral arterial sheath removal had significantly lower MAP and HR recordings. However, the recordings in both groups would be considered in the normal range for clinical decision making. These findings suggest that other factors influencing hypotension, such as a postprandial decrease in blood pressure, may need to be pursued in further research.

### Efficacy of CPR on NATO/Decontamination Litters With/Without a Backboard

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**Purpose:** To determine the efficacy of CPR on 2 litters (NATO and Decon) with/without backboard on end-tidal CO2 (ETCO2), coronary perfusion pressure (CPP), and return of spontaneous circulation (ROSC) in pigs (58 ± 5 kg). **Background/Significance:** During military/disaster operations, litters serve as the hospital bed; however, CPR backboards may not be available. Thus, during cardiac arrest, CPR may be delayed to move the patient to the floor, which increases the mortality risk. **Methods:** A randomized 4-group design with repeated measures was used. Sixty-four pigs were anesthetized and placed over the stiffest part of the litter (crossmember). After a 10-minute baseline, Vfib was induced for 4 minutes without CPR, followed by 8 minutes of CPR (Thumper": 5 cm depth/100% O2/13 bpm/VT-no D) and then defibrillation. RANOVA and Chi-square analysis were used. **Results:** Groups were similar during baseline and Vfib. During CPR, there were no significant differences in ETCO2 or CPP between the NATO litter with/without backboard and Decon litter with backboard. ETCO2 and CPP were significantly lower (P < .05) on Decon litter without backboard. ROSC was 18%, with increased survival on the NATO litter with/without backboard (P=.09). **Conclusions: T**here was no difference in the efficacy of CPR on the NATO litter with/without a backboard or the Decon litter with backboard. CPR efficacy was degraded on the Decon litter without a backboard. Thus, a backboard must be used on a Decon litter, but it is not absolutely required on the NATO litter if the patient's sternum is positioned over the crossmember. **Follow-on:** Is ROSC different between CPR on NATO litter/no backboard and delayed-onset CPR on a firm surface, simulating patient movement to the floor? **Funding:** TriService Nursing Research Program.

### Predictors of Adherence to Exercise After Heart Transplantation

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**Purpose:** The purpose of this study was to identify predictors of adherence to exercise in heart transplant recipients. **Background/Significance:** Identifying factors that predict exercise adherence after heart transplantation may lead to interventions that improve exercise ability by analyzing factors that can be changed and/or modified. Increasing the capability to adhere to exercise will increase the chance of experiencing the positive benefits associated with regular exercise. **Methods:** This study used a predictive design with 3 questionnaires that assessed exercise routine, feelings about exercise, symptoms, and motivation. Factors to predict exercise adherence included pre-operative, physical, psychological, situational, disease-related, and social influences. A sample of 16 subjects, 6 months post-operative heart transplant surgery, was obtained from a university hospital clinic. **Results:** Positive correlations were found among pre-operative exercise participation ($r$=-0.509, $P$=0.043), exercise at home ($r$=0.498, $P$=0.049), exercising functional status ($r$=0.575, $P$=0.019), and exercise adherence. Regression analysis showed number of days on the waiting list (F=6.77, $P$=0.032) and functional status ($F$=8.42, $P$=0.019), significantly predicted exercise adherence and accounted for 65% of the total variance. Accessibility ($F$=10.37, $P$=0.007) and climate ($F$=6.43, $P$=0.026) also were significantly predictive and accounted for over 46% of the variance. Additional findings revealed the demographic variable, pre-operative exercise participation ($F$=4.90, $P$=0.043), significantly predicted exercise adherence and accounted for over 26% of the variance. **Conclusions:** Exercise adherence should be assessed, as exercised is prescribed for heart transplant recipients. Attitude, motivation, and financial support should be maximized; ideal body weight should be maintained; compliance with medications should be encouraged to enhance cardiac function; exercise convenience should be improved; and education on the benefits of exercise with focus on weight-reduction, symptom relief, and anxiety reduction should be provided.

### A Comparison of Three New Generation $SpO_2$ Devices During Ambulation After Open Heart Surgery

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**Purpose:** The purpose of this study was to assess the clinical performance of 3 new generation $SpO_2$ devices (Philips FAST, Masimo SET and Nellcor N-3000) during ambulation after open- heart surgery (N=36). **Back-**

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**ground/Significance:** The new generation $SpO_2$ devices have been designed for improved clinical performance during motion, however little is known about the differences in performance among these new generation devices during patient motion. **Methods:** Randomization was used for digit and hand selection, and all 3 devices were used continuously during ambulation. Data on dropouts (DO), false alarms (FA), and correlation with heart rate (HR) were recorded. **Results:** Pairwise comparisons indicated significant differences across all 3 devices for both DO and FA. The N-3000 had the most data dropout (odds ratio of 31.9 to Masimo SET and 5.6 to Philips, at the 95% CI). However, converse was true for FA, with the Masimo SET being highest (odds ratio of 17.9 to Nellcor and 2.3 to Philips, at the 95% CI). There was also a significantly higher amount of data dropout for all three devices when readings were taken in the hand where a radial graft had been used (P=.004). For HR correlation, the mean absolute difference across all three devices was similar (Philips=4.3, Masimo=5.1, Nellcor=3.0). **Conclusions:** Physiologic monitoring in acute care requires accuracy and minimal false alarms. This study shows that there are differences across all three devices with regard to both DO and FA. High amounts of DO are problematic, because no clinical patient information is available during DO. However, false alarms are even more problematic, because they desensitize the clinicians to alarms and call into question the accuracy of displayed data. While these data highlight the statistical differences in the $SpO_2$ devices that were studied, the clinical implications of these differences warrants further study. **Funding:** Funding, in part, was provided by Philips Medical Systems, Andover, Mass.

### A Comparison of Measurements From a Temporal Artery Thermometer and a Pulmonary Artery Catheter Thermistor

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**Purpose:** The purpose of this study was to compare differences between temperatures measured by the thermistor (T) of a pulmonary artery catheter (PAC) and an infrared (IR) temporal artery thermometer (TAT). **Background/Significance:** Inferior thermometry increases risk of morbidity and mortality, thereby increasing the cost of care. The readings from the T of an invasive PAC are considered "gold standard," but the PAC has potential risks/complications. Therefore, other thermometry methods are needed. **Methods:** Using each subject as his/her own control, data were collected to measure the difference between PAC T and TAT readings. Measurements were recorded from PAC T, and 3 readings from the TAT (forehead/behind the ear continuously, only forehead, only behind ear). To assess the effect of skin oil build-up on the TAT IR lens, the lenses of 1 unit were regularly serviced (cleaned), and the other unit was serviced sporadically. **Results:** There were 300 subjects, mean age 66 years, 201 men and 88 women. Seventy percent were post-cardiac surgery, with 46% in the warming stage after hypothermic surgery and 17% actually diaphoretic. There were no significant differences between the temperature readings from the PA thermistor and a clean TA thermometer using behind the ear and both forehead and behind the ear readings, the measurement recommended by manufacturer (98.6+1.3 vs. 98.7+1.5, $t$=1.4; $P$<0.17), or when using just behind the ear (98.6+1.3 vs. 98.4+1.5, t=0.9, $P$<0.39). There were, however, significant differences when using the forehead alone, suggesting major effects from diaphoresis (98.6+1.3 vs. 97.5+1.3, $t$=8.0, $P$<0.001) and from nonserviced IR lens (98.28±1.4 vs. 97.69±1.6, $t$=7.8, $P$<0.001). **Conclusions:** These results demonstrate that the TAT is as accurate as a PAC T when using the technique of forehead/behind the ear and cleaning every 2 weeks as recommended. This technique should be promoted as the most accurate method to collect TA temperatures. **Funding:** Exergen Corporation.

### Effects of Endotracheal Tube Suctioning on Arterial Oxygen Tension and Autonomic Response in Adult ICU Patients

Bourgault AM.

**Purpose:** The purpose of this study was to explore the effects of open and closed endotracheal tube suctioning on autonomic modulation of heart rate through measurements of heart rate variability, baroreflex sensitivity, and arterial oxygen tension. **Background /Significance:** Untoward effects such as hemodynamic alterations and decreased oxygenation have been associated with endotracheal tube suctioning. **Methods:** Eighteen adult ICU patients, ages 33 to 82 years (M=59.67, SD=15.04), were included in this study. Subjects were suctioned by open and closed methods, randomized by order. Heart rate variability by general spectral analysis and baroreflex sensitivity by the spontaneous sequence method were used. Heart rate and blood pressure were analyzed beat to beat for 10-minute periods before and after suctioning. Cardiovascular measures, systolic blood pressure (SBP), and heart rate (HR) were measured before and after suctioning (1 and 5 minutes). Arterial oxygen tension ($PaO_2$) was measured before and after suctioning (30 seconds and 5 minutes). **Results:** Following open suctioning, the parasympathetic nervous system (PNS) indicator decreased. Closed suctioning was followed by a minor reduction in parasympathetic activity, as evidenced by decreased high frequency power and R-R interval. Both methods of suctioning caused an increase in SBP and $PaO_2$, yet an increase in heart rate was observed only after open suctioning. **Conclusions:** Decreased PNS indicator in subjects 65 years of age without coronary

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artery disease following open suctioning was the only difference observed between open and closed suctioning. In subjects with a positive end-expiratory pressure (PEEP) of 5 cm $H_2O$ and baseline $PaO_2$ 80 mm Hg, there are no obvious physiological advantages to using 1 method of suctioning instead of the other.

### "I'm Here": Experiences of Families of High-Risk ICU Patients

Puntillo K, Day L. University of California San Francisco School of Nursing, San Francisco, Calif.

**Purpose:** To describe family members' experiences of having a loved one at high risk of dying in the intensive care unit (ICU). **Background/Significance:** Although care in ICUs is often focused mainly on the critically ill patient, skilled clinicians realize that comprehensive patient care also involves the patient's family. Family members have a unique and important perspective on patients' symptoms, on the appropriateness and/or effectiveness of care that patients are receiving, and on how family members themselves do and/or should participate in various aspects of patient care. **Methods:** Consenting family members of seriously ill ICU patients participated in a study to describe the assessment and management of distressing symptoms in patients at high risk of dying in the ICU. As part of this study, family members described in general their experiences as family members of ICU patients. Family members were interviewed at least 1 time during the patient's ICU stay using an open-ended interview guide. Interviews were audiotaped and transcribed verbatim. Interview transcripts were analyzed using qualitative methods, including thematic analysis. **Results:** Twenty-four family members of 24 ICU patients [mean (SD) APACHE II 24 (10)]; hospital mortality 42%] were interviewed for an average (range) of 23 (10-55) minutes in, or close to, the patient's ICU. The following themes evolved from the family members' general experiences of being in the ICU during their loved one's ICU stay: family presence (eg, "I'm here"), the role of care manager (eg, instructing physicians, helping nurses), and descriptions of their own symptoms (eg, being scared, distressed, emotionally labile, encouraged). **Conclusions:** These findings about ICU family members emphasize the important role of family members in the care of ICU patients and shed new light on their personal distress. **Funding:** Soros Foundation Project on Death in America; University of California San Francisco Academic Senate.

### Critical Care Nurses' Perceptions of Impediments to Provision of End-of-Life Care

Dehaven J, Ray L, Smith M. Oregon Health & Science University, Portland, Ore.

**Purpose:** This quality improvement project reports Phase 1 of a comprehensive critical care bereavement program. Baseline data involving 5 end-of-life care areas were collected. Areas included: knowledge, work situation, staff resources, patient/family resources, and stress. **Background/Significance:** Advances in critical care have increased the number of patients for whom decisions about withholding or withdrawing life-sustaining therapies must be made. Such decisions require nursing staff to develop a different set of skills, knowledge, and professional relationships. As the first step in creating a bereavement program to support families and staff, a needs assessment was conducted looking at 5 significant areas of end-of-life care in the critical care setting. **Methods:** A cross-sectional descriptive survey (consisting of 50 Likert-type items with subscales for each area) was derived from the literature and was distributed to currently employed registered nurses working in 4 adult critical care units at 1 university facility. Reliability scores for the subscales were acceptable. **Results:** Eighty-nine usable surveys yielded a response rate of 38%. Knowledge, work situation, staff resources, and patient/family resources results were fair/good, with means of 2.0, 2.4, 2.9, and 2.5, respectively. The stress subscale mean was 1.9, indicating relatively high stress. There were no significant differences in the mean scores between individual units. Some items were noteworthy, such as "knowledge of withdrawal of life-sustaining treatment," which had a mean of 2.6. **Conclusions:** Despite differences in the number of patients at end-of-life in each unit, results were similar for all 5 data areas. However, means were higher than the set criteria of less than 2.0, indicating a need for practice development in end-of-life care issues across all units and in specific targeted areas identified through individual scale items. Phase II of this project involves nursing educational programs designed to remove perceived impediments to end-of-life care in the ICU. **Funding:** A grant from Sigma Theta Tau, Beta Psi Chapter.

### What Can Family Members Tell Us About ICU Patients' Symptoms?

Day L, Puntillo K. University of California San Francisco School of Nursing, San Francisco Calif.

**Purpose:** To describe how family members assess the symptom experience of patients at high risk of dying in intensive care units (ICUs). **Background/Significance:** Many ICU patients are unable to communicate symptoms that are distressing to them. Family members may provide a perspective on the patient's experience that will assist critical care professionals in promoting patient comfort. **Methods:** Family members underwent open-ended interviews and completed a 10-item patient symptom survey immediately after they had spent time with the patient in the ICU. Audiotaped interviews were tran-

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scribed verbatim and analyzed using qualitative and quantitative methods. **Results:** Twenty-four family members of 24 mostly medical patients [mean (SD) APACHE II 24(10)]; hospital mortality 42%] described both physical and psychological symptoms that they thought patients were experiencing. They rated thirst, tiredness, and scared as the 3 most intense patient symptoms and hunger, confusion, and shortness of breath as the 3 least intense patient symptoms. Pain, anxiety, restlessness, and sadness were rated as in between the most and least intense symptoms. Themes that evolved from the interviews regarding patient symptoms included behavioral cues to patient distress, "knowing versus not knowing," the burden of intubation and mechanical ventilation, and disease- versus treatment-associated symptomology. **Conclusions:** While the family members of ICU patients are often involved with end-of-life decisions, such as withholding or withdrawing treatments, they have seldom been invited to help professionals better understand what may be distressing to the patient. Further research is warranted to better describe the experience of family members as they engage in assessment of the patient's symptoms and the relationship of these assessments to what patients report in order to improve the comfort of patients at high risk of dying in ICUs. **Funding:** Soros Foundation Project on Death in America; University of California San Francisco Academic Senate.

**Cytokines and Activity in ICU Patients**

Winkelman C, Higgins PA, Chen Y-JK. Frances Payne Bolton School of Nursing, Case Western Reserve University, Cleveland, Ohio.

**Purpose:** This pilot investigated the relation of activity to the inflammatory response in a sample of intensive care unit (ICU) patients receiving long-term mechanical ventilation (LTV). **Background/Significance:** Inflammation, a common phenomenon in ICU patients, is influenced by the presence of cytokines. Low-to-moderate activity levels in community-dwelling subjects with cardiac disease are known to modulate pro-inflammatory cytokines. There is no information about the relationship between activity in ICU patients and inflammation as measured by cytokines. **Methods:** This was a prospective, cross-sectional pilot study. Serum samples from 10 hemodynamically stable ICU patients receiving mechanical ventilation for >72 hours were collected during periods of rest and activity. Activity, such as turning or dangling, was measured via direct observation and actigraphy. Serum samples were analyzed via commercially available kits (R&D Systems) for levels of interleukin-6 (IL-6), a proinflammatory cytokine. **Results:** The sample consisted of 10 subjects (6 women and 4 men), aged approximately 60, with averaged APACHE III score of 71, who were admitted with cardiopulmonary disorders. Patients averaged 15 ICU days. The most common activity was turning. However, 5 patients experienced no activity. Baseline IL-6 averaged 86.1 pg/mL (normal=< 5pg/mL). Four patients with activity had a decline in IL-6 with activity; the most dramatic declinations were associated with IL-6 baselines >50 pg/mL. Only 1 patient demonstrated a rise in IL-6 after activity. **Conclusions:** Low levels of activity in hemodynamically stable ICU patients with prolonged mechanical ventilation were not associated with an elevation in IL-6 in 4 of the 5 ICU patients. Whether these changes in IL-6 influence inflammation and outcome in LTV patients still needs investigation. A surprisingly small number of activities occurred in these stable ICU participants. **Funding:** RO1NR05005-01A2, University Hospitals GCRC, & the Frances Payne Bolton School of Nursing.

**Resource Utilization and Outcomes for Obese Patients in the ICU**

Winkelman C, Maloney B, Al-Dgheim R, Coffee T, Eggensshwiler KK, Fellner J, Fielden N, Fritsch D, Hamilton D, Kerber K, Klein D, Kloos J, Vanek R, Zeager A, Abdellah N, Payne F. Bolton School of Nursing, Case Western Reserve University, Cleveland, Ohio.

**Purpose:** This study examined the nursing resources and patient outcomes in obese, critically ill patients. **Background/Significance:** Caring for obese patients in intensive care units (ICU) is challenging. There are limited data about resource use and how resources may be linked to patient outcomes. **Methods:** Patients with a body mass index (BMI) > 30 kg/m2 were identified by advanced practice nurses (APN) in 8 ICUs across 4 facilities. In this descriptive study, cross-sectional data about equipment/personnel resources and patient outcomes were collected. **Results:** Forty-three patients with an average BMI of 47 kg/m2 were enrolled. Our patient sample was typically female (65%), Caucasian (79%), aged 56 (range 23-83), admitted with cardio/pulmonary diagnosis (63%), and had an APACHE II score of 13; they averaged 4 days in the ICU. Specialized equipment was used most often for patients with a BMI > 40, although 75% of participants used a special bed or overlay mattress. Most participants (63%) required 2 staff to assist with positioning. One-third of the participants required 2 attempts to obtain intravenous/arterial access. Ten patients (23%) needed special skin care (80% of these had BMI > 40). Two patients (5%) in the sample developed a pressure ulcer after admission to the ICU. Twenty-four patients (56%) required mechanical ventilation; 5 (12%) were ventilated for 3 days. Respiratory complications occurred in 21% of the sample. Other complications were arrhythmias (9%), myocardial infarction (2%), congestive heart failure (2%), DVT

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(2%), and line dislodgement (9%). Patients (98%) were ultimately transferred out of the ICU. Graphically, complications were more likely to be associated with increasing BMI rather than resource use. **Conclusions:** In general, this sample is younger, female, and less severely ill on admission than the typical ICU patient. Additional staff/staff time and specialized equipment were used in nursing care for obese ICU patients, particularly those with a BMI of 40 kg/m2. **Funding:** The Frances Payne Bolton School of Nursing.

### Critical Care Nurse Knowledge of Ethical, Legal, and Clinical Issues Related to Withdrawal of Mechanical Ventilation

Westphal C. Oakwood Healthcare System, Dearborn, Mich.

**Purpose:** This study assessed critical care nurse (CCN) knowledge of ventilator withdrawal and the information resources used. **Background/Significance:** There has been an increase in the prevalence of ventilator withdrawal; however, there is wide variation in clinical practice. Lack of knowledge of ethical, legal, and clinical issues may contribute to practice variation. **Methods:** A random sample of CCNs was obtained from 7 critical care units within a 1300+bed community healthcare system. The instrument, designed for the study, included demographics, information resources, and a knowledge test. Content validity was determined by expert review. **Results:** Surveys were distributed to 148 nurses, with 44 (28%) returned. Almost 90% of respondents reported competence caring for patients and 70% in caring for families; however, almost 70% of the respondents reported feeling "somewhat" to "very" stressed by withdrawal. A knowledge test with 17 items used a response set ranging from "strongly disagree" to "strongly agree". The final score was the sum of all correct responses (N=17). Scores ranged from 6 (35%) to 16 (94%) correct (X=12.5; SD 2.3). Ethical/legal items were answered correctly by 40% to 98% of respondents. Knowledge of facts about drugs and symptom management were answered correctly by almost all respondents; however, items that required application to a clinical scenario had approximately a 50% rate of correct response. A 3-point scale was applied to rate the use of 8 identified resources. Multidisciplinary colleagues, including ethics committee members, were most often used to obtain information. Academic courses, continuing education, and journals were rarely used. **Conclusions:** Although CCNs reported feeling competent to provide care for patients/families, ventilator withdrawal is perceived to be a stressful event. Knowledge, obtained most often from colleagues, may not reflect current theory and practice, as evidenced by knowledge deficits. Additional evidence-based education and practice resources are indicated.

### Environmental Cues Used by Advanced Practice Nurses in Air Medical Services

Clochesy JM, Reimer AP, Holloway DD, Manacci C, Nieman C. The National Flight Nurse Academy, Case Western Reserve University and Metro Life Flight, Cleveland, Ohio.

**Purpose:** The purpose of this project is to identify the range of sensory cues used by advanced practice nurses (acute care nurse practitioners/flight nurse specialists) to monitor the environments of care: home, accident scene, site of natural or technologic disaster, and aircraft fuselage. **Background/Significance:** The range of sensory cues identified will be used to develop a "synthetic natural environment" to conduct training of advanced practice nurses and to conduct clinical research using simulated patients under a wide range of environmental conditions. **Methods:** Data were collected for this exploratory study through observations during patient missions and during post-mission de-briefing interviews with flight nurse specialists. Data collection occurred until the identified environmental cues duplicated those previously identified. **Results:** Six categories of cues have been identified: visual, acoustic, vibration, air current, thermal, and smell. Examples of sensory cues identified include VISUAL: observation of treatment provided by first responders, wind direction, fireworks being launched into the air, shadows of poles and trees that were not themselves visible, blinking lights that might indicate the presence of obstruction of "steady" light sources, damage to vehicles and buildings, the inability to visualize, monitor power failure, estimating the size of confined spaces; ACOUSTIC: inability to hear change in breath sounds (thus choosing to electively place chest tube for 50 mL hemothorax), noise produced by generators, fire trucks and extrication tools, rotor sound; THERMAL: air temperature and temperature of fluids during fluid resuscitation; SMELL: smell of jet fuel (potential emergency condition) versus jet exhaust (time signal on close approach). **Conclusions:** Situational awareness is a key factor in preparedness for emergencies. The sensory cues identified can be used to develop a simulator to train advanced practice nurses to provide acute and critical care services in the air medical environment and other unstructured settings following natural and technologic disasters.

*Research Abstract Award Winner*

### Effects of 3 Groin Compression Methods on Comfort, Distress, and Complications Post-Percutaneous Coronary Intervention

Chlan L, Sabo J, Savik K. University of Minnesota School of Nursing, Minneapolis, Minn.

**Purpose:** The purpose of this study was to determine which groin compression method after a percutaneous

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coronary intervention procedure (PCI) is the most comfortable, least distressful for patients, and produces the fewest vascular complications (VCs). **Background/Significance:** Femoral artery hemostasis after sheath removal following PCI is achieved with 1 of 3 groin compression methods: manual pressure, C-Clamp, or Femostop, which causes mild to moderate patient discomfort. VC rates vary by method of groin compression. It is not known which of the methods is the most comfortable, least distressful for patients, and produces the fewest VCs, as no studies have examined all of these variables simultaneously in 1 study. **Methods:** A 3-group experimental design with repeated measures was used wherein 250 patients undergoing PCI were recruited from one Midwestern heart hospital. Patients were randomized to 1 of the groin compression methods and rated their discomfort and distress (0-10 scale) prior to sheath removal, 1 minute after pressure applied, and 1 and 10 minutes after pressure released. The groin was assessed for any VCs (hematoma, ecchymosis, oozing, pulsatile mass) prior to, 10 minutes after, and 12 and 24 hours after sheath removal. **Results:** A majority of patients were male (79%, female 21%), with a mean age of 62 (SD 11.4). Discomfort and distress ranged from 1.14 to 1.26 and 1.22 to 2.0, respectively. Patients in the Femostop group reported the least amount of distress at 1 minute after pressure was applied (X 2=6.2; P=.04). No differences were detected among discomfort ratings by device. Incidence of VCs ranged from 0.4% (pulsatile mass) to 35% (ecchymosis), with no significant difference by hemostasis device. **Conclusions:** Patients in the Femostop group reported the least amount of distress during groin compression with comparable discomfort levels. Data trends indicate that ecchymosis was the most common VC. Findings will be used to further develop clinical practice guidelines. **Funding:** This research was funded by a Critical Care Grant from the American Association of Critical-Care Nurses (AACN), Medtronic Research Grant from the Greater Twin Cities Area Chapter-AACN, United Education and Research Grant, Allina Nursing Research Grant, and the Minnesota Nurses' Association Foundation Grant.

### Effectiveness of Peridex Oral Rinse in Reducing the Prevalence of Nosocomial Pneumonia in Trauma Patients

Konop D, George B, Dow S, Gilchrist K, Adams K, Stuart S, Pokrywka M, Muto C, Darby J. University of Pittsburgh Health System, Pittsburgh, Pa.

**Purpose:** The purpose of this research was to evaluate the effectiveness of an oral care protocol Peridex‘ (0.12 % chlorhexidine gluconate) to reduce the prevalence of ventilator-associated pneumonia (VAP) in trauma patients. **Background/Significance:** Nosocomial pneumonia is the most common infection in intensive care units (ICUs). VAP is a leading cause of morbidity and mortality in the ICU. Intubation interrupts the body's normal defense mechanisms against aspiration, an important mechanism that leads to VAP. The incidence of VAP varies from 6% to 52% of intubated patients. Mortality from VAP ranges from 30% to 50%. VAP can increase LOS by 13 days (hospital) and 4.3 days (ICU). VAP cost per episode can reach $6,000. Previous research supports that vigorous oral hygiene reduces oral colonization of pathogenic organisms. **Methods:** A prospective, 3-month study was performed. The institution's Patient Safety Committee approved the study. The population consisted of intubated/trached patients admitted to Trauma ICU. Patients with a hypersensitivity to chlorhexidine or valvular disease were excluded. A standard procedure for oral care and Peridex‘ rinse was developed. Nurses received training on the procedure and proficiency was validated by performance. To control for potential variability in protocol administration, independent observations of staff were done. **Results:** There was a significant reduction in VAP incidence during the trial period compared to the previous year. The number of VAP infections preintervention was 30 per 2661 ventilator days (VD) and 1 per 1000 VD during trial period. VAP infection rate decreased from 11.27 to 1.52 ($P$=0.009). **Conclusions:** The protocol was easily introduced into routine care, and previously identified variations in oral care (frequency, process, rinse solution) were reduced. Compliance with the protocol was more than 90%. Additional research will investigate cost-effectiveness of this protocol and the clinical benefit in other populations.

### Frequency and Predictors of Return to Incentive Spirometry Volume Baseline After Cardiac Surgery

Grap MJ, Harton SC, Savage L, Elswick RK. Virginia Commonwealth University School of Nursing, Richmond, Va.

**Purpose:** This study describes the time to return to preoperative (pre-op) incentive spirometry (IS) volume after cardiac surgery, the percent of pre-op volume achieved by hospital discharge, and the effects of pain, smoking history, and duration of intubation on IS volume achieved. **Background/Significance:** Incentive spirometry is widely used after cardiac surgery, but little is known about the level of inspiratory effort expected after cardiac surgery and time to return to baseline. **Methods:** Sixty-nine subjects (71% male; 60% Caucasian, 38% black; mean age 58.9) undergoing cardiac surgery (63.5% had 3 or more grafts; 19% had valve replacements) were studied. Pre-operative and twice daily post-op IS volumes (AM and PM) were documented. Prior to IS use, the patient's vital signs and reported pain level were

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obtained. Highest temperature for the previous 12 hours was also documented. **Results:** The mean length of stay after extubation was 4.6 days; 19% of subjects achieved their IS pre-op volume by hospital discharge. On average, subjects achieved 75% (SD= 38%; range 27%-255%) of their pre-op volume by discharge. Percent of post-op volume achieved by discharge was not associated with mean pain level, age, pre-op EF, intubation time, or smoking history. However, daily IS volumes achieved were negatively correlated with respiratory rate, systolic and diastolic blood pressure, and $O_2$ saturation, and were minimally associated with pain level ($r$=-0.08, $P$=0.06). Using the highest recorded postoperative IS volume a regression model using pain level, smoking history, age, and length of intubation showed that only pain level was marginally predictive. **Conclusions:** Predictors of return to IS volume baseline investigated here did not adequately predict IS volume achieved. While pain level appears to minimally affect IS volume, other factors should also be evaluated to best assist the nurse to more realistically guide the patient's pulmonary hygiene activities after cardiac surgery.

### The Impact of Selected Environment and Personal Factors on Professional Nursing Practice Behaviors in Hospital Settings

Manojlovich M. University of Michigan School of Nursing, Ann Arbor, Mich.

**Purpose:** The study was conducted to understand how the environment affects hospital nursing practice behaviors. **Background/Significance:** The environment may interfere with nurses' ability to practice autonomously and according to professional standards. Nursing may not be an attractive career option because of the task-centered focus of a lot of nursing work, and patient outcomes may be adversely affected by task-oriented behaviors. **Methods:** The study used a nonexperimental, comparative design. Surveys were sent to a random sample of 500 nurses in Michigan. Four instruments, measuring structural empowerment, self-efficacy, professional nursing practice, and nursing leadership were included. Path analysis was used for statistical analysis. **Results:** Three hundred and sixty-four (73%) med-surg and ICU nurses responded, resulting in 266 usable surveys. Environmental factors (structural empowerment) and self-efficacy contributed to differences in professional nursing practice, but self-efficacy mainly exerted its effect as a mediator in the relationship between environmental factors and practice behaviors. Level of education and specialty certification were also found to positively affect practice behaviors. Nursing leadership had an indirect effect only, helping to explain 46% of the variance in nursing practice behaviors. **Conclusions:** Nurses may practice more professionally and, in effect, rise above task-centered behaviors, when the environment provides opportunities and power through resources, support, and information. Self-efficacy may contribute to practice behaviors, especially in an environment that has the requisite factors that provide empowerment. Strong nursing leadership may also influence nurses' self-efficacy by providing more access to structural empowerment factors. Future research should consider the indirect nature of the impact of nursing leadership to improve nursing practice and perhaps patient outcomes. **Funding:** The 2003 MNRS Dissertation Grant.

### Impact of Prospective Ethics Consultations in Reducing Moral Distress in ICU Nurses An Empirical Study

Duncan L. North Park University, School of Nursing, Chicago, Ill.

**Purpose:** This study was conducted to assess the impact of prospective ethics consultation on reducing the moral distress experienced by ICU nurses who care for patients in whom value- based treatment conflict arose. **Background/Significance:** The moral distress experienced by ICU nurses is increasing and having a tremendous impact on their ability to provide compassionate care for their patients. ICU nurses increasingly find themselves in the middle of value conflicts and feel they are unable to take the appropriate actions. Some have suggested that persistence of this environment has led nurses, and specifically ICU nurses, to leave the profession. **Methods:** One hundred and fifty ICU patients in whom ICU nurses identified that value-based conflicts arose during the course of treatment were assigned to either an intervention (ethics consultation offered) or nonintervention (ethics consultation not offered) group at a metropolitan community-based hospital. Medical data were compared between the intervention and control groups prior to and after randomization. Structured and open-ended interviews were conducted with the responsible nurses randomized to the intervention group within 1 month after the patient's death or hospital discharge. **Results:** The majority of ICU nurses reported a high degree of satisfaction with the ethics consultation. The nurses agreed that ethics consultations were helpful in addressing and resolving treatment conflicts. It was noted that there was no difference in overall mortality between control and intervention patients. However, ethics consultations were associated with reduction in hospital and ICU days and life-sustaining treatments in patients who ultimately failed to survive to discharge. **Conclusions:** Ethics consultation increased ICU nurses' satisfaction in caring for patients in whom value- based treatment conflicts arose. Also, ethics consultations seem to be useful in resolving conflicts that may be inappropriately prolonging non-beneficial or unwanted treatment.

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**Observable Indicators of Pain in Cardiac Surgery ICU Patients**

Gélinas C, Fillion L, Viens C. Nursing Faculty, Laval University, Quebec City, Quebec, Canada. Puntillo K. Department of Physiological Nursing, University of California in San Francisco, San Francisco, Calif.

**Purpose:** The aim of this study was to describe behavioral (facial expressions, body movements, muscular tension, compliance with the ventilator, or vocalization) and physiological (MAP, HR, RR, $SaO_2$, $CO_2$) responses to a nociceptive procedure in cardiac surgery ICU patients while intubated (unconscious and conscious) or extubated and in relation to their self-report of pain. **Background/Significance:** Little research has been done on pain assessment in critically ill patients, especially while intubated and at different levels of consciousness. Moreover, behavioral and physiological indicators of pain have not been widely studied in critically ill adult patients. **Methods:** A descriptive-correlational design was used. A total of 105 cardiac surgery patients were observed for behavioral (per Pain Assessment Tool developed by the authors) and physiological indicators during a nociceptive procedure (ie, positioning). Physiological data were taken from patient monitors. Three sequences of 3 times of measurements (before, during, and after the positioning) were collected: 1) unconscious and intubated (T1-T2-T3), 2) conscious and intubated (T4-T5-T6), and 3) conscious and extubated (T7-T8-T9). From T4 to T6, patients communicated presence of pain by head nodding. From T7 to T9, they evaluated their pain intensity on a 0 to 10 numeric scale. Analysis of variance and correlations were used. **Results:** All behavioral indicators increased during the nociceptive procedure. Behaviors were positively and moderately correlated to the patients' self-reports of pain. In contrast, no precise profiles for physiological indicators could be identified except that HR was positively and moderately correlated to extubated patients' self-reports of pain intensity. **Conclusions:** Behavioral indicators seem relevant to pain assessment in critically ill patients independent of level of consciousness or intubation status. Even if physiological data are easily accessible in critical care settings, the use of this data for pain assessment needs to be considered with caution. **Funding:** Acknowledgment to Heart & Stroke Canadian Foundation for financial support.

**Needs of Family Members of Dying Hospitalized Adult Patients**

McKee M, Westphal C. Oakwood Healthcare System, Dearborn, Mich.

**Purpose:** To describe the needs of family members of dying hospitalized adult patients, the extent to which their needs were met, and the relationship between needs being met and grief resolution. **Background/Significance:** Illness may place a family into a crisis state in which needs exceed resources. The impending death of a loved one presents additional needs. Unmet needs may exacerbate the crisis. **Methods:** This retrospective descriptive study sampled 163 next-of-kin of patients who died at a 600+ bed community teaching hospital during a 3-month period. Families' needs and the extent to which needs were met were identified using the Hampe (1974) tool. The 10-Mile Mourning Bridge (Huber & Bryant, l990) assessed the degree of grief resolution as measured by return to pre-event function. Surveys were sent 2 weeks post-death. **Results:** Forty-five (28%) responded to the survey. Needs identified as "very important" were: to be informed (96%), be with the patient (94%), be reassured of comfort (93%), and be informed of the impending death (91%). Of these, the need to be with the patient was met most of the time for 84% of respondents. Being reassured of the patient's comfort was met most of the time for 73%, whereas being informed and advised of the impending death was met for only 58%. Needs were unrelated to age or acute vs. chronic illness. Middle-age spouses had a significantly greater need to be kept informed of condition and impending death compared to other groups ($P$=.19). Only 19% of respondents were able to return to pre-event function. There was no correlation between needs being met and 10-Mile Mourning Bridge scores. There was a strong relationship between having needs met and the satisfaction with the hospital experience. **Conclusions:** Although families of dying patients have many similar needs, the needs are not met consistently for most. Grief resolution is not related to need satisfaction; however, meeting the needs of families can increase family satisfaction. **Funding:** A grant from Sigma Theta Tau Lambda Zeta.

**Comparison of Oxygen Saturation Values Between Two New Generation Pulse Oximeters in Patients Following Cardiac Surgery**

Ackerman M, Graves B, Giuliano K, Athilingam P, Yeager C. University of Rochester Medical Center, Rochester, NY.

**Purpose:** The purpose of this study was to compare the clinical performance of two new- generation pulse oximetry ($SpO_2$) devices, Philips FAST (Philips Fourier Artifact Suppression Technology), and Masimo SET (Masimo Signal Extraction Technology), in immediate postoperative cardiac surgery patients with low perfusion. **Background/Significance:** The continuous emergence of new medical device technology demands that clinicians are knowledgeable regarding the comparative clinical performance of available devices. While both the Philips and the Masimo products are available for

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use, there is a lack of peer-reviewed data comparing their clinical performance in critically ill patients with low perfusion. **Methods:** This study was approved by the IRB of the Medical Center, and informed consent was obtained from either the subject or a family member. Subjects for this study (N=50) were a convenience sample of patients admitted to the cardiovascular intensive care unit (CVICU) following cardiac surgery. Once admitted to the CVICU, a pulse oximetry finger probe from each oximeter was placed on the subject using random finger assignment for probe placement. Pulse oximetry and perfusion index (PI) readings were recorded at baseline and every 5 minutes for a period of 2 hours. **Results:** The mean age of the sample was 64.9 years. There were 36 men and 14 women enrolled. Pearsonian correlations for the oximetry measurements were done at each time point and were statistically significant (*P*=.01), with the exception of the 15-minute time point. In addition, the range of the mean absolute difference between readings was -.80 to 1.34%, indicating no clinical differences in device performance across any of the time points. **Conclusions:** These results support that there are no differences, either statistically or clinically, between the pulse oximetry values obtained from the Philips FAST and the Masimo SET pulse oximeters in patients following cardiac surgery. **Funding:** This research was partially funded by a research grant provided by Philips Medical Systems.

### Comparison of Resource Utilization in a Matched Sample of Subjects Undergoing Standard Versus Off-Pump Isolated CABG

Hravnak M, Hoffman L, Saul M, Zullo T, Pellegrini R, Cuneo J. University of Pittsburgh, Pittsburgh, Pa.

**Purpose:** To compare resource utilization (LOS and postoperative charges) between isolated CABG and OPCABG subjects when they are matched on risk factors for increased LOS. **Background/Significance:** Prior studies suggest off-pump CABG (OPCABG) patients consume less hospital resources than standard on-pump CABG patients, but few studies have matched comparison groups on factors known to increase hospital length of stay (LOS). **Methods:** A cohort-matched design was used. Data were extracted from 3 electronic databases at a university medical center over an 18-month sampling period (1/00-7/01). Isolated CABG patients (n=107) were matched to CABG patients on age +2 years, gender, left ventricular ejection fraction (LVEF) +5%, and exact graft:patient ratio (# vessels bypassed per subject). The matched pairs were: 63% male, mean age 66 years +10 years, mean LVEF 50% +5%, and mean graft:patient ratio 3.41 vessels +.7 vessels. No significant between-pair differences existed in NYHA class (*P*=0.431), APACHE III score (*P*=0.218), or postoperative beta-blocker use (*P*=0.727). Analyses included Wilcoxan, McNemar, and t tests for paired comparisons. **Results:** CABG and OPCABG subject pair members had similar postoperative hospital LOS (6.52 days vs. 7.05 days, *P*=0.168) and ICU LOS (1.66 days vs. 1.78 days, *P*=0.566). CABG pair members had a nonsignificant trend toward higher postoperative charges than OPCABG ($86.2K vs. $81.3K, *P*=0.128), with a mean difference of $5K. CABG and OPCABG pair members had similar prevalence of new-onset atrial fibrillation (*P*=0.607), stroke (*P*=0.262), reoperation within 24 hours (*P*=0.226), and need for > 3uPRBC (*P*=0.212). **Conclusions:** When isolated CABG and OPCABG subjects were matched on age, gender, LVEF, and graft:patient ratio, there were no significant between-pair differences in LOS or postoperative charges. The similar prevalence of postoperative complications in these subjects matched on risk factors may explain these results. **Funding:** The Central Research Development Fund, University of Pittsburgh.

### Testing a Protocol for Measuring Gastrointestinal Residual Volumes in Tube-Fed Patients

Schallom L, Stewart J, Nuetzel G, Schnelker R, Gardner R, Ludwig J, Metheny N. St. Louis University School of Nursing, St. Louis, Mo.

**Purpose:** To test a protocol designed to facilitate measurement of gastrointestinal (GI) residual volumes in continuous enterally fed patients while maintaining patency of the feeding tubes. **Background/ Significance:** Frequent monitoring of GI residual volumes is important to identify patients who are intolerant of feedings. However, this important assessment is sometimes omitted because clinicians believe that fluid cannot be withdrawn from small-bore (SB) feeding tubes and that checking residual volumes may result in tube clogging. **Methods:** The protocol was tested in 135 critically ill patients with continuous tube-feedings (71 with gastric tubes and 64 with intestinal tubes). Three-fourths of the patients had SB (10 Fr) feeding tubes; the others had feeding tubes ranging in size from 14 Fr to 18 Fr. Patients were followed prospectively for 3 days or until their feeding tubes were removed, if less than 3 days. At 4-hour intervals, a RN investigator injected 30 ml of air into the tube before attempting to withdraw fluid with a 60-ml syringe; this maneuver was designed to force the feeding tube's ports away from mucosal folds. A total of 1,809 (1359 for SB and 450 for large bore) residual check attempts were made. Following withdrawal of aspirate, 30 ml of water or NS (for select neurologically impaired patients) was injected into the tube before feedings were resumed. **Results:** Fluid was withdrawn from 71.9% of the SB tubes and from 96.1% of the large-bore tubes. The maximal amount withdrawn from both types of tubes

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exceeded 500 ml. The volume of aspirate increased as the diameter of the feeding tube increased. None of the tubes became clogged. **Conclusions:** Injecting 30 ml of air into the tube prior to attempting to aspirate fluid resulted in success in 72% to 96% of the attempts. Success rate was dependent on the tube's properties. In addition, flushing the tubes with 30 ml of water after each measurement prevented clogging. **Funding:** This project was part of a grant funded by the NINR; R01 5007, P.I. Norma Metheny.

*Research Abstract Award Winner*

**Validation of the FLACC Scale as a Pain Assessment Tool in the Adult Patient**

Crechiolo L, Burke K, Draus C, Haase S, Kester P, Mrock J, Schwartz S, Shpakoff L.
Oakwood Hospital & Medical Center, Dearborn, Mich.

**Purpose:** The goal of this study was to validate the FLACC scale as a reliable tool for the assessment of pain in the adult patient experiencing postoperative pain. **Background/Significance:** Accurate assessment of pain is vital to ensure proper administration of analgesic agents. Self-report tools like the VAS and NRS are used to assess pain in communicative adults. The FLACC tool has been proposed as a pain assessment tool for noncommunicative adults; however, research to date has failed to document the reliability and validity of using the FLACC with adults. **Methods:** Subjects in this study were patients between 18 and 70 years of age who had undergone CABG surgery. A team of 2 nurses assessed pain in these patients, first by using the FLACC scoring system and then by using the Numerical Rating Scale. Inter-rater reliability was also tested. **Results:** Both the Numeric and the FLACC scales were found to have high inter-rater reliability. Statistically significant differences in pain scores were found when comparing the FLACC scores to the Numeric scores. The FLACC scale was found to be a poor tool for pain assessment in these patients. Most patients scored nearly zero on the FLACC scale, while those same patients simultaneously rated their pain anywhere from 0 to 10 on the Numeric Rating Scale. **Conclusions:** The FLACC tool was found to be an inaccurate measure of pain in the adult patients studied. There was a statistically significant lack of correlation between the FLACC score and the Numeric Pain Scale. Further study with larger and more diverse samples is recommended to confirm the findings in other patient populations.

**Patient Education Survey Following Thoracic Surgery**

Jeffries M. Massachusetts General Hospital, Boston, Mass.

**Purpose:** This survey was developed to identify needs and concerns of postoperative thoracic surgical patients and to evaluate the discharge information provided to them. **Background/Significance:** Documenting phone calls to the thoracic unit from discharged patients identified a gap in education and inconsistency in information provided to thoracic surgical patients at discharge. Templates of the most common thoracic surgeries were written and made available on the Web for easy access by all disciplines. Information provided in the templates included activity, incision care, pain management, common problems, follow-up care, and phone numbers for the physician and thoracic unit. **Methods:** A follow-up, 1-page anonymous survey was distributed to each patient on arrival to the surgeon's office 3 weeks after discharge (the first follow-up visit). Questions related to the patient's demographics, surgery, postoperative care, length of stay, and pain management were asked. **Results:** Thirty-seven patients completed the questionnaire over a 3-month period. Fifty-nine percent of the patients were male and 38% were female, with 23% being less than age 50 and 65% between the ages of 51 and 80. Ninety-seven percent received discharge information from their nurse and verified that the information was explained to them. All 97% read the information themselves and 96% felt it was helpful. The majority (91%) felt that they could call the unit with questions or concerns during recovery. In addition, call back data for these 3 months were decreased. **Conclusions:** These responses provided positive feedback to the nurses that discharge information was used by the patient and was helpful during the recovery period after thoracic surgery. The survey did assist in evaluating the present educational templates and also identified areas for improvement, particularly related to medication education and pain.

**Evaluation of a Newly Developed Nonverbal Pain Scale (NVPS) for Assessment of Pain in Sedated, Critically Ill Adults**

Odhner M, Wegman D, Freeland N, Steinmetz A, Ingersoll G. University of Rochester Medical Center, Rochester, NY.

**Purpose:** To determine the reliability of the NVPS in sedated, intubated, critically ill adults. **Background/Significance:** Although an instrument has been developed to assess the magnitude of pain in nonverbal children (the FLACC), an accurate, reliable scale has not been developed for adults. A recommendation to use the FLACC for nonverbal adults was unacceptable to nursing staff. As a result, several nurses reviewed the literature and developed the NVPS, which replaces the Cry and Consolability dimensions of the FLACC with 2 physiologic subscales. **Method:** One hundred paired assessments were completed on 59 patients hospitalized for multiple trauma, severe burns, or major abdominal surgery. Subjects were sedated, intubated, and unable to

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speak or report level of pain through the use of pen or paper aids. Assessments were conducted during periods of rest and activity. Pearson's correlation was used to assess relationships. Student's t-test, ANOVA, and chi square were used to detect differences across raters and rating characteristics. **Results:** Alpha coefficients for both scales were similar (FLACC=.84; NVPS=.78). The inter-rater reliability estimates for both scales were good, with nurses rating components comparably. Subscales of the NPVS correlated well with those of the FLACC, suggesting evidence of criterion-related validity for the new scale. The NVPS Physiology I subscale, which contains markers for change in vital signs, was strongly correlated to overall pain rating. The Physiology II subscale of the NVPS was the least stable. **Conclusions:** This pilot study has provided preliminary information concerning the reliability and validity of the NVPS for use with critically ill nonverbal adults. The NVP Physiology II subscale needs refinement to eliminate subjectivity. Future investigations should include pain assessment surrounding timing of pain medication administration and the inclusion of larger and more diverse patient populations.

### Relationship Among Nursing Assessment of Signs of Sepsis, Antibiotic Treatment, and Outcomes in an Intensive Care Unit

Cantey C. University of Alabama in Huntsville, Huntsville, Ala.

**Purpose:** This investigational study examined the relationship among timing of critical care nursing assessment documentation of signs of sepsis, timing of new intravenous antibiotic therapy, and patient outcomes of septic adult trauma patients in an intensive care unit. **Background/Significance:** Sepsis has become the tenth leading cause of death in the United States and is the leading cause of death in noncardiac intensive care units. Critical care nurses are continuously monitoring for changes and trends in their patients' condition during their documented assessments. Recent literature indicates that early identification and treatment for septic patients will lead to improved outcomes. **Methods:** This investigational study included a retrospective correlational design. A sample of 40 patients was included, and a manual chart review was utilized for data collection. Sepsis was identified by utilizing the 1992 criteria presented by the Society of Critical Care Medicine (SCCM) and the American College of Chest Physicians (ACCP). **Results:** Data analysis revealed there were no significant relationships among timing of critical care nursing assessment documentation of signs of sepsis, timing of new intravenous antibiotic therapy, and patient outcomes. The significant finding in this study was the length of time in days in which sepsis was identified in the documented nursing assessment at 1.28 days versus the physician's documented identification at 4.69 days. **Conclusions:** The critical care nursing assessment is important in the identification of signs of sepsis as identified in this study. As bedside critical care nurses, it is essential to evaluate for early signs of sepsis, which may lead to improved outcomes for the patient. It is recommended by the author that further research be invested into the relationships evaluated in the study and inclusion of a larger sample population.

### A Survey of Cardiothoracic Intensive Care Unit (CTICU) RN Orientation

Casida J. The Heart Hospital of New Jersey Newark Beth Israel Medical Center, Newark, NJ.

**Purpose:** The purpose of this survey was to determine the current process of CTICU nursing orientation in various cardiac surgery centers in the United States. **Background/Significance:** Despite the many changes in CTICU nursing practice, little information has been published related to the specific educational needs or the type and length of the CTICU nursing orientation process in the twenty-first century. **Methods:** A survey instrument consisting of structured and open-ended questions was distributed to a sample of 50 CTICU nurse managers (NMs). **Results:** Thirty NMs responded to the survey (60%). Over half of the respondents (56.7%) reported having an orientation program that was divided into didactic and clinical phases, with variations in the length of orientation. Twenty-two (73.3%) of the respondents have trained clinical preceptors. Further, the clinical nurse specialists and/or nurse educators and nurse managers shared the responsibility of coordinating the orientation process. In spite of the current nursing shortage, a majority (86.7%) of the NMs preferred to hire nurses with at least one year of critical care nursing experience. However, 21 (70%) NMs would consider hiring new graduates who have completed an internship program in critical care. **Conclusions:** Findings of this survey provide benchmarking tools for clinical educators and administrators involved in the development and implementation of CTICU nursing orientation program. Future studies of this type should explore: (1) process of orientation based on evidence and the influence of support/resources on orientation outcomes (eg, trained preceptors, NMs, educators, advanced practice nurses, and physicians), (2) orientation process of combined critical care services (eg, adult/pediatric CTICU), (3) the profile and learning styles of new CTICU RNs, (4) indirect and direct costs, and (5) a larger sample that is more representative of all levels of cardiac surgery centers.

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### The Effectiveness of the Cortrak Device in Avoiding Lung Placement of Small Bore Enteral Feeding Tubes

Ackerman M, Mick D, Bianchi C, Chiodo V, Yeager, C. Center for Clinical Trials and Medical Device Evaluation, University of Rochester School of Nursing.

**Purpose:** This study was conducted to determine if a novel technology (CorTrak) aids in placement of feeding tubes, avoiding inadvertent lung placement. **Background/Significance:** The current standard of care for feeding tube placement is blind nasal or oral insertion to position the tube in the stomach or small bowel. Placement is assisted by clinical judgment, and ultimately verified by X-ray, the gold standard for assuring GI tract placement and avoiding lung intubation. **Methods:** The study was IRB approved, and informed consent was obtained. Twenty-five subjects were recruited from a convenience sample of ICU patients. Tube placement was aided with the CorTrak device, which creates a computer-generated image from a sensor at the tip of the feeding tube stylet. A stationary locator was placed on the abdomen, which plotted the path and depth of the stylet's sensor, creating a dynamic computer image. Feeding tube location was determined via computer image. All subjects then had an X-ray to verify feeding tube location. **Results:** No tubes were placed into the lung, retained, and subsequently found by X-ray to be in the lung. Of 25 subjects, 4 had what appeared to be lung placement during the procedure. This assessment was based on the CorTrak device as well as on clinical judgment. When this occurred, the tube was removed and reinserted. **Conclusions:** The CorTrak device had a 100% success rate for avoiding permanent lung placement of the feeding tube. Utilizing the device allowed the practitioner the opportunity to reposition the tube prior to X-ray, eliminating the cost and patient safety burden of additional X-rays. The CorTrak device has the potential to improve the practice of bedside feeding tube placement. **Funding:** This research was supported by a grant from ViaSys Health Care.

### Predictors and Correlates of Neurocognitive Function of Patients Following Off-Pump Coronary Artery Bypass Surgery

Sendelbach S, Lindquist R, Watanuki S, Joyce L, Savik K. Abbott Northwestern Hospital and the University of Minnesota, Minn.

**Purpose:** The purpose of this study was to identify predictors and correlates of neurocognitive function following OPCAB surgery. **Background/Significance:** Cardiopulmonary bypass pump (CPB) use has been suggested to be a major possible contributor to neurocognitive decline, but research results have demonstrated "off-pump" CABG (OPCAB) patients also experience a decline. **Methods:** Fifty-four (54) consenting adults at a large Midwestern urban tertiary care center participated. Neurocognitive testing was administered within 72 hours preoperatively and 72 hours after surgery (before discharge). Specific measures included tests of motor function (psychomotor speed and dexterity) and cognitive function (language, memory, and attention). Patient data were collected and included medical, psychosocial, and demographic variables to determine potential association with neurocognitive function. **Results:** In multivariate analysis, controlling for baseline cognitive composite score, the final model showed a decline in the post cognitive composite with increasing age and incidence of new atrial fibrillation ($F3, 40=42.97$; $P=<.001$). Controlling for baseline motor composite, declines in the post motor composite score were associated with age and anxiety ($F3, 35=15.83$; $P<.001$). **Conclusions:** Patients with better preoperative cognitive function, those who were younger, and those who did not go into atrial fibrillation had better postoperative cognitive function; patients who were younger, performed better at baseline, and had less postoperative anxiety had better postoperative motor function. It is recommended that further studies be conducted to determine the relationships between neurocognitive outcomes at discharge and long-term follow-up. **Funding:** This research was supported by the Minneapolis Heart Institute Foundation, Allina Foundation; Helen Wells Nursing Research Award and the Multicultural Award of the University of Minnesota.

### Determining Best Practice: Comparison of Three Methods of Femoral Sheath Removal Following Cardiac Interventional Procedures

McAlpine Benson L, Wunderly D, Perry B, Kabboord J, Wenk T, Birdsall B, Vanderbos L, Roach V, Goole R, Crippen C, Nyirenda T, Rumsey L. Bronson Methodist Hospital, Kalamazoo, Mich.

**Purpose:** The objective of this research study was to test the null hypothesis that there is no significant difference between the 3 most common methods of sheath removal: manual compression and mechanical compression with either the Compressar or the Femostop. **Background/Significance:** Insertion of sheaths is a routine component of cardiac interventional procedures such as PTCA and intracoronary stenting. However, while the procedure has become standardized, there has yet to emerge a best nursing practice recommendation for the removal of arterial sheaths post cardiac interventional procedure. To date, there has been no published randomized study comparing the methods of sheath removal. **Methods:** The research design was experimental; patients were randomly assigned using a random numbers table to have 1 of the 3

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methods of sheath removal performed. **Results:** The 3 groups were similar in that there were no significant differences between the groups in terms of age, BMI, sheath size, heparin utilization, antiplatelet agents, or use of IIb-IIIa inhibitors. The complications between the methodologies for sheath removal were statistically significant. Those patients who had manual sheath removal had fewer complications when compared with the Compressar or Femostop (chi-square *P* value 0.04). When complications were compared with the other parameters, the only parameters that proved to be statistically significant were the presence of a heparin infusion post procedure (chi-square *P* value=0. 014) and ACT values (*t* test *P* value=0.044). An adjusted level of significance of 0.049 was used for single intermediate analysis. **Conclusions:** Based on the results, the study setting is currently exploring manual sheath removal as the preferred practice. When used in conjunction with closure pad devices, manual hold times can be reduced, resulting in cost savings through lessened equipment usage, earlier discharge times, and improved bed utilization. **Funding:** This research was funded by the Bronson Center for Clinical and Community Research.

**Donation After Cardiac Death (DCD): The Status of DCD Organ Donation in the U.S.**

Chabalewski FL, Seem DL, McGaw LJ. United Network for Organ Sharing (UNOS), Richmond, Va.

**Purpose:** DCD provides families with opportunities to donate organs after the decision has been made to discontinue life support. This retrospective review assesses the current status of DCD and analyzes increases in DCD donors since 1993. **Background/Significance:** In 2000, the Institute of Medicine (IOM) recommended that all organ procurement organizations (OPOs) explore the option of DCD in cooperation with hospitals and healthcare professionals and make this option available to patients and families who wish to donate. The IOM reported an estimated 1,000 DCD donors per year, which could potentially yield more than 3,000 additional organs for transplantation. **Methods:** Data from brain dead and DCD donors that were collected and reported to the Organ Procurement and Transplantation Network/ UNOS database from 1993 to 2002 were reviewed. Of 56,085 organ donors, 953 (1.7 %) were DCD donors. **Results:** In 1993, there were 4,861 donors, with 42 being DCD donors. In 2002, out of 5,992 donors, 191 were DCD donors, with 310 kidneys, 81 livers, 10 pancreata, and 1 lung transplanted. Of these donors, 127 were male and 61 were female. Six donors were under the age of 5; 27 donors were between 6 and 17; 57 donors were between 18 and 34; 92 were between 35 and 64, and 7 were more than 65 years old. The causes of death were reported as anoxia (52), CVA (43), head trauma (81), CNS tumor (4), and unspecified (8). There was no statistically significant difference in the 3-year graft survival rates for kidneys from brain dead donors (78.1%) and DCD donors (78.0%) and livers from brain dead donors (73.2%) and DCD donors (66.9%). **Conclusions:** Despite a 355% increase in the number of DCD donors since 1993, a considerable gap remains between the current number of DCD donors and the estimated potential. Therefore, continued collaborative efforts between the critical care and OPO communities are needed to identify those patients who might be DCD donors in order to provide their families with the opportunity to donate.

*Research Abstract Award Winner*

**Influence of Automatic External Defibrillators (AEDs) on In-Hospital Cardiopulmonary Arrests**

Martin NK, Ahrens TS. Barnes-Jewish Hospital at Washington University Medical Center, St. Louis, Mo.

**Purpose:** To compare time-to-first-defibrillation using AEDs operated by first responders versus manual defibrillators operated by the traditional ACLS response teams inside hospitals. **Background/Significance:** The AHA has set a goal for hospitals to deliver defibrillation within 3 minutes of a patient's collapse. Limited research has been done inside hospitals to determine the fastest method of defibrillation delivery. **Methods:** The study included 82 non-ICU inpatients from 4 different Midwest hospitals. All patients had an initial dysrhythmia of either ventricular fibrillation (VF) or tachycardia (VT). Two of the four hospitals authorized first responders to use the AED as the method of providing the initial defibrillation. The other 2 hospitals continued their usual practice of waiting for the ACLS response team to arrive and provide the initial defibrillation using a manual defibrillator. **Results:** Continuous variables of age and Apache scores 24 hours prior to arrest were not significantly related to the time differences in each group ($P$=0.0065). The mean time-to-first-defibrillation in the manual defibrillator group (N=73) was 5.1 minutes (SD 3.5), while the same interval in the AED group (N=9) was 1.8 minutes (SD 0.81). All patients in the AED group received defibrillation within 3 minutes of collapse, while 41% (N=30) of the manual defibrillator group attained this goal (Fisher's exact test $P$<0.0008). While the study was not powered to reflect survival rates, the AED group's survival rate at hospital discharge was 89% (N=8) and 21% (N=15) for the manual defibrillation group. **Conclusions:** AEDs used by the first responder appears to provide faster defibrillation inside these hospitals. This finding has important implications for redesigning the traditional hospital arrest response. **Funding:** 2000 Hewlett-Packard/American Association of Critical-Care Nurse Research Grant Award Winner.

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**Wound Care Pain in Acutely and Critically Ill Adults**
Stotts NA, Puntillo K, Morris AB, Stanik-Hutt J, Thompson CL, White C, Wild LR. University of California San Francisco, San Francisco, Calif.

**Purpose:** This prospective study was conducted to describe patients' pain perceptions and responses prior to, during, and after wound care (WC) (dressing change, packing, irrigation, debridement); examine the relationships between patients' WC pain and demographic variables; and describe the distress associated with WC. **Background/Significance:** Wound care is an important treatment for hospitalized adults with wounds, yet a paucity of patient data indicates the type or amount of pain associated with wound care. **Methods:** The sample was composed of acutely and critically ill adults (n=412) undergoing WC (mean age 56.3 years, SD 17.13). Instruments included a pain intensity numeric rating scale (NRS), the Thunder Study modified McGill Pain Questionnaire–Short Form, a behavioral observation tool, a distress NRS, and the body outline diagram. A 1-group repeated measures design was used to assess patients' pain prior to, during, and after WC. WC distress also was measured. **Results:** Pain intensity was greatest during WC (mean 4.4, SD 3.20). Pain was most consistently described as stabbing, sharp, tender, and stinging. Behaviors that frequently occurred with pain were grimacing, wincing, moaning, verbal complaint, and rigidity. There were no gender differences in pain intensity; nonwhites had greater WC pain than whites. Pain intensity in older and younger patients was the same during WC. Pharmacological pain treatment was used in 23.8% of patients, nonpharmacological therapy in 88.3%, and combination therapy in 20.6%. WC pain was mildly distressing; most distressed were nonsurgical patients and those having the wound packed, irrigated, or debrided. **Conclusions:** Patients experience pain and distress during WC. Some behaviors and terminology consistently describe WC pain. Further work is warranted on assessment and management of pain in acutely and critically ill patients during WC procedures. **Funding:** Funded by the American Association of Critical-Care Nurses.

**Georgia Nurses Report on End-of-Life Care Practices**
Trotochaud K, Kinlaw K. Center for Ethics, Emory University, Atlanta, Ga.

**Purpose:** This study surveyed nurses in Georgia about current institutional and individual practices, attitudes, beliefs, and experiences in caring for patients at the end of life. **Background/Significance:** Nurses are primary care providers for dying patients, rendering comfort and caring, supporting grieving families as they struggle through this difficult time, and coordinating care provided by other healthcare providers. **Methods:** A sample of nurses selected from the membership of professional nursing organizations in specialties likely to be involved in end-of-life care was mailed a 68-question survey inquiring about observations of institutional end-of-life care practices as well as their own practices, attitudes, and beliefs. After 2 mailings, 337 completed surveys (26%) were returned out of over 1300 mailed. **Results:** Although nurses reported that Advance Directives and Do Not Resuscitate orders were effective, they were less frequently followed when there was disagreement on the part of the family and/or the physician. Only slightly more than half reported that institutional pain assessment practices were effective even though they were confident in their own skills in assessing end-of-life pain. A majority did not find fear of hastening death to be a barrier to providing appropriate pain management, but they did report that this was sometimes a problem for physicians prescribing effective doses of pain medications. The nurses supported withholding CPR and withdrawal of ventilation and dialysis more than withdrawal of artificial nutrition and hydration and antibiotics. They reported a lack of basic professional education in end-of-life care, pain assessment, and pain management but some continuing education on these topics. **Conclusions:** These findings reinforced the need to improve basic professional end-of-life education and to improve nursing assessment of end-of-life pain and its management. It raised questions about Advance Directives and their compliance in the face of family and physician disagreement. It demonstrated that nurses have mixed feelings about practices that may hasten a patient's death. **Funding:** Funding for this survey came from the Whitehead Foundation.

**A Clinical Comparison of Forearm and Upper Arm Automatic, Noninvasive Blood Pressures**
Schell K, Bradley E. Christiana Care Health System, Bucher L, Seckel M, Lyons D, Wakai S, Bartell D, Carson E, Chichester M, Foraker T, Simpson K. University of Delaware, Newark, Del.

**Purpose:** This study was conducted to compare automatic, noninvasive blood pressures (NIBP) taken on the forearm (FA) with those taken on the upper arm (UA). **Background/Significance:** Some healthcare workers obtain NIBPs using the FA rather than the UA site when a standard-sized BP cuff does not fit the UA or when the FA is more accessible than the UA. Accurate BP measurement is critical for making appropriate healthcare decisions. Research on the use of the FA for BP measurement is extremely limited. **Methods:** A descriptive, correlational comparison study was conducted in the emergency departments of a 1071-bed teaching hospital. Two hundred and four medically stable patients (ages 6

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to 91 years) were recruited. Left UA and FA circumferences were measured, and cuff size determined based on manufacturer's recommendations. Using the Welch-Allyn Vital Signs 420 Series monitor, NIBPs were taken first on the left FA and then (within 1 to 2 minutes) in the UA with the subject seated and the arm at heart level. Order of BP measurements was alternated for subsequent participants. **Results:** Pearson's R correlation coefficient between UA and FA systolic BPs was .884, between UA and FA diastolic BPs was .763, and between UA and FA mean arterial pressures (MAPs) was .839 ($P$<0.0001, respectively). A paired t-test revealed significant differences between FA and UA systolic BPs (t=2.07, $P$<.05). No significant differences in diastolic or mean BPs were found. **Conclusions:** Although a statistically significant difference between UA and FA systolic BP was noted (mean systolic BPs 122.5 and 123.9 mm Hg for UA and FA, respectively), the researchers believe these differences are not clinically significant. These findings provide support for the use of FA NIBPs in seated, stable patients in the clinical setting when the UA is not accessible or the cuff does not fit. However, strict attention to correct cuff size and placement of the arm at heart level is necessary. **Funding:** This research was funded by a research grant from the Southeastern Chapter of the American Association of Critical-Care Nurses.

**Analysis of Medication Usage in Pediatric Resuscitation**

Agosto P, Maka D, Roth C, Brown M, Lin R, Nadkarni V, Helfaer MA. The Children's Hospital of Philadelphia, Philadelphia, Pa.

**Purpose:** An analysis of resuscitation medication usage was conducted to determine those medications most frequently used from those available in the resuscitation cart. We hypothesized that only a small percentage of resuscitation cart medications were used on a routine basis. Findings would allow for more focused staff education. **Background/Significance:** To be responsive to unexpected cardiac arrests and in-hospital emergencies, hospital resuscitation carts are stocked with a variety of medications. There is a trade off between having numerous medications to be able to respond to a wide variety of emergencies and a limiting the number of medications to those most frequently used. The tension created between too many and too few medications impacts patient safety and staff education. **Methods:** With IRB approval, we performed a retrospective review of medication usage from all hospital resuscitation carts over a 22-month period. Results: Forty medications were maintained on each of 135 trays in 80 resuscitation carts during the period analyzed. Twelve medications accounted for 82% of the usage. The top 5 medications most frequently used from the medication inserts were atropine, sterile water for injection, epinephrine 1:1000 injection, vecuronium, and epinephrine 1:10,000 Bristojet. Of the medications requiring replacement, 5.2% were replaced due to expiration. The top 3 medications replaced for expiration were isoproterenol, amiodarone, and thiopental. All the medications listed as needing replacement due to expiration were used for resuscitations during the study period. **Conclusions:** Resuscitation carts in a large children's hospital have predictable patterns of medication utilization. Ongoing analysis by the hospital resuscitation committee is required to streamline contents to include those that optimize safety and efficiency. Results may assist in future resuscitation training, focusing attention on those top 12 medications most frequently used.

**Factors That Affect Nutritional Adequacy in Mechanically Ventilated Patients Receiving Enteral Nutrition**

O'Leary-Kelley C, Puntillo K, Stotts N, Barr J, Douglas M. University of California, San Francisco, and Veterans Affairs Palo Alto Health Care System, Palo Alto, Calif.

**Purpose:** The study examined the adequacy of enteral intake and factors affecting delivery in mechanically ventilated intensive care unit (ICU) patients. **Background/Significance:** Several factors may limit enteral intake and lead to malnutrition and increased mortality and costs. **Methods:** A prospective, descriptive design was used to compare enteral intake with nutritional requirements in 60 patients receiving enteral nutrition at goal rate. Requirements were determined using Harris Benedict Equation (HBE), and 25 patients were also measured by indirect calorimetry. Enteral calories received, and reason and duration of feeding interruptions were recorded for 3 consecutive days. **Results:** Findings revealed a significant difference between mean requirements by HBE and mean calories received [95% (CI) 573-905; $P$<.0001]. There was no difference between measured requirements and mean calories received for patients measured by indirect calorimetry. Forty-one patients (68.3%) received less than 90% of required calories, 18 (30%) received within 10%, and 1 patient received more than 110% of required calories. Five variables—episodes of diarrhea, emesis, residual volume, tube placements, and number of minutes that feedings were off—explained 70% of the variance in calories received ($P$<.001, $R^2$=.70; multiple linear regression). The mean number of minutes that feedings were off explained 45% of the variance over and above the other 4 variables ($P$<.001). **Conclusions:** Actual enteral intake does not consistently match requirements due to frequent interruption in continuous enteral feeding. These findings pose additional questions, requiring further research, about enteral nutrition delivery and accuracy of methods used to establish requirements. **Funding:** National Insti-

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tute of Nursing Research, National Research Service Award #1 F31 NR07707-01, VA Predoctoral Nurse Fellowship, and Alpha Eta chapter, Sigma Theta Tau.

**Preliminary Report of a Novel Therapy for Maintaining Normothermia in Organ Donors**

Mahanes D, Luba S, Bassin S, Smith T, Harnois M, Bleck T, Nathan B. University of Virginia Health Sciences Center, Charlottesville, Va.

**Purpose:** To provide preliminary evaluation of the safety, efficacy, and ease of use of an intravascular temperature control system to maintain normothermia in potential organ donors. **Background/Significance:** Poikilothermia following death by neurological criteria is common due to loss of hypothalamic function. Maintaining normothermia prior to organ procurement can be challenging. Common strategies include thermal blankets, heating inspired air, warming blood products or intravenous solutions, and increasing ambient temperature. These efforts are often labor intensive and fail to adequately maintain normothermia. An alternative is the use of an intravascular temperature control system. **Methods:** This is a preliminary report based on cases at the University of Virginia. Four potential donors were enrolled following death by neurological criteria and consent for organ donation. A large-bore central venous catheter (Fortius heat exchange catheter, Alsius Corporation, Irvine, Calif) was inserted and connected to an external control unit (CoolGard 3000, Alsius). Saline flows through the catheter and control unit in a closed circuit. An internal feedback loop adjusts the temperature of the saline. Efficacy was determined by comparing actual donor temperature to normothermia (37 C). Safety was evaluated through reporting of adverse events. Nurses were surveyed for ease of use and time required to manage donor temperature. **Results:** Normothermia was effectively reached and maintained, with a mean error of 0.27 C after a 60-minute induction time. All cases resulted in successful procurement of organs for transplant. One donor developed tachycardia and hypertension that may have been unrelated to warming. Nurses rated the system easy to use and reported decreased time spent managing temperature. **Conclusions:** Use of an intravascular temperature control system shows promise as a safe, effective, and easy to use method of maintaining normothermia in organ donors. Enrollment is ongoing.

*Research Abstract Award Winner*

**Observing Oral Care in the Mechanically Ventilated Patient: What Is Oral Care and Is It Being Done?**

Cutler C, Davis N. Advocate Health Care, Oak Brook, Ill.

**Purpose:** To objectively assess the method and frequency of oral cleansing and suctioning for mechanically ventilated (MV) patients. **Background/Significance:** Oral care is poorly defined and its importance misunderstood by ICU nurses. Necessary oral care components include assessment, brushing to remove dental plaque, frequent swabbing to maintain mucosal integrity, suctioning of oral secretions, and moisturizing mouth and lips. Since colonization of dental plaque and the oropharynx is associated with ventilator-associated pneumonia (VAP), appropriate oral care interventions may affect patient and financial outcomes. **Methods:** Oral care for MV patients was observed during random, 4-hour time blocks over 2 months at 5 Chicago-area hospitals. Patients in 8 ICUs represented medical, surgical, cardiac, neuro, and trauma diagnoses. Variables recorded included time, tool used, and task performed. **Results:** One hundred and thirty-nine MV patients with a median of 3 days on vent (range 0 to 74) were observed during 21 four-hour time blocks. None of the patients had their oral cavities assessed or their teeth brushed. In fact, no patient had a toothbrush available bedside, and only 42% had any oral cleansing tool available. Only 31% (n=43) of patients' mouths were swabbed (27% q-4 hour and 5% q-2 hour). In 69% of patients, no oral swabbing was observed. Only 32% (n=44) received oral suctioning with a tonsil-suction device (22% q-4 hour and 10% at least q-2 hour). In 68% of patients, no oral suctioning was observed. **Conclusions:** Effective oral care is seriously lacking for MV patients. In fact, the majority of MV patients receive no oral cleansing. A significant gap exists between evidence-based research and actual nursing practice. Despite the importance of brushing teeth to remove dental plaque, foam swabs remain the primary oral cleansing tool. Further study is necessary to determine the effect education and an oral care protocol (clearly defining tools and frequency) can have on patient and financial outcomes.

**A Comparison of Two Methods of Continuous Renal Replacement Therapy in Patients on Total Mechanical Cardiac Assistance**

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

**Purpose:** The study compares differences in creatinine clearances between patients on continuous renal replacement therapy (CRRT) utilizing a duraflo-treated extension tubing (DTET) on the externalized cannulae of the Abiomed BVS 5000 versus a double-lumen venous access device (DLVAD) in patients on total mechanical cardiac assistance. **Background/Significance:** Acute renal failure in the setting of mechanical cardiac assistance is highly predictive of adverse outcomes in bridge-to-transplantation patients. The early institution of CRRT is postulated to increase survival, increase transplantability, and decrease hospital length of stay in this

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patient population. The risk of hemorrhage from a DLVAD is a concern in this group of patients because of mandatory anticoagulation intra- and post-operatively. Creatinine clearance is the most sensitive indicator of renal function. **Methods:** Calculated creatinine clearances for 2 groups of CRRT patients on total mechanical cardiac assistance were taken in a retrospective, nonrandomized study. Twelve patients on DTET were matched against an equal number of patients on the DLVAD (control group). The groups were well matched for age (58, 52 years), sex, and mean observation time (5 days). All patients were on the CVVHDF mode during the entire observation period. Paired T-tests were utilized to test levels of significance. *P* values less than 0.05 were considered to indicate statistical significance. **Results:** Mean creatinine clearance for the study group was 60.3 + 17.2 ml/min versus 72 + 24.8 ml/min for the control group. The study did not show any significant differences between the DTET and DLVAD in terms of creatinine clearance (P>0.19). **Conclusions:** The use of DTET in patients on total mechanical cardiac assistance provides easy, readily available access for CRRT in patients in whom postoperative bleeding is a concern. It is an effective alternative when the paucity of vascular access is a concern.

**Are Small Incisions Less Painful in the Postoperative Robotically Assisted Cardiac Surgery Patients?**

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

**Purpose:** To compare the postoperative pain of robotically assisted cardiac surgery patients with traditional open sternotomy patients. **Background/Significance:** The advent of robotic technology allowed cardiac surgeons to perform complicated procedures through small incisions, thereby minimizing surgical trauma. To date, there is a dearth of information addressing the issue of whether small incisions between the ribs translate to a lesser or more painful postoperative course compared to the long incision and splitting of the sternum associated with conventional heart surgery. **Methods:** A retrospective chart review of 40 patients who had surgery for coronary artery bypass graft, mitral valve repair, and atrial septal defect repair from January 2002 to August 2003 was done. Twenty robotically assisted cardiac surgery patients were compared to 20 randomly selected post open-sternotomy patients. Standardized Pain Rating Scales were utilized. Patient's pain levels were classified as mild, moderate, and severe depending on the type and amount of pain medication received and/or required within 6 hours post-extubation. The differences in results were subjected to Chi-squared tests. *P* values less than 0.05 were considered to indicate statistical significance. **Results:** Eight (40%) of robotically assisted patients reported severe pain compared to 0 in the traditional surgery patients. Six (30%) in the test group reported moderate pain compared to 2 (10%) in the control group. However, 18 (40%) in the control group reported mild pain compared to 6 (30%) in the test group. Post robotically assisted patients experienced more pain than the post open-sternotomy patients ($P<0.001$), and therefore disproves the perception that small incisions translate to less pain. **Conclusions:** Closer attention to the pain issues of post robotically assisted patients is recommended to negate the effects on functioning and healing, and achieve the ultimate goal of robotic surgery—faster recovery.

**Parental Satisfaction in a Pediatric Intensive Care Unit**

Koontz VS. Marshall University College of Nursing and Health Professions.

**Purpose:** The study was conducted to assess the level of Parental Satisfaction with patient care provided in a pediatric intensive care unit (PICU). The survey was sub-categorized into 3 subsets of hospital environment, patient care, and communication to better determine parental satisfaction. **Background/Significance:** In the United States (US), pediatric medical services represent a $55 billion per year business. The US children's hospitals are in a unique position to obtain a large share of this specialized market and remain profitable in this uncertain future of American healthcare. Smaller PICUs must compete for pediatric customers by delivering more personal and state-of-the-art care while maintaining a higher level of parental approval of patient care than ever before to retain customers. **Methods:** A 24-question survey using a 5-point Likert scale was distributed to a anonymous convenience sample of parents who's children had been admitted to the PICU for longer than 24 hours but no longer than 14 days. The survey also included 3 open-ended questions to determine liked and disliked aspects of the patient admission as well as suggestions for improvement. The completed surveys were collected in a locked drop box at the nurse's station. **Results:** The results of this study found high correlations for hospital environment ($r=.75$, $P<.01$), patient care ($r=.86$, $P<.01$), and communication ($r=.92$, $P<.01$), indicating that there is a very high level of parental satisfaction in this PICU. **Conclusions:** This study has indicated a very high parental satisfaction correlation with hospital environment, patient care, and communication administered in this Appalachian healthcare facility. The satisfaction level of parents was verified by asking them to rate this statement using a 1-5 grading system: "I would recommend this ICU to a friend or a family member who needed to be hospitalized" (M=4.7, SD=.6). The results of this survey report a Cronbach's coefficient alpha yielding alpha=.89, indicating that the study is reliable. Continuing research is needed to discover and assess additional aspects of parental satisfaction of patient care in the PICU.

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**Is Cardiac Surgery Good for Women? An Analysis of Pre-existing Conditions, Intra-operative Factors, and Complications**

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**Purpose:** To determine gender differences in pre-existing conditions, intra-operative factors, and postoperative complications in patients undergoing cardiac surgery. **Background/Significance:** Previous research has revealed that women are less likely to undergo cardiac procedures and have more comorbid conditions coming into surgery. It has also been observed that surgery may be technically more difficult in women due to their smaller body size and that women are more likely to have postoperative complications. **Methods:** The sample for this prospective, longitudinal study contained 302 patients who had undergone coronary artery bypass graft and/or valve surgery at Yale-New Haven Hospital. Data were obtained from the patient and medical records. Chi square and *t*-test analyses were done to determine gender differences in pre-existing conditions, intra-operative factors, and postoperative complications. **Results:** The sample was 73% male, 94% white, with a mean age of 64+/-11 years. For pre-existing conditions, 23% of the women and 8% of the men had a previous diagnosis of heart failure ($P<.001$), and 41% of the women and 26% of the men were obese (BMI>30) ($P=.009$). Intra-operatively, men had a longer cardiopulmonary bypass pump time of 106 minutes and cross clamp time of 74 minutes, versus 94 and 64 for women ($P=.032$ and $P=.042$, respectively). For postoperative complications, 12% of the men had respiratory complications versus only 2% of the women ($P=.010$). There were no gender differences in other pre-existing conditions; type of surgery; postoperative length of stay; or neurological, cardiac, endocrine, renal, psychological, infectious, or bleeding complications. **Conclusions:** Despite coming to surgery with more pre-existing conditions, women's surgery was shorter and they had fewer postoperative complications. Surgery should be recommended to women if it is indicated, because women did well during surgery and had fewer postoperative complications than their male counterparts. **Funding:** National Heart, Lung, and Blood Institute (1K24 HL04261-01) and the Yale-Howard Partnership Center on Reducing Health Disparities (1P20 NR08349-01).

**CHF: Effect of Inpatient Education and Follow-Up Phone Calls on Compliance and Readmission Rate**

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**Purpose:** This particular research effort examined the patient's compliance with CHF in-hospital education and discharge instructions through post-discharge phone calls. The impact and effectiveness of the phone calls on raising patient disease management compliance and on lowering the 30-day readmission rate for this diagnostic group were quantified. **Background/Significance:** Congestive heart failure, or CHF, has shown an increasing incidence in both hospital admissions and readmissions. Thirty-day readmission rates range between 21 and 25 percent. **Methods:** The study involved inpatients on the telemetry unit with a primary diagnosis of congestive heart failure. The clinical nurse specialist and dietician provided education on the disease process, signs and symptoms of CHF, weight monitoring, dietary modifications, and generalized medication instructions. This instruction was reinforced on both the written materials provided to the patient and the disease-specific discharge instruction sheet. At 1- and 3-week intervals following discharge, the research assistant placed telephone calls to the patients to determine the level of compliance with the education provided. Data collection was accomplished pre-intervention or prior to the phone call by the clinical nurse specialist and the dietitian. The research assistant collected the data during the post-discharge phone calls. **Results:** No patient admitted to the study and having received a phone call was readmitted within 30 days for a diagnosis of CHF. Four patients were readmitted within 30 days for diagnosis other than CHF. Three patients were readmitted between the 30 and 60 days post discharge, beyond the last phone call. **Conclusions:** Based on the results, a full-time employee has been designated to continue making the telephone calls in order to maintain the gains and further decrease the CHF readmission rate. Information on the strengths of our in-patient education for this DRG was also assessed. **Funding:** This research was funded by the Bronson Center for Clinical and Community Research.

**Predictive Utility of the Braden Scale in Two Groups of Pediatric Burn Patients**

Gordon M, Jaco M, Owen S, Marvin J. Shriners Hospital for Children, Galveston, Tex.

**Purpose:** To identify if the Braden scale predicts risk for skin breakdown in pediatric burn patients. **Background/Significance:** Evidence-based practice supports the use of a skin risk assessment scale to determine risk and prevention strategies. **Methods:** A chart review was done on 2 groups of patients with an admission Braden score. Group 1 (N=123) was admitted between 1995 and 1998 and group 2 (N=152) between 1999 and 2001. Additional data were collected: incidence of death, age, length of stay, days in special bed, % body burned, and days on a ventilator. Both groups were similar in age, % burn, and mean length of hospital stay. The incidence of

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pressure sores in group 2 increased to 14% from 7.1% in group 1. Skewed variables were transformed, and a logistic regression model was built using these variables as predictors of risk. In addition, Braden subcategory scores were collected. **Results:** The total Braden score was insignificant for both groups. A second regression model focused on the predictive validity of individual subcategories. Activity ($P$=.017), mobility ($P$ =.02), and nutrition ($P$=.004) were significant predictors of pressure sores in group 1. For group 2, there was only one predictor, mobility ($P$=.01). The initial regression model in both groups was significant at $P$<.001. Inside the regression model in group 1, three predictors made significant ($P$<.05) contributions (average % TBSA, death, and number of days on a ventilator); however, in group 2, only 1 predictor (length of stay) made a significant contribution ($P$<.001). **Conclusions:** The total Braden scale was not useful in predicting risk for pressure sores. Both groups' regression model showed a very high specificity (.98-.99), predicting who would not develop pressure sores, but very poor sensitivity predicting who would develop pressure sores. The results imply a need for the development of a skin risk assessment scale specific to pediatric burn patients.

### Critical Care Nurses' Assessment of Pain and Discomfort in Adult Ventilated Patients Receiving Continuous Intravenous Sedation

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**Purpose:** To investigate critical care nurses' assessment of pain and discomfort in adult ventilated patients receiving continuous intravenous sedation. **Background/Significance:** Critical care nurses providing care to adult ventilated patients receiving continuous intravenous sedation are unable to assess pain and discomfort utilizing conventional pain assessment tools. **Methods:** Van Manen's (1990) phenomenological inquiry was used to guide data collection and theme analysis. Kolcaba's taxonomic structure of comfort further analyzed the 4 emerging themes. Audiotaped transcribed interviews were conducted with a convenience sample of 27 critical care nurses from 3 community hospitals in upstate New York and were employed either part time, full time, or per diem. Study participants ranged in age from mid-20s to late 50s, and the majority of the sample was female (N=24) 88.9% and worked full time (N=21) 78%. **Results:** Four overarching themes were identified: Observation and Utilization of Technological Data for Deciding Treatment, Observation of Patient and Discomfort Behaviors by Nurse and Family, Subjective Perceptions of Pain and Discomfort, and two additional sub themes, Presumptions of Pain and Discomfort and Personal Experiences of Pain and Discomfort, emerged under the theme of Subjective Perceptions Distinguishing Between Pain and Discomfort. **Conclusion:** Critical care nurses assessing pain and discomfort in adult ventilated patients receiving continuous intravenous sedation is a complex process. The majority of nurses interviewed expressed that there is no one meaningful way to assess pain and discomfort. Kolcaba's concept that comfort is dynamic, interrelated, and greater than the sum of its parts echoed the expressions of the majority of critical care nurses interviewed. Further investigation and utilization of measurement tools designed to assess pain in sedated, ventilated patients is needed. **Funding:** Funded by the Broughton Fellowship at The Sage Colleges, Troy, NY.

### Nurse-Physician Communication: Patient and Staff Outcomes

Gradman J, Powell B, Mohr J, Jackson D. University of Chicago Hospitals, Chicago, Ill.

**Purpose:** Survey of staff prior to study found that ineffective communication was a common, ongoing issue on the inpatient general medicine units at the University of Chicago Hospital. The purpose of the study was to explore causes and solutions to poor RN/MD communication. **Background/Significance:** Analysis of prior survey responses found that poor communication was of significance to patient and team member satisfaction. Barriers to effective RN/MD communication are not well understood. **Methods:** Four focus groups were conducted, 2 with nurses (n=8) and 2 with house staff (n=8); there were no mixed groups. Questions were designed to illicit opinions and stories about RN/MD relationships, experiences of RN/MD conflict, and suggestions for improvement. Discussions lasted approximately 1 hour and were audiotaped and transcribed for analysis. Members of the research team (2 RNs, 2MDs, 1 researcher, and 2 research assistants) independently coded the transcripts using the constant comparative method. Discrepancies in the coding were reconciled by research team consensus. **Results:** Five factors emerged from the analysis: need for education and training, organizational support, cultural change, and team approach. **Conclusions:** Knowledge gained from this qualitative study was used to inform initiatives underway at the University of Chicago Hospitals to improve communication and working relationships between nurses and physicians. Three specific interventions were designed: pilot of nurses included in attending rounds, focus group for implementation of effective text paging, and the creation of educational materials to include in the monthly house staff orientation.

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**Cost-Effectiveness of Kinetic Therapy in Patients at Risk of Pulmonary Complications: Results of a Decision-Analysis**

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**Purpose:** To assess whether Kinetic Therapy was cost-effective for patients who were mechanically ventilated or at greater risk of experiencing pulmonary complications. **Background/Significance:** Critically ill and immobile patients are at risk of a variety of pulmonary complications, including ventilator-associated pneumonia (VAP). Recent studies have demonstrated the potential benefits of prone positioning and Kinetic Therapy (rotation of a patient bilaterally 40 degrees to each side) in preventing and treating pulmonary complications and in reducing associated health care costs and length of hospital stay. **Methods:** A decision-analysis was undertaken to assess whether Kinetic Therapy was cost-effective for patients who were mechanically ventilated or at greater risk of experiencing pulmonary complications. The model incorporated results of a prospective, multicenter, quasi-randomized control study of 255 patients assigned to receive either Kinetic Therapy or conventional turning. **Results:** The study found that 15% of patients receiving Kinetic Therapy experienced VAP compared to 31% of patients receiving conventional turning ($P$=0.0031). Kinetic Therapy was associated with cost savings of $2,359 compared to conventional turning in an intensive care unit (ICU), despite the additional $750 ($150 per day for a typical 5-day ICU stay) initially required for Kinetic Therapy. When total hospital costs were included in the model, Kinetic Therapy was associated with a cost savings of $6,533. Sensitivity analyses indicated that these cost-savings estimates were robust over a range of values and scenarios. **Conclusions:** This cost-effectiveness model demonstrates that for patients who are mechanically ventilated or at greater risk of experiencing pulmonary complications, treatment with Kinetic Therapy saves costs, as the incidence of VAP is significantly lowered. **Funding:** This research was funded by an unrestricted educational grant by KCI USA.

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