

RESEARCH ORAL POSTER PRESENTATION AWARD WINNERS

RS7 Interrater Reliability Testing in Assessing Patient Acuity Using AACN Synergy Model

Lisa Gilmore, Laurie Matney, Lori Godaire, Barbara Phelan, Heidi Morse; The William W. Backus Hospital, Norwich, CT

Purpose: To determine interrater reliability of a patient classification system (PCS) developed by using language from the AACN Synergy Model for Patient Care. A secondary aim was to determine if differences between ratings was related to the level of nursing competence. **Background:** Hospitals use a PCS to determine patient acuity and staffing needs, but challenges remain in accurately measuring nurse workloads and patient complexity. Published studies on the use of the Synergy Model framework to classify patients' needs are limited, and none include interrater reliability. Following integration of the patient characteristic components of the Synergy Model into the Optilink PCS system, interrater reliability was tested in a 215-bed acute care hospital. **Method:** In this descriptive study, the model's 8 patient characteristics were defined across Optilink's 4 levels of acuity (low, medium, high, and extreme) using patient descriptors derived from unit-specific profiles. Patients were independently assessed within 30 minutes by 3 unit staff nurses of different competence levels: competent, proficient, and expert. Competence levels were determined by managers. Patients were scored on each characteristic and then assigned an overall acuity score. Raters were blinded to others' scores. Analyses included Randolph's free marginal k statistic (interrater reliability) and repeated measures analysis (agreement of acuity scores across competence levels). **Results:** Twenty-three nurses completed 186 evaluations of 62 patients on 6 different care units (10 patients in intensive care unit, 10 in telemetry unit, and 42 in 4 units that were not intensive care). Percentage of agreement across all units ranged from 40% to 92% (mean, 67%). Kappa for interrater reliability for acuity scoring was 0.66 (a value > 0.4 is considered moderate to good agreement). Level of competence was not predictive of agreement in scoring acuity ($P = .20$ competent vs expert; $P = .99$ competent vs proficient). Complexity (76%) and resiliency (71%) were most often assessed differently when overall acuity scores differed. **Conclusion:** Interrater agreement for acuity scores was moderate, suggesting that acuity may

be determined within the context of the Synergy Model. Refinement of the patient descriptors, particularly in the areas of complexity and resiliency, is a next step to improve the level of nurse agreement in lower scoring units. This study suggests that a comprehensive acuity system based on a holistic and individualized assessment of patients can be used reliably by nurses of different competence levels.

RS20 Impact of a Multidisciplinary Diabetes Self-Care Class on 30-Day Diagnosis-Specific Recidivism and Patients' Perception

Carol Copsey, Samantha Abate, Michele Zucconi; Inspira Medical Center, Vineland, NJ

Purpose: Diabetes presents a complex and costly health care challenge. As the socioeconomic status of the nation declines and the prevalence of diabetes increases, novel and comprehensive approaches to patient engagement are necessary. A multidisciplinary team (MDT) approach has proven to improve diabetes management and decrease complications. The purpose of this study was to evaluate the impact of an MDT diabetes self-care class on 30-day readmission rates and perceptions of knowledge acquisition. **Background:** Diabetes affects more than 25 million Americans and results in more than 630 000 hospital admissions annually. Inspira Health Network patients are among those most at risk for diabetic complications. There is marked correlation between glycemic control and cost of medical care, with medical charges increasing significantly for every 1% increase in hemoglobin A_{1c} levels above 7%. Self-care education improves glycemic control, facilitates self-management, decreases complications, and lowers health care costs. **Method:** This quasi-experimental study approved by the institutional review board invited admitted diabetic patients and their families to attend a 1-hour structured diabetes education course conducted by nurses, pharmacists, physical therapists, and dietitians. Following the class, an explanation of the study was provided. Patients who consented completed a survey regarding their perception of and satisfaction with the class. Participants were followed up for 30 days to capture diagnosis-specific readmissions. Readmission rates in the study population were compared with organizational and national diagnosis-specific readmission rates by using an independent t test. Satisfaction data were analyzed by using descriptive statistics. **Results:** Ninety patients were accrued with a mean age of 64 years; 97.8% were type 2 diabetics and 46.7% of participants were insulin dependent. No study patients were readmitted for diabetes

(or diabetes-related complications) within 30 days of discharge. These results represent a significant decrease of 26.3% ($P < .01$) and 19.1% ($P < .01$) from national and organizational diagnosis-specific 30-day readmission rates, respectively. Patient satisfaction data analysis revealed that 100% of participants enjoyed the class, will use what they learned, and would recommend the class to others. Almost all (98.9%) felt better prepared to manage their diabetes and stated that they would use what they learned in their self-care. **Conclusion:** Potential annual cost savings associated with similar readmission reductions exceed \$1 million organizationally and \$700 million nationally. Participants in the MDT diabetes class enjoyed the experience, thought that the knowledge gained was useful, and felt better prepared to manage their disease. The results of this study indicate that a multidisciplinary diabetes self-care class is a cost-effective and successful intervention that facilitates patient self-management and subsequently decreases readmissions.

RS27 The Perceptions of Adult Hospitalized Patients Regarding Family Presence During Cardiopulmonary Resuscitation

Carolyn Bradley, Nelson Leach, Meghan Petrocelli, Michelle Keithline, Mary Scanlon, Janet Parkosewich; Yale-New Haven Hospital, New Haven, CT

Purpose: (1) Explore patients' perceptions regarding family presence during cardiopulmonary resuscitation (CPR), (2) Identify who that family member would be, (3) Determine how important it would be for the patient to be the decision maker regarding family presence during CPR and if consent should be given ahead of time, and (4) Determine factors associated with patients' preference for family presence during CPR. Family includes someone who is biologically or legally related to the patient, a companion, or a close friend. **Background:** Family presence during CPR is not a universally accepted practice in the acute care setting. Studies on this topic have shown agreement among clinicians, lay public, and family members that family presence during CPR is beneficial and should be offered, although physicians have more reservations about this practice. Limited research has examined patients' wishes to have a family member present should CPR be necessary and whether patients wish to be the decision makers regarding who should be present. **Method:** The random sample for our exploratory-descriptive study was composed of 117 patients (mean age, 54 years; 60.7% white, 56.4% female, 54.6% with a high school education or higher) admitted to medical inpatient units. After institutional review board approval, we obtained informed

consent and conducted a 15-minute interview with patients who were 18 years of age or older, had full code status, and were able to read/speak English. Bivariate analyses were performed to explore candidate variables (demographic factors and sources of CPR information) for the logistic regression analysis used to determine factors independently associated with patient's preference for family presence during CPR. **Results:** Approximately half of the patients agreed or strongly agreed that it was important to have a family member present during CPR (52.1%), important for them to be the decision maker about who should be present (50.4%), and important to give consent ahead of time (47%). Patients identified an other unspecified person (20.5%), spouse (14.5%), adult child (8.5%), close friend (5.1%), or companion (4.3%) as the person they wanted to be present. Agreement with importance of family presence during CPR was associated (unadjusted) with age ($P = .02$) and race ($P = .05$), whereas younger age was significantly and independently associated with this statement (odds ratio, 0.963; 95% CI, 0.932-0.966; $P = .03$). **Conclusion:** Having a family member present during CPR is a very personal decision that needs to be made by the patient. For some, particularly younger patients, having a family member stay with them during this critical event is important. The results of this study should be used to inform the creation of family-witnessed CPR policies in acute-care settings with the specific aim of providing care that is patient and family centered. Replication of this study in other settings is warranted.

RS29 Transitions from Cardiac Intensive Care to Home: A Psychometric Comparison of Generic and Disease-Specific Measures

Janet Kloos, Mary Anthony; University Hospitals Case Medical Center, Cleveland, OH

Purpose: To explore psychometric evidence and utility of the general Care Transitions Measure (CTM) and the cardiac-specific, Cardiac Care Transitions Measure (CCTM) in a sample of patients being discharged home directly from an intensive care unit (ICU). **Background:** Patients experiencing myocardial infarction are discharged home from the ICU in increasing numbers. The constraints of short ICU stay with limited time to teach make research on the timing and method of creating a foundation for building a teaching discharge program most relevant. "Patients and caregivers frequently are unprepared for what will transpire after the transition and their role in the process...." Little evidence exists on teaching patients once they are discharged from the ICU. **Method:** Design—Descriptive cross-sectional design

using survey methods. Setting and sample—A 20-bed coronary care unit in a Midwestern academic medical center. The sample was 85 patients experiencing myocardial infarction from cardiac disease and being discharged from the ICU directly home. Measures—CTM: a 15-item unidimensional instrument of the quality of preparation for care transition from hospital to home. CCTM: an 8-item unidimensional measurement instrument that is more specific about quality of preparation for a care transition after a myocardial infarction. **Results:** The mean age of participants was 61 years (SD, 13.18 years) with a mean LOS of 3.99 days (SD, 1.80 days), sex was almost even, most were living with someone, and 56% had college or higher education. Participants scored higher on the general CTM (mean, 79.32; SD, 14.9) compared with the specific CCTM (mean, 86.82; SD, 17.9). The reliabilities between the 2 scales were comparable (Cronbach α : 0.94 for CTM and 0.89 for CCTM). Exploratory factor analysis (Kaiser Meyer Olkin [KMO] measure of sampling adequacy) demonstrated validity of the CTM (KMO = .91) and CCTM (KMO = .86). The factor structure of the CCTM was consistent with the conceptual development of items developed on the basis of the American Heart Association's "Get with the Guidelines" teaching topics. **Conclusion:** Discharging from an ICU is a relatively new phenomenon. Using existing measures to determine readiness of transition to home must be carefully examined. The CCTM, a disease-specific instrument, demonstrated reliability and validity. Our results, which used a combination of measures, indicate that at this point in time, an optimum strategy may be to evaluate preparation for discharge from the ICU. Further research on this disease-specific instrument is warranted.

RESEARCH POSTERS

RS1 Does a Blended-Learning Method to Achieve Electrocardiography Competency Ensure Nurses' Capability at the Bedside 8 Weeks After the Course?

Carol Ann Brooks, Colin O'Rourke, Nancy Kanyok, Nancy Albert; Cleveland Clinic, Cleveland, OH

Purpose: To determine nurses' electrocardiographic (ECG) knowledge 8 weeks after successfully completing a blended-learning ECG course. The specific aims were to compare postcourse and 8-week clinical competency in basic ECG interpretation and management of patients and to determine if 8-week scores were associated with nurses' characteristics, work environment, and perceived comfort in ECG analysis and interventions. **Background:** After passing a basic ECG interpretation and patient management

course, there is very little literature available on continued competency of nurses. In our setting, nurses learn ECG via a blended-learning course (8 hours computer content and 8 hours facilitated classroom instruction/case study application); however, ECG course knowledge after course completion is unknown. **Method:** This correlational study involved a single group of 69 nurses working with ECG monitors who successfully passed initial ECG testing. The 8-week ECG test was composed of 9 ECG strips: 3 each at beginner, intermediate, and advanced levels. Demographics, perceived comfort with ECG expectations, and perceived competency levels were collected. Postcourse and 8-week test scores were compared by using a paired *t* test. Relationships between 8-week and postcourse test scores and nurse demographics were measured by using Spearman's rank correlation ρ , Wilcoxon rank-sum or Kruskal-Wallis rank sum tests for continuous or categorical data. Analyses were performed by using R software (v.2.15.2, Vienna, Austria). **Results:** Of nurses, 85.5% perceived their ECG competency level to be beginner/advanced beginner and 57.9% were somewhat comfortable or comfortable with rhythm interventions. The 8-week test scores decreased (mean difference [SD], 26.3% [11.5%], $P < .001$) reflected intermediate-level ECG knowledge. Nurses with greater perceived comfort with interventions for ECG abnormalities had higher median (interquartile range) 8-week scores, 66.1% (60.8%-71.8%) vs 59.2% (53.4%-67.6%), $P = .01$. Perceived ECG competency was associated with 8-week test score ($r = 0.28$, $P = .02$). Differences in 8-week and postcourse scores were smaller in nurses with greater perceived comfort with ECG measurement ($P = .008$) and nursing interventions ($P = .009$). **Conclusion:** At 8 weeks, nurses who completed ECG competency testing had intermediate knowledge that was correlated with self-perceptions of ECG competency. Unit educators/coaches need to focus on ECG interpretation, measurement, and interventions to reinforce ECG course information and guide nurses toward advanced knowledge to ensure optimal patient care quality and safety.

RS2 Amiodarone Peripheral Infusion Phlebitis: A Nursing Intervention to Reduce Patient Harm

Mary Spiering; Providence St Vincent Medical Center, Portland, OR

Purpose: To reduce patient harm by implementing a standardized approach to infusing peripheral amiodarone. **Background:** Amiodarone is one of the most widely prescribed antiarrhythmics for treatment of atrial fibrillation with rapid ventricular

response. Peripheral amiodarone infusion may cause pain during infusion and subsequent phlebitis. Left undetected, ongoing infusion can result in severe chemical burns resulting in tissue necrosis. Furthermore, undetected ongoing pain can contribute to complex regional pain syndrome and require ongoing treatment. Nurses on the cardiac telemetry unit reported ongoing issues with amiodarone-related pain and phlebitis, requiring repeated starts of intravenous catheters. Nurses had a limited understanding of the incidence of phlebitis, and no guidelines for peripheral amiodarone infusion existed. **Method:** In March 2012, the clinical nurse specialist began tracking all patients with peripheral amiodarone infusions on the cardiac telemetry unit. Data collection included amiodarone concentration, visual inspection of the infusion site, and phlebitis grading. An amiodarone infusion guideline was developed by a multidisciplinary group that included pharmacy, intravenous therapy, cardiology, and nursing. In August 2012, approval was obtained from the institutional review board and data were collected after guideline implementation. Patients were identified through a report from the electronic medical record, and individual nurses notifying the clinical nurse specialist for patients with amiodarone infusions. Data were collected to compare amiodarone phlebitis rates from before to after implementation. **Results:** The rate of peripheral phlebitis related to amiodarone was 85% before and 38% after implementation of the guideline, which represented a 47% change or improvement. The majority of the data collected were on males (68%) with a mean age of 69 years. More medical patients were observed in this study than surgical patients. The medical admission diagnoses included heart failure, atrial fibrillation, chest pain, and hypertension. The surgical diagnoses was exclusively open heart surgery and coronary artery bypass graft with or without valve replacement. An interesting finding was the severity or grade of phlebitis before and after guideline implementation. A more desired phlebitis scale of 0 was much higher after (62%) implementation of the guideline than before (14%). Conversely, a less desired phlebitis rating of 4 was higher in the preguideline observation (12%) than the postguideline (0%) observation. This finding indicated that with implementation of the guideline, not only was the phlebitis rate reduced, but the severity of the phlebitis was reduced as well. **Conclusion:** Implementation of a peripheral amiodarone infusion guideline helped reduce harm to patients; however, further improvement is needed to reduce amiodarone-related phlebitis rates even further.

RS3 Family Presence During Resuscitation after Trauma

Jane Leske; University of Wisconsin-Milwaukee

Purpose: To examine the effects of family presence during resuscitation (FPDR) in patients who survived trauma from motor vehicle crashes (MVCs) and gunshot wounds (GSWs). The primary aim was to compare the effects of FPDR on family strengths (resources and communication) and outcomes (anxiety, stress, and well-being) and compare those strengths and outcomes in families who were present ($n = 55$) with those in families who were not present ($n = 55$) during resuscitation. **Background:** FPDR has been debated in the literature around the world for the past 20 years. The ongoing controversy, dearth of comparative designs, small sample sizes, and survey methods make it difficult to come to a definitive conclusion about the benefit of FPDR. This study has the potential to bring an understanding to an often neglected and vulnerable population of families who participate in the FPDR option by describing if the experience fosters any positive outcomes after trauma. **Method:** The Resiliency Model guided the design and selection of variables for this study. A multivariate, comparison, prospective design was used. A convenience sample of family members participated within 3 days after admission to critical care. Family strengths were measured by the Family Inventory of Resources for Management and Family Problem-Solving Communication Index. Family outcomes were measured by the State anxiety portion of the State Trait Anxiety Inventory, Acute Stress Disorder Scale, and the Family Member Well-being Index. Analysis of covariance with propensity score analysis was used to answer the research question. **Results:** Family members of 110 trauma patients (MVC, $n = 86$, 78%; GSW, $n = 24$, 22%) participated in this study. Family members ranged in age from 20 to 84 years (mean, 47; SD, 15, median, 47). Most were female (80%) and white (68%). Patients ranged in age from 18 to 93 (mean, 43; SD, 21; median, 42) years. Almost one-third of patients ($n = 35$) had a secondary diagnosis of traumatic brain injury and 35% ($n = 38$) arrived at the hospital via Flight for Life air transport. Results indicated that scores for communication ($t = 2.35$, $P = .02$) and well-being ($t = 3.31$, $P = .001$) were higher and anxiety ($t = -2.60$, $P = .01$) and stress ($t = -3.25$, $P = .002$) were lower in the FPDR group. **Conclusion:** The results of this study contribute to the growing body of literature that FPDR has some beneficial effects for family members. The major limitation was the inability to

randomize the FPDR option. Data were cross-sectional and based on family self-report. Any moderating effects of mode of transportation (Flight for Life) or secondary diagnosis of traumatic brain injury must be examined in further research. Long-term effects of FPDR remain unknown.

RS4 Comparison of Temporal Artery Temperature Measurement With Standard Temperature Measurement in Critically Ill Children

Kelly Merrill; Seattle Children's Hospital, Seattle, WA

Purpose: To describe the correlation of temporal artery (TA) temperature measurement to bladder, rectal, and axillary temperatures in critically ill children. **Background:** Accurate measurement of temperature is an essential component of routine nursing care in critically ill patients and is typically obtained by using an invasive probe. In the past decade, a noninvasive temporal artery method has been developed and studied primarily in the adult population. **Method:** Sixty-nine participants 0 to 12 years old had concurrent temperature measurements from 3 sources: TA, bladder or rectal, and axillary. Participants were stratified on the basis of age (<1 year and 1-12 years) and method of core temperature monitoring. Pairwise comparisons of TA with other measures were carried out on the basis of an effect size of 0.5°C. **Results:** The paired difference between bladder and TA temperature in the <1 year group ($P < .001$) was significant at 0.55°C with bladder temperatures lower than TA temperature (95% CI, 0.24°C -0.85°C); however, bladder temperatures in the 1-12 year group ($P = .57$) showed a paired difference of only 0.1°C lower (95% CI, -0.23°C to 0.42°C) in comparison to TA temperatures. The paired differences between rectal and TA temperature did not differ significantly in either age group (<1 year: mean [95% CI] = 0.31°C [-0.15°C to 0.77°C], $P = .19$; 1-12 years: mean [95% CI] = 0.29°C [-0.17°C to 0.75°C], $P = .22$). Axillary to TA temperatures, in both age groups, revealed paired differences that reflected a significant difference (<1 year: mean [95% CI] = 0.91°C [0.6°C -1.2°C], $P < .001$; 1-12 years: mean [95% CI] = 0.87°C [0.6°C -1.2°C], $P < .001$). **Conclusion:** The results of this study support use of TA thermometry in the pediatric intensive care unit as an acceptable alternative to rectal temperatures. It also shows that TA thermometry is a more accurate estimate of core temperature than axillary temperatures. The results showed varied bias between TA and bladder thermometry depending on the age of the patient. Therefore, TA temperature is most likely an acceptable

alternative to rectal and bladder temperatures in children and other infants when limitations are considered.

RS5 Step Forward to Decrease Visitor Anxiety in the Intensive Care Unit

Robin Fichuk, Elizabeth Woodley, Susan Smith, Ijeoma Anen; Duke Raleigh Hospital, Raleigh, NC

Purpose: Comparing visitor anxiety before and after a video or placebo orientation to the intensive care unit (ICU). The hypothesis for this study was: In family members of critically ill patients, participation in a structured orientation program about the critical care environment and experiences will decrease visitor anxiety. **Background:** High level of visitor anxiety was noted with no relief with current standard practice upon ICU admission. Few studies have evaluated how best to provide information to family members of newly admitted critically ill patients to decrease their anxiety and better meet their needs. Only 1 prior study was a randomized controlled trial, and most bundled several interventions into a single study, making it impossible to know which of those tested provided benefits for the family. **Method:** A pretest, posttest, randomized, placebo-controlled trial study design was used to evaluate the effects of a structured orientation program on visitor anxiety levels. A convenience sample of 67 visitors was used. The dependent variable was the anxiety level of ICU visitors. Random assignment to treatment groups was done by using a computerized randomization scheme. A videotape educational program was made by ICU nurses; the study control group was shown a videotape about the health system. Anxiety was measured with the Spielberger State Anxiety Inventory tool. Changes in anxiety scores were analyzed between groups to detect differences related to intervention and characteristic. **Results:** Anxiety was significantly lower after viewing the orientation video. Anxiety scores decreased more for visitors of patients who had emergency ICU admissions when compared with patients whose admission was elective or planned, even with prior experience as a visitor or a patient. The sample was nearly equal by sex and varied by education level, age, and relationship to the patient. **Conclusion:** A structured video orientation program affects visitors of emergency ICU admissions by positively decreasing their anxiety level. Providing a consistent and complete orientation to the ICU environment validated the nurses' hypothesis. Further studies may be indicated with larger sampling and revised video content.

RS6 A Balancing Act: End-of-Life Decision Making in the Intensive Care Unit

Natalie McAndrew, Jane Leske; Froedtert Hospital, Milwaukee, WI

Purpose: Research findings provide evidence that differing professional perspectives during end-of-life decision making are a source of potential conflict and barrier to communication. This raises questions about how nurses and physicians share their perspectives during end-of-life decision making and the influence of these professional perspectives on the decision-making process. The purpose of this study was to describe end-of-life decision making experiences as understood by nurses and physicians in the intensive care unit (ICU). **Background:** The possibility that life-supportive technology may lengthen the process of dying is distressing for health care professionals; however, withholding advanced medical support when it is available may seem unethical. Nurses and physicians must acknowledge conflicts that occur during end-of-life decision making by discussing perspectives and must work collaboratively to resolve issues. When this does not occur in practice, it may hinder decision-making processes and adversely affect patient and family outcomes. **Method:** A descriptive, qualitative design based on grounded theory methods was used for this study. Intensive care units in a large academic, Midwestern hospital were the research setting. A purposive sampling method was used. The digitally audio recorded open-ended interviews were transcribed and reviewed multiple times with transcripts in hand to check for accuracy. All transcripts were coded during the process of line by line analysis of the data, and during this time sensitizing and theoretical questions were proposed and potential concepts and categories were explored. After data coding, a central category, categories, and subcategories were identified to derive a theoretical scheme. **Results:** Interviews were conducted with 7 nurses and 4 attending physicians. Grounded theory analysis revealed the core category of "end-of-life decision making as a balancing act." Three interacting subthemes were identified: emotional responsiveness, professional roles and responsibilities, and intentional communication and collaboration. Balancing factors included a team approach, shared goals, understanding the perspectives of those involved, and knowing your own beliefs. In contrast, feeling powerless, difficult family dynamics, and recognition of suffering caused an imbalance. The consequence of an imbalance during an end-of-life decision-making experience was moral distress. **Conclusion:** Evidence exists that

nurses are not satisfied with communication processes during end-of-life decision making. The result of a nurse's inability to advocate and realize patient care goals can cause symptoms of moral distress. Developing and maintaining support (education, shared decision-making teams, debriefings), and interventions aimed at improving collaborative practice for nurses and physicians who engage in end-of-life decision making may improve end-of-life experiences for all involved.

RS8 Compassion Doesn't End When the Heart Stops: Nurse's Perceptions of Honoring Ceremony at End of Life

Diane Barkas, Sara Voigtritter, Tokie Shynk; Santa Barbara Cottage Hospital, Santa Barbara, CA

Purpose: The busy environment of critical care often does not allow nurses time to support family members through the event after death and the grief process after the loss of their loved one. The nurse is hurried to move on to the next patient or admission. When performing an end-of-life honoring ceremony, critical care nurses will report a greater sense of comfort with care after death. Nurses and patients' families express increased feelings of closure and increased satisfaction with their care.

Background: The Institute of Medicine reports that death has frequently become a medical event, often involving advanced technology and extraordinary procedures due to cultural, societal, and individual expectations. Death typically occurs in hospital settings, with family and friends sometimes separated from the dying patient. Unfortunately, this and most everything published, only addresses care up to the time of death. Little is written about care after death, or how nurses perceive care after death. **Method:** This is a qualitative study with a convenience sample of staff who participated in an interview about their experience with an honoring ceremony. The honoring ceremony consists of staff and family reading a script and applying lavender oil after the patient has passed. Staff were recruited through e-mail, sign-up list, or conversation if they had participated in an honoring ceremony during the past year. The private interviews were taped and reviewed. Data were analyzed and evaluated for overreaching themes and changes in nurses' perceptions of care beyond the end of life. This is a qualitative study and thus did not require statistical analysis. **Results:** Structured interviews of 11 staff working in critical care participated in an honoring ceremony as an observer or primary nurse. Of those interviewed, 31 honoring ceremonies had been performed. All ceremonies

were conducted with family or friends at the bedside with various degrees of participation. The overarching theme pointed to the “sense of closure” for both staff and family. There was a feeling of awkwardness with the first ceremony that expanded to being comfortable with progressive ceremonies. Staff felt that they did more for the family than say “I’m sorry”; the script gave them a way to “honor someone’s life.” Staff expressed satisfaction with their role in supporting the family. **Conclusion:** Improving staff satisfaction with the process of end-of-life care and care after death can be attributed to an honoring ceremony. Staff regularly described improved comfort levels with care after death saying “it becomes more personal” after participation in the honoring ceremony. Performing the ceremony consistently shows that staff and family feel they have closure and thus the ability to move on. A connection is formed between staff and family in this intimate moment.

RS9 Advanced Cardiac Life Support Recertification: Comparison of HeartCode and Instructor-Led Courses

Jeffrey Bell, Elizabeth Powell, Lauren Conlon; University of Pennsylvania, Philadelphia

Purpose: To compare the written test scores and megacode performances of all participants enrolled in American Heart Association (AHA) Advanced Cardiac Life Support (ACLS) HeartCode, and instructor-led recertification courses to determine if multimedia education alone is sufficient to train health care professionals in ACLS. The secondary aim of this study is to determine participant satisfaction and comfort with training in each course. **Background:** ACLS certification is required for many providers working in critical care settings, including physicians, nurses, and nurse practitioners (NPs). Courses have typically been taught in a classroom with instructor-led practice sessions before final evaluation with written and megacode examinations. More recently, computer models have been introduced as an alternative to classroom teaching. No studies have compared the performance of participants after the computer-based HeartCode training versus the instructor-led model. **Method:** This is a prospective, cohort study conducted during the regularly scheduled ACLS recertification classes at the Penn Medicine Clinical Simulation Center from June 2012 to December 2012. We enrolled all health care providers in ACLS recertification instructor-led 8-hour courses or HeartCode courses. To determine differences in written and megacode performance between HeartCode and instructor-led groups, the hypothesis was

tested by using the posttest written exam performance as well as the modified ACLS Megacode Performance Score Sheet. An experienced ACLS instructor scored each subject by using the performance sheet. Analysis of variance was then performed, adjusting for experience. Statistical significance was defined as a *P* value of .004 or less. **Results:** A total of 38 students were enrolled. Most participants in the instructor-led group were nurses and NPs, and most participants in the HeartCode group were physicians. The instructor-led group performed better than the HeartCode group on the overall megacode score (88.07% vs 78.91%, *P* = .004), assigning team member roles (6.2 vs 4.2, *c* < .001), and providing appropriate care after cardiac arrest (6.2 vs 5.0, *P* = .002). Although not statistically significant, there was a trend toward better performance by the instructor-led group in making sure that monitor leads were applied appropriately (5.8 vs 4.7, *P* = .006), demonstrating confidence as a team leader (6.2 vs 5.57, *P* = .02), and the instructor’s overall impression of the team (6.2 vs 5.78, *P* = .04). There was no difference in written test scores (44.667 vs 42.435, *P* = .15). **Conclusion:** Instructor-led participants in ACLS recertification courses performed significantly better in aspects of team dynamics and postarrest care than did those who took HeartCode courses without sacrificing algorithm knowledge. Instructor-led courses that incorporate small group sessions as part of recertification are an important part of training critical care providers. Those regularly using ACLS should take courses with an instructor-led component, as this may improve team performance and leadership.

RS10 Effects of Standardization of Comfort Management on Team’s Perception of Patient Care Delivery

Sandra Staveski, Michael Cisco, Stephen Roth, Tiffany Tesoro, May Wu; Lucile Packard Children’s Hospital at Stanford, Palo Alto, CA

Purpose: To examine the effects of employing a standardized comfort communication strategy and implementing comprehensive comfort management guidelines on the interdisciplinary pediatric cardiovascular intensive care unit (PICU) team’s perception of comfort management. Comprehensive comfort management is inclusive of pain, agitation, withdrawal, and delirium. **Background:** Patients in the PICU experience discomfort because of the need for life-saving yet distressing interventions and a stimulating environment. Care teams acknowledge these issues and develop strategies to manage their

patients' comfort. Different clinicians may use diverse approaches to provide comfort. Without standardized team communication and management strategies, care delivery can be perceived as disjointed and unsatisfactory to patients, their families, and the interdisciplinary team. **Method:** The comfort management guidelines included pain, sedation, and withdrawal. Medical and nursing staff members were queried about their attitudes and perceptions of comprehensive comfort management in a PCICU before and after implementation of standardized comfort management guidelines. To ensure the guidelines were being used appropriately, use of continuous fentanyl and morphine infusions for postoperative analgesia was compared before and after implementation, as the guidelines included the preferential use of morphine over fentanyl.

Results: Infusion data were supportive of compliance with comfort guidelines. Additionally, there were statistically significant improvements in the team's impression of comfort management in the PCICU. Team members felt that their opinions were valued more in the development of individual comfort plans ($P = .02$) and was used more ($P = .01$), the team functioned better after standardization ($P = .001$), communication was more similar ($P = .001$), there was a decrease in the loss of important information ($P = .04$), and that the team used pharmacological ($P < .001$) and nonpharmacological ($P < .001$) therapies better. **Conclusion:** Our investigation revealed that implementation of a standardized approach to comfort communication and medical management was associated with an improvement in our PCICU team's perception of comfort management.

RS11 Improving Readmission Rates for Chronic Obstructive Pulmonary Disease

Julie Cooke, Jessica Lundquist, Jimmy Callicutt; Novant Health Forsyth Medical Center, Winston-Salem, NC

Purpose: Hospital readmissions continue to be a focus for hospital quality and financial outcomes. Factors contributing to readmissions for patients with chronic obstructive pulmonary disease (COPD) are not fully understood. The purpose of this study was to identify factors associated with COPD readmissions in a pulmonary progressive care unit (PPCU). **Background:** COPD is one of the top 10 diagnoses for hospital readmissions. In May 2011, our facility's readmission rate was 8.43%, with the national benchmark trending even higher at 17.7%. The literature has identified several variables that may contribute to COPD readmissions, including preadmission debility/severity of illness, various demographic

factors, pharmacological factors, discharge disposition/follow-up, and hospital factors. **Method:** This retrospective, quasi-experimental research study analyzed the readmissions of COPD patients to a PPCU to determine possible contributing factors. A control group consisted of matched COPD patients who were not readmitted. A literature review informed the selection of approximately 30 patient-related factors that served as the independent variables. Of the 726 patients admitted in 2011, a sample of 71 patients was selected. Factors were analyzed 1 factor at a time for readmissions both at 30 days and at 60 days. Determination of statistical analysis was done at $\alpha = 0.05$. All 2-way χ^2 tests were performed by using the Fisher exact test. **Results:** COPD readmissions shared several similarities: polypharmacy, oxygen therapy, smoker history, heart failure history, multiple physician consultations with previous admissions, and continuous positive airway pressure (CPAP) support. Of these variables, smoking, heart failure history, and CPAP were only statistically significant with patients readmitted at 60 days. Oxygen therapy support was statistically significant with the patients readmitted at 30 days. Multiple physician consultations were statistically significant with both patients readmitted at 30 days and those readmitted at 60 days. **Conclusion:** From this research, the leadership team realized how imperative follow-up and discharge education are for COPD patients. The PPCU employed 2 practice changes to address COPD readmissions. First, the PPCU improved the discharge process by implementing follow-up telephone calls within 1 week of discharge to check patients' status. Second, a pulmonary rehabilitation consultation is automatically initiated for all COPD admissions to our unit.

RS12 Effects of Ambulation and Nondependent Transfers on Vital Signs in Patients Receiving Low-Dose Norepinephrine in an Intensive Care Unit

Rosario Nievera, Ann Fick, Hilary Harris; Barnes Jewish Hospital, St Louis, MO

Purpose: To assess the safety of ambulation and transfers in patients receiving low-dose norepinephrine (Levophed; 0.05 $\mu\text{g}/\text{kg}$ per minute) by examining blood pressure, mean arterial pressure (MAP), and heart rate before and after activity with parameters set by the physician. **Background:** Norepinephrine is a peripheral vasoconstrictor given to patients with acute hypotension. It is used centrally for more effective perfusion of the heart. Norepinephrine is quick acting and increases arterial blood pressure with few effects on heart rate or cardiac

output. During activity, blood flows to the periphery to supply muscles with oxygen, which counteracts the action of norepinephrine. Although physical activity is beneficial, a discrepancy exists regarding the safety of mobilizing patients receiving norepinephrine. **Method:** This retrospective study included chart reviews of the physical therapy intervention of 47 patients during the first time the patient transferred or ambulated while receiving norepinephrine. Data including heart rate, blood pressure, MAP, norepinephrine dose, and specific activity performed were extracted. Parametric tests were used with the significance set at $\alpha > 0.05$ with a 95% confidence interval. Paired *t* tests compared MAP and heart rate before and after physical therapy. A Pearson correlation coefficient was calculated between norepinephrine dose and activity level. **Results:** Forty-one of the 47 patients (87%) tolerated the activity within safe vital sign ranges as recommended by their physician. The change in patients' MAP from before to after activity was not statistically significant ($P = .16$), whereas a statistically significant increase in heart rate occurred after activity ($P < .001$). No significant correlation was found between the norepinephrine dose prescribed and the patient activity level performed ($r = -0.107$, $P = .48$). There were no instances of cardiopulmonary or respiratory arrest during any of the physical therapy sessions. **Conclusion:** The results of this study offer preliminary support of the safety of ambulation and transfers in patients receiving low-dose norepinephrine. Throughout physical therapy interventions of patients receiving norepinephrine, it is important to closely monitor vital signs, specifically MAP and heart rate values, to ensure these values remain within physician-recommended parameters. More research is needed to validate the findings of this study in a prospective controlled study.

RS13 Impact of Nurses' Individual Performance Appraisal on Health Care-Associated Infection Rate

Seunghyo Hong; Geisinger Medical Center, Danville, PA

Purpose: Seeking more effective and innovative measures to reduce hospital-associated infections (HAIs), an adult intensive care unit (AICU) implemented a policy that correlated the rate of HAIs to the nursing staff's individual performance appraisals with financial consequences. Few studies have been published to date reporting research findings on the design and implementation of hospitals' linking pay with performance. This research explored the possible correlation between nurses' behaviors and unit infection rates. **Background:** With the significant implications of performance appraisals based on

patients' outcomes, HAI rates have been a national challenge as a cause of morbidity and mortality. An exchange of pay for performance has been a result of increasing health care costs and public awareness. However, specific implications for nurses' contributions have not been clearly defined. Research linking the unit's HAI rates directly to individual nurse's annual performance appraisals would establish a concrete example. **Method:** This retrospective quantitative study sought a concrete correlation between unit nurse behavior and the annual performance appraisal as evidenced and measured by a reduction in the unit's rate of HAIs per central catheter-associated bloodstream infection (CLABSI), catheter-associated urinary tract infection (CAUTI), and ventilator-associated pneumonia (VAP). The AICU data were collected for 12 months before the policy was implemented and compared with the unit's data collected for the 12 months after the policy was implemented. With variables controlled for, the HAI rates of another comparable critical care unit (CICU) where the policy had not been implemented were compared. **Results:** The AICU reduction rates for CLABSI and VAP were significant at 80% and 100%, respectively. The CICU, the control group, also had a significant HAI reduction rate in both categories of CLABSI and VAP at 100% and 100%, respectively. However, the reduction rates for CAUTI in the AICU and CICU were only 5% and 12%, respectively, which proved to be much lower than the reduction rates for CLABSI and VAP. The difference between the AICU and CICU reduction rates in all 3 categories were not statistically significant to establish a concrete correlation between the HAI reduction rates and the pay for performance policy. **Conclusion:** A direct correlation between the policy of pay for performance and changed nurse behavior manifested in the reduction of HAIs was not significantly established. The study's scope was insufficient to determine whether the AICU's reduction was solely due to the new policy's implementation, since the CICU also had a reduction in HAIs. A further continuation of this study, and a qualitative study of the nurses' perceptions of the policy, is recommended to establish more consistent and reliable results.

RS14 A Computer-Assisted Electrocardiography Measurement Intervention Improves QTc Documentation in Hospital Patients Receiving QT-Prolonging Drugs

Sue Sendelbach, Barbara Drew, Marjorie Funk, Kristin Sandau; Abbott Northwestern Hospital, Minneapolis, MN

Purpose: To examine the impact of education and

computerized documentation enhancements on QTc documentation. **Background:** Many medications commonly used in the hospital can cause prolonged QTc, putting patients at risk for torsades de pointes, a potentially fatal arrhythmia. However, documentation of QTc for hospitalized patients receiving QT-prolonging medications is often not consistent with American Heart Association guidelines. **Method:** A preintervention to postintervention, multisite study within a 10-hospital health care system was conducted to compare QTc documentation for cardiac-monitored patients receiving QTc-prolonging medications at preintervention (n = 1517), 3 months postintervention (n = 1301), and 4-6 months postintervention (n = 1193). The 3-step intervention included (1) online education for 3232 nurses, (2) electronic notifications to nurses to alert them when a patient received at least 2 doses of a QT-prolonging medication, and (3) computerized calculation for QTc into the electronic health records following nursing documentation of heart rate and QT. **Results:** QTc documentation for inpatients receiving QTc prolonging drugs significantly increased from 17.3% (baseline) to 58.2% for the 3-month period after the intervention and to 62.1% at 4-6 months postintervention within the 10 hospitals, χ^2 (df = 2, N = 4011) = 703.87, $P < .001$. Post hoc analyses revealed significant differences in QTc documentation between baseline and the two 3-month periods after the intervention. However, no significant difference was detected in documentation between the first 3 months after the intervention (58.2%) and 4-6 months after the intervention (62.1%). **Conclusion:** A 3-step system-wide intervention was associated with an increase in QTc documentation for patients at risk for drug-induced torsades de pointes, and improvements persisted over time.

RS15 Status of Current Bereavement Services Offered in Adult Intensive Care Units

Jennifer McAdam, Alyssa Erikson; Samuel Merritt University, Oakland, CA

Purpose: To describe current bereavement programs and follow-up services provided to family members who have lost a loved one in adult intensive care units (ICUs) in the United States. **Background:** Losing a loved one in the ICU is often traumatic and stressful for family members. Critical care guidelines recommend bereavement support to help alleviate family members' psychological distress and assist them with the grieving process. However, little is known about the prevalence and types of bereavement services implemented in adult ICUs. Examining the current status of bereavement care in adult

ICUs may better identify needs and interventions to improve end-of-life care in the ICU. **Method:** This cross-sectional prospective study surveyed a convenience sample of ICU nurse leaders about current bereavement practices in their ICUs. The researchers developed a 26-item survey that included questions about hospital and ICU demographic information and the ICUs' current practices and interventions in bereavement care. ICU nurse leaders were invited during a 4-week period in April 2013 to complete the survey through a link that was posted in the American Association of Critical-Care Nurses (AACN) e-newsletter. The survey demonstrated high clinical sensibility and validity. Data were analyzed by using descriptive statistics and binary logistic regression. **Results:** The survey respondents included 237 ICU nurse leaders from hospitals in the South (n = 75, 31.6%), Northeast (n = 61, 25.7%), Midwest (n = 58, 24.5%), and West (n = 43, 18.1%) regions. Hospital and ICU types were diverse with most being community (n = 81, 34.2%) and medical (n = 61, 25.7%). A majority of the respondents reported that their ICUs (n = 148, 62.4%) did not offer bereavement follow-up services, with the main barrier being lack of education or support for staff (n = 71, 48%). Binary logistic regression indicated that ICUs in hospitals with palliative care were almost 8 times (odds ratio = 7.66) more likely to provide bereavement support than were ICUs in hospitals without this service. **Conclusion:** Most adult ICUs in this study did not offer bereavement follow-up services. In the ICUs that did offer follow-up care, their hospitals also had palliative care services that provided additional bereavement support. These results indicate the important role palliative care services may have in providing bereavement support. Further research is warranted in integrating palliative care and bereavement support in those ICUs and hospitals that do not have any type of bereavement follow-up services.

RS16 Why Keep Patients in Bed for More Than 4 Hours After Cardiac Catheterization?

Sek Ying Chair; The Nethersole School of Nursing, Hong Kong

Purpose: To compare patients' outcomes of back pain, puncture site pain, vascular complications, urinary discomfort, and general perception of well-being between patients having bed rest for 4 hours and patients having bed rest for 12-24 hours after transfemoral cardiac catheterization (CC). **Background:** Cardiac catheterization is an essential diagnostic procedure for coronary artery disease. Owing to the potential vascular complications, bed rest

and immobilization of the affected leg after the procedure are essential. The recommended bed rest duration varies from 2 to 24 hours. Many patients experienced physical and psychological discomforts with an extended period of bed rest. Therefore, to obtain optimal patient outcomes, bed rest duration after transfemoral CC should be minimized. **Method:** A randomized single-blinded controlled trial was used. Patients were assigned to an experimental (n = 63) or a control (n = 74) group according to a computer-generated random list. Experimental group patients had bed rest for 4 hours and control group patients had bed rest until 8 am the morning after CC (12-24 hours). For the experimental group, the puncture site was assessed hourly for the first 4 hours as well as before and after each ambulation, whereas for the control group, it was assessed hourly for the first 6 hours. Back pain was assessed at 4 hours and 8 hours after CC and at 8 AM. Urinary discomfort was assessed at 6 hours, and general well-being perception was assessed before CC and at discharge. **Results:** Among the 137 patients, the proportion of males to females was similar (50.4% vs 49.6%). There was no significant difference between the 2 groups on puncture site complications and puncture site pain ($P > .05$). Patients in the experimental group experienced less back pain at 8 hours after CC (odds ratio [OR] = 0.19, 95% CI = 0.08-0.45, $P < .001$) and in the next morning (OR = 0.36, 95% CI = 0.15-0.87, $P = .02$). Experimental group patients also experienced less urinary discomfort (OR = 0.35, 95% CI = 0.14-0.90, $P = .003$) and better general well-being ($P = .01$) when compared with the patients in the control group. **Conclusion:** Keeping patients in bed for only 4 hours was found to be safe without increasing vascular complications but might promote patients' comfort and well-being after transfemoral CC. Shorter bed rest may also reduce nursing time needed for administering analgesics and assisting patients for self-care. Results of this study contributed to the body of nursing knowledge that can be used to inform evidence-based nursing practice in caring for patients after CC.

RS17 Improving Intravenous Heparin Infusion Administration and Monitoring: A Multidisciplinary Approach

Deborah Klein, Theresa Cary, Jennifer Goodman, Aaron Hamilton; Cleveland Clinic, Cleveland, OH

Purpose: To improve the overall safety and effectiveness of intravenous heparin administration through enhanced technology, improved workflow, and local accountability. In addition, the goal was to reduce time to initial therapeutic values for activated partial thromboplastin time (aPTT) and increase the overall

time that patients spend in the therapeutic range.

Background: Intravenous heparin, a high-risk medication, accounted for 90% of anticoagulation event reports in our institution in a 1-year period. Further examination identified inconsistent practices in physician ordering, nurse administration, and anticoagulation monitoring that resulted in significant fluctuations in aPTT and delays in achieving therapeutic ranges. **Method:** A multidisciplinary team followed an aPTT blood sample from bedside, through laboratory analysis, posting of the result, and heparin dose adjustment by the nurse. Based on this information, new weight-based heparin nomograms, an electronic heparin dose calculator, electronic nurse dual sign-off functionality, priority and timed phlebotomy draws, a new laboratory aPTT designation (PTTAC), and enhanced communication to the nurse when PTTAC results are posted were implemented. Data extracted from the electronic medical record on adult patients who were receiving intravenous infusions of heparin to treat venous thromboembolism from January 2010 to March 2012 determined baseline performance and measured the impact of these interventions. **Results:** After exclusions were applied, data for 4790 patients in the preintervention group and 2650 patients in the postintervention group were analyzed. Postintervention, the proportion of patients who were in the therapeutic range within 24 hours increased 13.5% and median time to therapeutic aPTT decreased by 17.1%. After the intervention, the proportion of time spent inside the therapeutic range increased 11.7%. Safety analysis revealed no statistical difference in rates of major bleeding. **Conclusion:** The use of weight-based heparin nomograms standardized the physicians' ordering process. Implementation of a heparin dose calculator and timed phlebotomy draws improved timeliness of dose adjustments. An electronic notification system provided the nurse with real-time notification when PTTAC results were posted. The nurses' dual signoff verified intravenous heparin dose adjustments and boluses.

RS18 Noninvasive Respiratory Volume Monitoring for the Safe Use of Opioids: Addressing a Nursing Challenge

Diane Ladd; West Virginia University, Morgantown

Purpose: To evaluate the utility of the algorithm for assessing risk for respiratory depression derived from the noninvasive respiratory volume monitor (RVM) to direct safe use of opioids, evaluate postoperative apnea (POA), and provide quantitative data to nurses for decision making. Previous research has shown that minute ventilation (MV) monitoring

can provide an early sign of impending respiratory decompensation. **Background:** Opioid-induced respiratory depression and POA often lead to postoperative complications and pose a significant challenge to nurses because of the lack of adequate monitoring in nonintubated patients. Current evaluation relies on oxygen saturation and subjective clinical assessment. A novel, noninvasive RVM that provides continuous measurements of MV, tidal volume (TV), and respiratory rate (RR) in nonintubated patients was developed to address this issue. **Method:** RVM data were collected from 114 patients following elective orthopedic surgery; 50 of the 114 patients received opioids. "Predicted" MV (MVPRED) and "Percent Predicted" ($MV_{MEASURED} / MVPRED \times 100\%$) was calculated for each patient by using standard formulas. Before opioid administration, patients were classified as: "not-at-risk", $MV > 80\% MVPRED$ and "at-risk", $MV < 80\% MVPRED$. "Unsafe" was defined as $MV < 40\% MVPRED$. Patients were analyzed post hoc for POA. Patients were also assessed for "at-risk" status at PACU 30 minutes before discharge. **Results:** Within 30 minutes of opioid administration, 28% of patients (14 out of 50) became potentially unsafe. This fraction is higher (43%, 6 out of 14) in the group with POA and lower (22%, 8 out of 36) in the group without POA. Thirty minutes before discharge, 14% of all patients (16 out of 114) were potentially "unsafe." In the POA group, this fraction was marginally increased (19%, 5 out of 26) and in the group without POA was essentially unchanged (13%, 11 out of 88). In the group that received opioids 18% of patients (9 out of 50) were potentially "unsafe," whereas in the group without opioids this fraction was only 11% (7 out of 64). **Conclusion:** RVM provides real-time MV measurements that can quantify respiratory depression, the effects of opioids and POA. This provides nurses with real-time, continuous, quantitative data previously unavailable in nonintubated patients. RVM may be used to create protocols for opioid administration and discharge criteria. RVM data will allow for better communication of the patients respiratory status and improve patient safety across the continuum of care.

RS19 Predictors of Agitation in Critically Ill Adults

Ruth Burk, Cindy Munro, Christine Schubert Kabban, Mary Jo Grap; Virginia Commonwealth University, Richmond, VA

Purpose: To identify predictors of agitation by investigating baseline demographics and preadmission risk factors as well as clinical data of critically ill patients. Understanding predictors of agitation

may allow opportunity for care providers to intervene to ameliorate or prevent agitation. Length of stay in the intensive care unit (ICU) and hospital, discharge destination or outcome, and adverse events were compared between agitated and nonagitated patients. **Background:** Agitation in critically ill adults is a frequent complication of hospitalization, resulting in significant adverse outcomes such as longer ICU stay, longer duration of mechanical ventilation, a higher rate of self-extubation, unplanned catheter removal, increased utilization of resources, and increased ICU costs. Potential causes of agitation in critically ill patients are numerous, but data about factors that predict agitation are limited. **Method:** Two hundred patients from a medical and a surgical ICU were studied with a total data collection of 17 938 patient-hours by using a retrospective review. Agitation was identified by using the Richmond Agitation-Sedation Scale and/or the use of an "agitation" key word. Data pertaining to baseline demographics and preadmission risk factors as well as clinical data were collected and evaluated by logistic multivariable regression to determine predictors of agitation. Two models were examined: (1) predictors of agitation on admission; and (2) predictors of agitation 24 hours before the first agitation event. Clinical outcomes and adverse events were also examined. **Results:** Predictors of agitation on admission to the ICU were past medical history of illicit substance use, height, both the respiratory and central nervous system subscores from the Sequential Organ Failure Assessment (SOFA), and use of restraints. Predictors of agitation identified from data gathered within 24 hours before agitation were past medical history of psychiatric diagnosis, height, SOFA score, ratio of PaO_2 to fraction of inspired oxygen < 200 mm Hg, serum pH, percentage of hours using restraints, percentage of hours using mechanical ventilation, pain, and presence of genitourinary catheters. Adverse events (50) included 5 self-extubations, 3 critical catheter/tube removals, 1 restraint torn off, and 30 noncritical catheter removals. **Conclusion:** Primarily clinical factors rather than medical history were implicated in the onset of agitation. Agitation was associated with multiple significant adverse events. Identification of patients at particularly high risk for developing agitation provides an opportunity to implement preventative strategies. This study contributes new knowledge to the identification of agitation in the medical and surgical ICU patient populations allowing a better understanding of risk factors for agitation.

RS21 Quiet Time in a Busy Cardiovascular Intensive Care Unit

Sara Bashyam, Lori Hadas; Florida Hospital, Orlando

Purpose: To examine noise levels in a busy cardiovascular intensive care unit (CVICU) during usual activities by using a decibel meter before and after implementation of a noise reduction protocol, and to evaluate the noise perception of patients and the nursing staff before and after noise reduction strategies are put in place. Noise levels within intensive care units are higher than the Environmental Protection Agency recommends for maximal hospital room noises. **Background:** Patients in the CVICU are disturbed by the distressing effects of constant noise, including sleep disturbances, increased stress, and reduced patient satisfaction. This noise also has a negative effect on staff working in the ICU. In an attempt to improve the patients' recovery, well-being, healing process, and satisfaction with their hospital experience and to improve staff satisfaction, the Nursing Practice Council members initiated scheduled uninterrupted rest periods. **Method:** This was a mixed-method study using survey and observation with a convenience sampling of patients admitted to the CVICU for cardiac surgery. The control group "A" was questioned before noise reduction interventions, and the comparison group "B" was questioned after noise reduction interventions. Patients were called 2 weeks after discharge to complete a survey. Study nurses were given a survey 3 weeks before and 3 weeks after the training about the noise reduction strategy project. Decibels were measured during high-activity times. Descriptives and regression analyses were conducted to determine if a relationship exists between quiet time and the standard practice. **Results:** Noise levels during quiet time were greatly reduced but noise levels during other hours were louder than during the previous time period when quiet time hours had not been implemented. Staff indicated that they perceived a reduction in noise during quiet time. The percentage of nurses indicating that the noise level was "noisy" went from 49% in the prestudy period to 25% in the postcollection period. This decrease was statistically significant ($P = .02$). The percentage of nurses indicating that uninterrupted rest was "very important" went from 70% in the prestudy period to 80% in the postcollection period. This change was not statistically significant ($P = .19$). **Conclusion:** This project has received a positive response from patients, family, visitors, nursing staff, physicians, and leaders. Awareness of noise levels, the noise-reduction protocol, and uninterrupted rest time is now included in the unit's routine. Initiating a quiet-time intervention

in the CVICU has led to increased satisfaction of patients and staff. The project was so successful that it has been disseminated to other nursing units, and some units are already installing decibel meters.

RS22 Effects of Open vs Closed Endotracheal Suctioning on Lung Injury in a Rabbit Model of Acute Respiratory Distress Syndrome

Hideaki Sakuramoto, Nobutake Shimojo, Subrina Jesmin, Satoru Kawano, Junko Kamiyama, Taro Mizutani, Takeshi Unoki; Tsukuba University Hospital, Tsukuba, Japan

Purpose: To determine whether repeated open endotracheal suctioning (OS) exacerbates lung injury, compared with closed endotracheal suctioning (CS) during mechanical ventilation in an animal model of acute respiratory distress syndrome (ARDS). **Background:** Repeated derecruitments of previously recruited lungs can exacerbate lung injuries during mechanical ventilation. Endotracheal suctioning is a nursing procedure frequently performed on patients receiving mechanical ventilation. Although endotracheal suctioning is known to be one of the causes of repeated derecruitments during mechanical ventilation, it is not clear whether repeated endotracheal suctioning exacerbates lung injuries. **Method:** Twenty rabbits were initially ventilated in pressure-controlled mode with a constant tidal volume (6 mL/kg). Then, lung injury was induced by repeated saline lavage, followed by randomization into 2 treatment groups. Both groups were then ventilated with positive end-expiratory pressure (PEEP) at 10 cm H₂O. CS was performed by using 6F closed suctioning catheters under the following conditions: (a) a suctioning time of 10 sec and pressure of 140 mm Hg and (b) suction depth of 2 cm plus length of tracheal tube. OS was performed using same conditions as for CS, except that the ventilator was disconnected from the animal. Each endotracheal suctioning was performed at an interval of 30 minutes. **Results:** Our results show that PaO₂ for the CS group remained at >400 mm Hg for 6 hours, whereas PaO₂ progressively declined in the OS group, with each suctioning decreasing PaO₂ to 300 mm Hg ($P < .05$). However, no difference was observed either in lung injury score (histology) or in cytokine concentrations (tumor necrosis factor- α , interleukin-6, vascular endothelial growth factor, and its soluble receptors) after 6 hours between 2 groups at circulatory and pulmonary levels. **Conclusion:** Arterial desaturation related to repeated endotracheal suctioning is greater with OS than with CS in a time-dependent manner, but OS does not exacerbate lung injury during mechanical ventilation observed over a longer time span (6 hours)

of endotracheal suctioning according to morphology and molecular analysis.

RS23 Use of a 3-Ounce Water Test to Identify Patients at Risk for Dysphagia After Extubation

Mary Beth Leaton, Marilyn Azuelo, Denise Fochesto, Jonathan Hancock, Michele DeFilippis, Brittney Daley, Valerie Weber; Morristown Medical Center, Morristown, NJ

Purpose: Currently in our intensive care unit (ICU), a formal swallowing screening is not performed after extubation to determine if a dysphagia evaluation is needed before starting a diet. This study aims to address the issue of possible error in clinical judgment by the nurses and physicians of not performing a formal screening before starting a diet, thereby placing the patient at risk for aspiration. A secondary aim is to determine if there is a relationship between delirium and dysphagia in our patients. **Background:** Many critical care patients require mechanical intubation/ventilation (MV); however MV can cause complications that include dysphagia after extubation. Limited studies have been implemented in recent years to identify patients at risk for dysphagia after extubation, and a standard screening process needs to be identified. Sitoh et al noted in 2000 that research, thus far, has been restricted to the stroke population and patients in long-term facilities. **Method:** This descriptive correlational study used a sample of convenience in our surgical and medical ICUs. Patients were screened 3 hours after extubation (T1) by using the 3-oz (90-mL) water test. Demographic data were collected and nurses completed the clinical judgment questions. If a patient does not follow commands or fails the screening at T1, the patient is reevaluated 12 hours later (T2). If the patient fails the screening at T2, an order for a formal evaluation is requested. Every fifth patient included in the study has a formal dysphagia evaluation to check for reliability of the nurses' swallowing screening. All patients were screened for delirium at T1 and T2, using the CAM-ICU. **Results:** A total of 93 patients were included. Mean age was 67 years, with 52% males. The distribution of service received was as follows: 64% medical, 20% trauma, and 16% surgical. At T1, 77 patients (83%) failed the water screening test. A total of 50 patients had a formal dysphagia evaluation (54%), out of whom 42 patients (84%) had dysphagia. Agreement of swallowing dysfunction between clinical judgment and the water screening test was 74% for nurses and 53% for physicians. Results of the water screening test were accurate for predicting results of the formal dysphagia evaluation (n = 7). Prevalence of delirium was

47% for patients with postextubation swallow dysfunction versus 31% for others ($P = .28$, by χ^2 test). **Conclusion:** Nurses' clinical judgment, as compared with physicians' clinical judgment, was a stronger predictor of swallowing dysfunction after extubation. In our sample, use of the 3-oz water swallowing test by trained nurses was an accurate screening tool to identify patients at risk for dysphagia (sensitivity, 90%). Although the presence of delirium was not significantly associated with dysphagia, a higher percentage of those with dysphagia also had delirium.

RS24 Randomized Controlled Comparison of AccuCath Intravenous Catheter With Coiled-Tip Guidewire and Conventional Peripheral Intravenous Catheter

Bette Idemoto; University Hospitals Case Medical Center, Cleveland, OH

Purpose: To evaluate user preferences and clinical outcomes between AccuCath, a new coiled-tip guidewire directed intravenously compared with conventional intravenous catheters in adult patients. Testing the hypothesis that AccuCath would have a higher rate of successful placement on the first attempt, higher completion of therapy, fewer complications, longer dwell times, higher user (patient and clinician) satisfaction, and lower costs of vascular access than conventional intravenous catheters. **Background:** About 90% of inpatients require an intravenous catheter. First-attempt success averages 40%, complications occur 47% of the time, and catheters dwell a mean of 44 hours. Multiple attempts at insertion and multiple intravenous catheters during each admission result in poor satisfaction of both patients and clinicians as well as unnecessary costs. With the Infusion Nursing Society's standards now stating that intravenous catheters can dwell until complication, there is significant opportunity to improve patients' outcomes with guidewire technology that offers atraumatic delivery with fewer sticks. **Method:** Approval from the institutional review board and financial approval were obtained before the start of the study. Adult medical-surgical patients who required a nonemergent intravenous catheter were enrolled and provided consent. The surgical intensive care unit and the telemetry step-down unit were initially the sites, but the study was expanded with the approval of the institutional review board to include all of medical-surgical adult patients. Randomized enrollment was ensured with sealed envelopes, opened once consent was obtained from the patient. Study forms were completed by the nurse after insertion. The study was conducted for 4 months. All data were logged and secured,

and analysis was completed with t tests and χ^2 tests. **Results:** The study included 248 patients (AccuCath, 123; conventional, 125). First-attempt success was 89% with AccuCath compared with 43% with conventional catheters. A second attempt was required with 50% of the conventional intravenous catheters. Typical complications including infiltration, phlebitis, occlusion, and infection, occurred only 8% of the time with AccuCath and 52% of the time with conventional catheters. Dwell time significantly improved with AccuCath at a mean of 4.36 days compared with conventional intravenous catheters at 1.84 days. Patients' satisfaction with catheter insertion scored 4.6 on a 5-point Likert scale for AccuCath compared with 3.06 for a conventional catheter. Patients' comfort rating of the procedure was 4.2 for AccuCath compared with 2.9 for the conventional catheters. **Conclusion:** Statistically significant results were demonstrated by χ^2 ($P = .001$). It was a remarkably successful study demonstrating the superiority of a guidewire-delivered peripheral intravenous catheter improving first-attempt success rates, lowering complication rates, and increasing dwell time. The AccuCath provided increased satisfaction of patients and clinicians due to elimination of unsuccessful attempts at catheter insertion and multiple restarts via its atraumatic insertion. Costs of intravenous catheter therapy were also significantly reduced.

RS25 Creating a Culture of a Healthy Work Environment in the Medical Surgical Intensive Care Unit

Dennis Doherty, Sandra Mott, Jean Connor, Aimee Lyons; Boston Children's Hospital, Boston, MA

Purpose: To compare perceptions of the current work environment among staff in a medical surgical intensive care unit (MSICU) with perceptions documented in a 2010 healthy work environment (HWE) project and to evaluate the perceived effectiveness of the initiatives designed and implemented in 3 of the 6 standards based on 2010 data. **Background:** In 2010, the MSICU participated in the HWE initiative: 89/163 (55%) staff completed the AACN HWE Assessment and scored 3.78 (1 poor-5 excellent) overall. To better understand their perceptions and response reasoning, a series of focus groups were held. Data analysis revealed that staff had concerns in 3 of the 6 standards of a HWE. A task force devised initiatives to address the concerns and, together with leaders, implemented the initiatives with the goal of improving the health of the work environment. **Method:** Mixed method design. All MSICU staff members were invited to participate in the 2012 HWE electronic assessment survey and to attend 1 of 8 HWE focus groups. The primary investigator

organized the sessions, and the same nurse scientist facilitated them. Focus groups to learn from the staff their perceptions of the effectiveness of the implemented initiatives and their current thinking about the health of the work environment were held until data saturation was achieved. Each 30-minute session was audio taped and transcribed verbatim with all identifying information removed. Transcripts were analyzed by using conventional content analysis. **Results:** Of the 209 staff invited, 96 (46%) completed the 2012 survey. The 2012 total aggregate score from the AACN HWE survey was 3.75. Analysis from the focus groups revealed a perceived improvement in the current work environment. There was general agreement that the initiatives implemented in the standards of skilled communication and appropriate staffing had positive effects. Meaningful recognition remained the standard identified as still needing improvement in terms of real time and face-to-face recognition. In addition, opportunities for recognition across disciplines within the MSICU health care team need to be addressed. **Conclusion:** An overall stability was noted in assessment results between the 2 time periods. Results from the HWE survey provided an overview of the environment's health. However, specific information about staff members' thoughts and reflections about initiatives implemented and additional ones needed was learned through the focus groups. Providing a work environment that fosters quality and safety is an ongoing effort. Staff input is critical to creating the culture of a healthy work environment.

RS26 Adding Wheels to a Wish: The Palliative Journey Home

Harriett Nelson, Sandra Mott; Boston Children's Hospital, Boston, MA

Purpose: To learn from the parents their perspective of the experience of a palliative transport and its effect on their life since the event. **Background:** Pediatric palliative transports, the act of transporting critically or terminally ill children home for end-of-life care including terminal extubation, is a relatively new practice. Since 2007, the Boston Children's Hospital Critical Care Transport Team in collaboration with the Pediatric Advanced Care Team has transported 6 children home to have life-sustaining measures withdrawn, and they have transported other children home for hospice care when the end of life was near. Research is limited in the United States. **Method:** Since the desired outcome was a basic, but thorough description of the parents' or guardians' experience and the goal a comprehensive

summary of events in the everyday language of those involved, the qualitative descriptive method was the best fit. Parents or guardians were asked to share their reflections about the process and experience of bringing their child home to die. They participated in a 60-90 minute interactive, audio-recorded interview. The interview consisted of an initial broad, open-ended request, "Please share with me your perspectives about the experience of bringing your child home prior to his/her death." Follow-up probes were used for clarification. **Results:** Six interviews and preliminary analysis are completed. Each interview was analyzed before the next, allowing ongoing comparative analysis. The dominant comment expressed was the comfort experienced on multiple levels by having the child die at home. The data detailed comfort for the patient, parents, and the extended family, allowing each the freedom to express grief individually. It included support from as many family members as they wanted present for as long as they wanted without the confines of a hospital/technical environment and strangers. Time with the child even after death also brought comfort. **Conclusion:** Six interviews concluded that parents found pediatric palliative transport a positive, meaningful experience. Each parent recommended that this or something similar such as hospice be available for children so that families do not have to experience their child's death in a hospital. Since the inception of this study, the Critical Care Transport Team (CCTT) has developed an algorithm to assist in streamlining these transports, making the process of coordinating them as simple as possible.

RS28 Perception of Comfort, Knowledge Retention, and Teamwork Among Staff in the Cardiothoracic Intensive Care Unit During Cardiac Surgery Advanced Life Support

Lynn McGugan, Myra Ellis, Jason Williams, Jill Engel, Kelly Spillane; Duke University Medical Center, Durham, NC

Purpose: To evaluate the effect of education about a formal chest reopening protocol on cardiothoracic intensive care unit (CTICU) nurses' and advanced practice providers' comfort with, and knowledge of, the chest reopening process; additionally, to evaluate the change in the perception of teamwork during chest reopenings before and after implementation of the protocol. **Background:** Chest reopening occurs for patients who have a cardiac arrest after cardiac surgery while still in the ICU; historically it is a high-anxiety, nerve-wracking

situation. A formal protocol for chest reopening was introduced into our CTICU. We hypothesized that formal training on chest reopening would improve nurses' and advanced practice providers' comfort and knowledge of the process and would improve the perception of teamwork during the chest reopening process. **Method:** Education on the new process occurred in an 8-hour day, and included didactic lectures, problem-based learning, return demonstration, and simulation. A pre-post study design was used. A 16-question survey was distributed to nurses and advanced practice providers before education, then 6 and 12 months after training. A total of 25 staff completed all 3 surveys. Data were collected and analyzed by using repeated-measures analysis of variance in SPSS. **Results:** Training improved staff perception of knowledge and comfort regarding the standardized process, although comfort level declined between 6 and 12 months. Staff reported increased knowledge levels at 6 and then 12 months, but knowledge of process specifics (knowing where to find items, inclusion criteria for process, knowledge of items in open chest tray) declined between 6 and 12 months. Perception of teamwork during chest reopening increased with time, although findings were not statistically significant. **Conclusion:** A mixed-methods training program was effective to increase staff comfort with and knowledge of a standardized process for chest reopening, although perception of both these constructs declined over time. Repeat education of resuscitation programs should occur on more frequent intervals to ensure knowledge retention and staff comfort.

RS30 Patients' Migration Toward the Foot of the Bed Affects Torso Angle

Neal Wiggermann, Catherine Vangilder, Kermit Davis; Hill-Rom, Batesville, IN

Purpose: To determine how patients' migration (sliding down in bed) affects the angle of the torso. **Background:** The ventilator-associated pneumonia (VAP) prevention bundle includes elevating the head of bed (HOB) to at least 30°. This practice is intended to prevent aspiration of gastric contents into the lungs, which can cause infection. However, the prescribed HOB angle is measured by the position of the bed frame and not the position of the patient, which may vary significantly at a given HOB angle. No information is currently available on how patients' migration affects torso angle. **Method:** Ten healthy participants were placed on a Total-Care SpO2RT bed as it was raised from flat to 30° HOB elevation. To simulate common patient movement toward the foot of the bed, participants were

positioned at 5 distances toward the foot of the bed when measured from the manufacturer-recommended position (aligned with the “hip locator”). A laboratory motion capture system measured the total distance of migration below the hip locator as well as the angle of the torso (angle between shoulder acromion and trochanter with respect to flat). A linear regression analysis was performed to determine the relationship between torso angle and migration. **Results:** Torso angle was strongly associated with migration to the foot of the bed ($R^2 = 0.86$), with increased migration associated with lower torso angles (linear coefficient $B = -0.89$, $P < .001$). With the HOB raised, 10 cm in migration (~4 inches) resulted in a loss of 8.9° of torso angle. When participants were migrated 25 cm (~10 inches) past the hip locator, torso angles averaged less than 15° . **Conclusion:** Maintaining HOB angle does not guarantee consistent elevation of the torso of the patient. Previous research has evaluated HOB compliance by measuring the bed frame angle and has not considered patients’ torso angles. More work is needed to understand how variation in patients’ torso angle affects risk of VAP. Until this relationship is better understood, nurses may wish to use equipment and protocols that minimize patients’ migration toward the foot of the bed for patients at high risk of VAP.

RS31 Using a “Rounding Nurse” Model to Reduce Mortality, Length of Stay, and Out-of-Intensive Care Unit Codes

Daniel Lantos, Dana Goforth; Carolinas Medical Center, Charlotte, NC

Purpose: Existing research has shown improved outcomes for patients when a critical care nurse makes rounds on inpatient care areas other than intensive care units (ICUs) to proactively identify and intervene with patients whose condition is declining. Carolinas Medical Center implemented a 3-month “rounding nurse” pilot program to emulate these studies and collect outcome data based on mortality, length of stay, identification of patients eligible for rapid response team (RRT) activation, prevention of unnecessary transfers to the ICU, and out-of-ICU code blues. **Background:** Rapid response teams (RRTs) have proven effective in improving outcomes, but RRTs are not called on all patients who meet the criteria. The aim of the rounding nurse model is to travel to each inpatient unit, actively seeking out patients whose condition is declining but for whom an RRT has not been activated. By doing so, interventions may be identified and put

into place earlier than would have otherwise been possible. Other institutions have demonstrated significant benefit to patients’ outcomes with this model. **Method:** A team of critical care nurses with RRT experience was selected for the rounding nurse pilot program. The rounding nurse position was staffed 24/7 and free of a patient assignment. Nurses were chosen to participate on the basis of their approachability, initiative, and clinical judgment. The rounding nurse responded to codes, RRTs, and phone requests, and also visited every inpatient unit twice per day. Data collection for each patient included demographics, medical history, whether RRT criteria were met, interventions, and disposition. Retrospective mortality and LOS data were collected for all patients who were transferred to the ICU. Additionally, non-ICU code blue calls were evaluated for the second quarter of 2013. **Results:** Historically, about 150 patients per quarter were identified as meeting RRT criteria, 57% of whom were transferred to the ICU. During the pilot, 493 patients were identified as meeting RRT criteria and only 30% required transfer. Twenty-two unnecessary transfers from general care areas to the ICU were cancelled. A total of 17 out-of-ICU codes occurred during the pilot study, compared with a consistent historical average of about 29 per quarter. Patients who did require transfer to ICU had lower mortality rates than did similar patients in the same quarter in 2012 (10.4% from 25.3%). When stratified by acuity based on all-patient-refined-diagnosis-related-groups scores, the least acute patients had a shorter stay. The highest acuity patients had longer stays, most likely because of decreased mortality rates. **Conclusion:** Compared with the previous structure of the RRT, the rounding nurse model led to earlier identification of and intervention with “at-risk” patients. A number of quality improvements were seen, including fewer out-of-ICU codes, lower mortality, prevention of unnecessary transfers to the ICU, and shorter hospital LOS in all but the most acutely ill patients. This finding is consistent with established research and the pilot program is now being implemented on a permanent basis.

RS32 Cultivating a Healthy Work Environment Through Action-Based Research

Sharron Jones, Ashley Light, Kimberly Carter; LewisGale Hospital Montgomery, Blacksburg, VA

Purpose: The intensive care unit (ICU) at LewisGale Hospital Montgomery is pursuing the Beacon Award for Excellence to recognize excellent nursing care. Part of the journey to obtaining this award includes

assessing all the components necessary for a healthy work environment and ensuring that they are implemented appropriately. The purpose of this study was to identify effective interventions to promote a healthy work environment (HWE). **Background:** In 2001, the American Association of Critical-Care Nurses (AACN) began a national campaign to promote and support HWEs. In 2005, AACN issued national standards for establishing and sustaining HWEs. Extensive research done by AACN consistently supports 6 standards that are necessary for creating and maintaining an HWE. The ICU at LewisGale Hospital Montgomery believes that implementing a HWE is absolutely essential for improving patient safety and outcomes, as well as staff satisfaction. **Method:** This study used the HWE survey tool provided by AACN with a focus on recommendations given in the analysis report provided after the survey was administered. The initial survey (pretest) assessed current work environment conditions in the unit that provided valuable insight to staff perceptions. Three standards, true collaboration, appropriate staffing, and meaningful recognition, were selected from the HWE data analysis, each with a specific component selected as a focus point for improvement. Interventions were then developed for each component on the basis of recommendations from the data analysis report, and a posttest was administered. **Results:** The HWE survey (posttest) noted improvements in the specific components selected as focus points for improvement. To summarize, when pretest and posttest aggregate scores were compared for the entire survey, scores increased from 3.73 to 3.99. According to the HWE survey used in this study, initial scores verified the ICU as having a “good” HWE and secondary scores continue to support this, with slight improvement with the total score bordering on the verge of an “excellent” HWE. **Conclusion:** Recommendations include administering a follow-up survey in 1 year after implementation of interventions, allowing additional time for expansion of interventions in place as well as development of new interventions based on recommendations from AACN. Conducting another survey will provide data regarding long-term effects of the study. In conclusion, continuing education and assessment of the work environment are essential in creating and sustaining an HWE.

RS33 End-of-Life/Palliative Care in the Intensive Care Unit: Development of a Chart Review Tool
Madalina Boitor, Joanna Bailey, Celine Gelinas; McGill University, Montreal, Canada

Purpose: To develop and examine the psychometric properties of a chart review tool for the documentation of quality indicators related to the provision of end-of-life/palliative care (EoL/PC) in the intensive care unit (ICU), more specifically, symptom assessment and management, establishment of level of care, and interdisciplinary clinician-family meetings. Content validation and interrater reliability testing of the chart review tool were targeted. **Background:** Elevated mortality rates are increasingly common in the ICU, and the quality of EoL/PC in this setting needs improvement. Dying patients suffer distressing symptoms, they frequently receive interventions that are incompatible with their goals, and their families also suffer psychological consequences from their experience with the EoL/PC provided. To our knowledge, very few, if any, validated and reliable tools exist for the assessment of the quality of EoL/PC in this field. **Method:** A 3-phase methodological study design was used. In phase 1, an initial version of the chart review tool with a coding manual was developed that included quality indicators related to symptom management, levels of care, and interdisciplinary clinician-family meetings. In phase 2 of content validation, the relevance of quality indicators was evaluated by 11 ICU expert clinicians. Content validity indexes for quality indicators (I-CVI) were computed and experts' suggestions were analyzed. The content of the chart review tool was revised accordingly and, in phase 3, was tested for interrater reliability using percentages of agreement of each indicator retrieved in 10 charts by 2 trained coders. **Results:** The initial version of the chart review tool included 31 quality indicators. The revised version of the tool included 9 more indicators, and only 3 indicators with I-CVI <0.80 were modified. Acceptable agreement (>80%) between the 2 coders was obtained for most indicators, except for frequencies of assessment of some symptoms (ie, pain and dyspnea) that could be retrieved in more than 1 source, and indicators in text form that required subjective interpretation from coders. Many missing data were also noted, as the majority of patients (8/10) were unable to self-report their symptoms (eg, thirst) which also confirms the need to use alternative measures for this vulnerable group. **Conclusion:** This is the first study describing all the required steps for the development and validation of a chart review tool in EoL/PC. Findings showed that the use of a valid and reliable chart review tool can support the documentation of quality indicators of EoL/PC in the ICU. Although such a tool may require being adapted to the setting's chart format, it could be

used for the evaluation of the quality of EoL/PC delivery or the evaluation of EoL/PC support intervention programs in the ICU.

RS34 Backrest Elevation and Tissue Interface Pressure By Anatomic Location During Mechanical Ventilation

Mary Jo Grap, Anatheia Pepperl, Valentina Lucas, Cindy Munro, Christine Schubert Kabban, Ruth Burk, Paul Wetzel; Virginia Commonwealth University, Richmond, VA

Purpose: Pressure ulcers and ventilator-associated pneumonia (VAP) are both prevalent and costly. To reduce the occurrence of pressure ulcers, backrest positions of $<30^\circ$ are recommended. But, to reduce VAP, positions of $>30^\circ$ are recommended during mechanical ventilation (MV). Interface pressure may vary with level of backrest elevation and anatomic location (sacrum, heels, etc). This longitudinal study in adults receiving MV describes backrest elevation, anatomic location, and intensity of skin pressure across the body. **Background:** Pressure is a primary factor that promotes development of pressure ulcers. Interventions should be aimed at anatomic locations at greatest risk; therefore, identification of these areas is paramount. However the effect of higher backrest positions ($>30^\circ$) intended to reduce VAP, on interface tissue pressure, specifically at anatomic locations at greatest risk for tissue breakdown, has not been examined in critically ill patients receiving MV. **Method:** Patients from 3 adult ICUs (medical, surgical, neuroscience) who were receiving MV were enrolled within 24 hours of intubation. Backrest elevation (inclinometer) and pressure (XSENSOR pressure mapping system) were measured continuously for 72 hours. Anatomic locations were segmented into 7 areas (left/right scapula, left/right trochanter, sacrum, left/right heel) and pressures in each segment were summarized. Descriptive statistics were used to examine the relationship among backrest elevation, body location, and tissue interface pressure. The frequency and intensity of peak pressure by location were compared across location and by backrest elevation. **Results:** In 96 patients receiving MV, mean backrest elevation was 25.2° ; 76% of observations were $<30^\circ$. Peak pressures were in the sacrum 74% of time, less in left and right scapula (8.7, 9.2% of time), heels (2.2, 3.3% of time), and trochanter (0.9, 1.2% of time). In backrest elevation $>30^\circ$, more peak pressure occurred in the sacrum (85% $>30^\circ$ vs 71% $<30^\circ$). When peak interface pressure occurred in the sacrum, the magnitude of the pressure was lower than at other locations. On average, peak interface pressure was lowest when in the sacrum (4.77 mm Hg),

higher but similar in the left and right heels and scapula (40.4–47.5 mm Hg), and highest in the trochanters (88.7–94.6 mm Hg). **Conclusion:** Higher backrest elevations ($>30^\circ$) were used infrequently and for short periods. Peak pressures over all segmented areas were found most often in the sacrum and this increased with higher backrest elevations. However, highest peak pressures were found in areas other than the sacrum. These data suggest that when high pressures do occur in the scapula, heels, and trochanter, it may place patients at greater risk for skin breakdown, highlighting the need for greater monitoring of these areas.

RS35 Examining Nurses' Knowledge and Attitudes Regarding Palliative and End-of-Life Care for Patients With Heart Failure

Jennifer Ballard-Hernandez, Lorraine Evangelista, Maurice Espinoza, Marjan Motie; Hoag Hospital, Newport Beach, CA

Purpose: To describe nurses' current practice in discussing prognosis, palliative care (PC), and end-of-life (EOL) issues in patients with heart failure (HF). Additionally, the study aimed to describe attitude, responsibility, and confidence of nurses' in discussing prognosis, palliative and EOL care issues with HF patients. Last, we aimed to describe barriers that keep nurses' from discussing prognosis and PC with HF patients and their family members. **Background:** Heart failure is a complex, progressive syndrome associated with poor quality of life and high morbidity, mortality, and readmission rates. Patients with HF often have unmet EOL needs, but communication about prognosis and PC preferences and options are often lacking. Nurses' working in acute and critical care play pivotal roles in communication and coordination of EOL issues for patients with HF. Despite this, little is known about nurses' knowledge, attitudes, and practices regarding PC and EOL care. **Method:** A descriptive, correlation study was conducted by surveying acute and critical care nurses' who took care of HF patients at 3 hospitals in the West. The surveys tapped into nurses' knowledge, communication skills, and confidence in discussing prognosis, PC, and EOL care with HF patients and their family members. A total of 211 nurses completed the survey questionnaire. In this sample, 62 nurses (29.4%) worked in a critical care unit, 15 nurses (7.1%) worked in a HF clinic, 50 nurses (23.7%) worked in a telemetry unit, 60 nurses (28.4%) worked in inpatient cardiology, and 24 nurses (11.4%) worked in the emergency department. **Results:** In our study, 57.3% of nurses reported that they had discussed EOL care at some point with their HF

patients. Overall the majority of nurses (75.3%) thought that it is appropriate for nurses to talk with their HF patients about EOL care. Most of the nurses (81.1%) thought that they had the knowledge to discuss EOL care with HF patients. Despite feeling that they had the knowledge to do so, 71.6% of the nurses reported having no training on how to discuss EOL care with patients. Additionally, 81.5% of the nurses reported a need for further training in discussing EOL care with patients. The majority of the nurses (70.6%) thought it was the responsibility of the physician or nurse practitioner to discuss prognosis with the patient. **Conclusion:** Despite nurses feeling competent in discussing EOL issues with HF patients, lack of formalized EOL training was noted. Nurses overwhelmingly thought that it was the responsibility of the physician or nurse practitioner to initiate discussion about prognosis and EOL care. This study highlights the need for further education and training for nurses to improve knowledge and awareness of PC and EOL needs in patients. Further research is needed to examine a variety of methods to increase nurses' knowledge about PC and EOL care.

RS36 Validity and Sensitivity of 6 Pain Scales in Critically Ill, Communicative and Noncommunicative Intubated Adults

Mamoona Arif, Drupatie Joseph, Mary Jo Grap, Pamela Ferguson; Virginia Commonwealth University Health System, Richmond

Purpose: To evaluate the validity and sensitivity of 6 pain scales (Face, Legs, Activity, Cry, and Consolability [FLACC]; Behavioral Pain Scale [BPS]; Comfort Scale; FACES; Adult Nonverbal Pain Scale [ANVPS], Pain Assessment Behavioral Scale [PABS]), compared with the Numeric Pain Scale (NPS) to identify the most appropriate measure of pain in noncommunicative patients (ie, patients receiving mechanical ventilation, or sedated). **Background:** Self-report is the best indicator of pain; however, pain is more difficult to assess in noncommunicative patients who may be either receiving mechanical ventilation or sedated and unable to report pain. Multiple expert guidelines emphasize procedures to systematically assess, diagnose, and treat pain. However, these guidelines are difficult to implement without a single valid and reliable pain scale that ensures adequate pain management for critically ill noncommunicative patients. **Method:** The study was conducted at an academic medical center and approved by the institutional review board. Fifty communicative and 100 noncommunicative patients receiving mechanical ventilation were observed before and

during nonnoxious stimulus (routine physical examination) and noxious stimulus (endotracheal tube suctioning). To test validity, communicative patients' pain was measured with the 6 scales as well as the patients' self-rating by using the NPS, which served as the "gold standard." A Pearson correlation coefficient was calculated for each of the 6 scales with the NPS. Two separate repeated-measures models (nonnoxious and noxious stimulus) were used to compare the sensitivities of the 6 pain scales. **Results:** Most of the patients were African American, with no difference in age, sex, race, or ethnicity between communicative and noncommunicative groups. The 6 pain scales had statistically significant moderate to high correlations with the patients' numeric rating during the noxious procedure. Score on the FACES scale rated by patients had the highest correlation with the patients' numeric rating ($r=0.75$, $P<.001$), and FACES scale rating by the nurse had the lowest correlation ($r=0.53$, $P<.001$) with patients' numeric rating. All scales were highly sensitive in capturing the patient's pain response before and during nonnoxious and noxious stimulus with highest sensitivity during the noxious procedure. **Conclusion:** Pain assessment remains a challenge in noncommunicative critically ill patients whose pain experience is inferred from observation of behaviors and physiological measures. Our study purpose was to evaluate and identify an effective scale for the assessment of pain in this population. However, all 6 of the pain tools were valid and highly sensitive for capturing changes in pain response during nonnoxious and noxious procedures in both communicative and noncommunicative patients.

RS37 Efficacy of Stool Management Systems for Preventing Environmental Spread of *Clostridium difficile*

Mikel Gray; University of Virginia, Charlottesville

Purpose: *Clostridium difficile* is the most common cause of hospital-acquired diarrhea. Multiple interventions are used to prevent environmental contamination, including selective use of stool management systems. Evidence concerning the efficacy of these devices for preventing environmental contamination with *C difficile* is lacking. The purpose of this study was to compare the efficacy of 2 stool management systems for preventing contamination of the immediate environment in a simulated clinical setting. **Background:** *C difficile* diarrhea and fecal incontinence in critically ill patients increases the risk of environmental contamination. Preventing spread of *C difficile* is challenging because of its resistance to hand washing with alcohol-based

products or cleaning with detergent-based products. Interventions to reduce environmental spread include indwelling stool management systems. Current research into the efficacy of these devices focuses on their ability to contain stool and prevent associated skin problems. **Method:** Two indwelling stool management systems, DigniShield (Bard, Inc [device 1]) and FlexiSeal (ConvaTec, [device 2]) were evaluated in a simulated clinical setting. Sterile liquid stool was inoculated with 10⁶ colony-forming units (CFU)/mL of *C difficile* vegetative cells and spores. Bag changes were performed daily for 30 days over an absorbent pad. Sterile swab samples from key locations (containment bags, hub/interface tubing, absorbent pad) were streaked on agar plates for anaerobic culture. Agar plates placed 5 to 10 cm from hub/tubing interfaces were also cultured for aerosol contamination. Contamination rates were analyzed with the generalized estimating equation. **Results:** Outcomes were categorized as dichotomous (growth vs no growth). Analysis of device surface contamination showed significant differences. More bags from device 1 than from device 2 showed no growth (device 1 vs 2: 79.2 vs 16.1%, $P < .001$). Significantly fewer hub/interface tubes from device 1 than device 2 were contaminated (device 1 vs 2: 79.2% vs 13.7%, $P < .001$). Findings were similar when absorbent pads placed under the devices were compared (99.4% vs 38.1%, $P < .001$). *C difficile* agar plates also showed statistically significant differences, indicating possible aerosol contamination of adjacent surfaces when the tubing is disconnected and bag emptied (device 1 vs 2: 0.0% vs 22.4%, $P < .001$). **Conclusion:** These results suggest that stool management systems may be effective for preventing environmental spread of *C difficile* vegetative cells or spores. Findings also suggest that substrate (material of construction) or design of the hub/interface tubing may influence the device's effectiveness in preventing environmental spread. Additional research is needed to evaluate the effectiveness of stool management systems to prevent or minimize environmental contamination in the intensive care unit.

RS38 Evaluation of Temperature Intervention in Patients at a Trauma Facility

Frances Grissom, Christie Collins, Joseph Kufera, Anne Grafton, Kathryn Von Rueden, Karen McQuillan; R Adams Cowley Shock Trauma Center, University of Maryland Medical Center, Baltimore

Purpose: To identify current strategies used to manage fever in trauma patients and to determine the effectiveness of these interventions in reducing body

temperature. Knowledge of the effectiveness of temperature strategies will aid in defining best evidence-based practice for fever management. **Background:** Fever is a common finding in trauma patients. Although research findings support preferred methods for taking temperatures and recommend avoiding fever in neurologically injured patients, little evidence exists to guide when fever should be treated or which interventions are most effective. **Method:** This prospective descriptive study used a convenience sample of 94 trauma patients ages 18-65 years admitted to critical care or intermediate care. Brain-dead patients were excluded. Nurses recorded each time a temperature was taken, the patient's temperature, method to obtain temperature, and interventions for temperature management. Factors that may have affected patients' body temperature were noted. Unidentifiable demographic data from patients were recorded. Data collection forms were coded to protect patients' confidentiality. Student *t* test was used to compare mean temperature response versus no change at 1, 2, and 3 hours after initiating each intervention. Temperature changes between interventions at the different time points were compared. A P value $< .05$ was statistically significant. **Results:** Of 5487 temperatures recorded, 22% were 101°F. Temperature reduction measures included fans (13.6%), acetaminophen (3.8%), ibuprofen (0.7%), ice packs (0.7%), cooling blanket (0.6%), cool bath (0.4%), or a combination of those methods. Acetaminophen, ibuprofen, or cooling blankets resulted in significant reduction in body temperature 1, 2, and 3 hours after administration. Ice packs caused significant reduction after 3 hours. Cool bath or fan did not affect body temperature. Greater reductions in temperature were obtained with ibuprofen than acetaminophen at 2 and 3 hours. Greater reductions occurred with cooling blankets than acetaminophen at 2 hours. Acetaminophen caused larger temperature reduction than cool bath at 3 hours and a larger temperature reduction than a fan or no intervention at hours 1, 2, and 3. There were no differences in temperature reduction between ibuprofen and cooling blankets. **Conclusion:** Subjects were febrile for 22% of recorded temperature observations. Interventions used for temperature reduction varied, with a fan followed by antipyretics used most often. Ibuprofen and a cooling blanket beneath the patient were the most effective interventions for reducing patients' temperature, followed by acetaminophen and then ice packs. A cool bath or a fan had no effect. These conclusions suggest the most

effective interventions for lowering body temperature in febrile trauma patients, which may aid in creation of evidence-based fever management protocols.

RS39 Self-described Nursing Roles Experienced During Care of Dying Patients and Their Families: A Phenomenological Study

Richard Arbour, Debra Wiegand; Thomas Jefferson University Hospital, Philadelphia, PA

Purpose: To understand the experiences and roles of critical care nurses providing care for dying patients and their families. This study fills gaps in research about the lived experience and roles of bedside caregivers during end-of-life care. **Background:** Critical care nurses often care for dying patients and their families. Clinicians caring for patients and their families have multiple roles during end-of-life care. Role confusion, stress, and personal context of perceiving death may add to job dissatisfaction and risk of burnout. Little is known about the roles experienced and perceived by bedside nurses as well as how these roles affect them as they care for dying patients and their families. **Method:** A descriptive phenomenological study was conducted and a purposive sampling strategy was used to recruit 19 critical care nurses with experience caring for dying patients and their families. Individual interviews were conducted, audio recorded, and transcribed verbatim. Each nurse was asked open-ended questions about their experience and roles including when caring for dying patients and their families. Colaizzi's method of data analysis was used to inductively determine themes, clusters, and categories. Data saturation was achieved and methodological rigor was established. **Results:** Critical care nurses described their main nursing roles as patient advocacy, educating and supporting the patient and family, as well as optimal symptom management while helping to promote a comfortable, dignified death. Roles evolving from the data also included encouraging family presence during the dying process, protecting families, and creating positive memories for the family. Modeling coping and self-care skills while mentoring and teaching novice clinicians was important. **Conclusion:** The results of this study have important implications for clinical practice, education, and research. Critical care nurses may be unprepared for roles encountered when caring for dying patients and their families. Teaching these important roles in nursing education and critical care orientation classes is essential. Future research should be directed at studying the best ways to mentor, teach, and prepare nurses to provide optimal end-of-life care.

RS40 Are You in the Zone?

Ashley Deane, Kristin Walker, Sharon Parrish, Susan Humphrey; Martha Jefferson Hospital, Charlottesville, VA

Purpose: Heart failure has been targeted as a frequent yet preventable cause of hospital readmissions. Heart failure readmission rates are scrutinized and may have adverse effects on hospitals under the Center for Medicare and Medicaid Services' Hospital Readmission Reduction Program. The purpose of this project was to determine whether discharge education using the teach-back method and a daily self-assessment model would reduce 30-day readmissions for heart failure. **Background:** Our 176-bed acute care community hospital is a member of a multi-hospital, multiregional health care system. In 2012, a readmission collaborative was formed that launched a system-wide initiative to reduce 30-day readmission rates for heart failure. Approximately 15% of our average daily census includes patients with heart failure. Our telemetry unit implemented an education program for heart failure patients aimed at home self-assessment, maintenance of optimal health, and prevention of readmission. **Method:** Heart failure patients on our telemetry unit received daily education from our charge nurses using the teach-back method and a 3-zone daily self-assessment tool. Patients were taught to recognize a state of optimum health (green zone), the presence of warning signs (yellow zone), and the need for emergent care (red zone). Routine daily home scenarios were presented. All-cause 30-day heart failure readmission rates were retrieved from retrospective hospital financial data. The study was granted exemption from our institutional review board. A χ^2 analysis was used to compare readmission rates before and after the intervention. The level of significance was set at $P < .05$. **Results:** The heart failure patient education program was implemented in January 2013. During the 24-month preintervention period (January 2011-December 2012), a total of 575 patients were discharged with a primary diagnosis of heart failure. Of these patients, 109 (19.0%) were readmitted for all causes within 30 days of discharge. During the 6-month period after the intervention (January 2013-July 2013), a total of 144 patients were discharged with a primary diagnosis of heart failure. Of these patients, 13 (9.0%) were readmitted for all causes within 30 days of discharge. Chi-square analysis revealed a significant decrease in readmission rate from before to after the intervention. **Conclusion:** Our results demonstrate that the teach-back method for educating heart failure patients in the use of a 3-zone daily self-assessment tool can

reduce 30-day all-cause readmissions. It is essential to provide patients with the information and resources they need for monitoring their health. Effective education of patients at the bedside can be an important component in hospitals' efforts to reduce readmission rates.

RS41 Identifying Current Practice Patterns in US Hospitals' Therapeutic Hypothermia Protocols

Roksolana Starodub, Barbara Riegel, Marion Leary, Benjamin Abella; University of Pennsylvania School of Nursing, Philadelphia

Purpose: We examined therapeutic hypothermia (TH) protocols from US hospitals to assess congruence between current practice patterns and American Heart Association (AHA)-identified parameters of successful postarrest care. **Background:** The mortality rate for out-of-hospital cardiac arrest (CA) in the United States has remained stable for the past 3 decades. TH improves patients' survival and neurologic recovery after CA. AHA has published recommendations for TH, but little is known about how well they are followed. Despite these recommendations, studies have revealed little uniformity in specific aspects of postarrest care, and the scope of this variability remains unknown. **Method:** TH protocols were obtained from a publicly available internet site maintained by the University of Pennsylvania (last updated January 23, 2013). Protocols from US hospitals were included if they targeted patients who were 18 years of age and were written in English. Those addressing out-of-hospital emergency services (EMS) were excluded; 64 protocols fit the inclusion criteria and were selected for review. A single investigator reviewed and scored all TH protocols on the basis of (1) duration of TH, (2) TH target temperature, (3) rewarming target temperature, and (4) rate of rewarming. Percentages and ranges were used to describe the results. **Results:** AHA recommends 12-24 hours of mild (32°C-34°C) TH for patients who had an out-of-hospital CA and were admitted to the hospital in ventricular fibrillation, followed by slow rewarming at 0.25°C to 0.5°C per hour. In this sample, definitions of the 24-hour cooling period initiation and rates of rewarming were inconsistent. In 27/64 (42%), initiation of the 24-hour cooling period was considered as the time point of cooling induction, whereas in 37/64 (58%), it was considered as the time in which target temperature was achieved. The rewarming rate was <0.5°C per hour in 32/64 (50%) and 0.5°-1°C per hour in 25/64 (39%). All 64 protocols included the same target temperature range for cooling (32°-34°C) and rewarming (36°-37°C). **Conclusion:** Current practice

patterns in US hospitals' TH protocols are not consistent. The AHA needs to provide more precise TH protocol guidance for US hospitals. TH protocols mirror the gaps in TH knowledge presented in the guidelines. Further investigation of clinical practice pertaining to hospital-based TH is needed.

RS42 Reported Practices of Nurse Recognition and Management of Patient Ventilator Asynchrony

Karen Mellott, Annette De Vito Dabbs; University of Texas, Health Science Center at Houston

Purpose: To determine (1) nurses' opinions and knowledge of recognition and management of patient ventilator asynchrony (PVA), and (2) nurses' opinions regarding learning preferences and barriers to using waveform graphics to recognize and manage PVA. **Background:** PVA results in fear/anxiety/discomfort, hypoxemia, cardiovascular compromise, impaired sleep quality, prolonged mechanical ventilation and hospital stay, and possible injury of the diaphragm. Staff nurses learn basic ventilator function, but their knowledge of PVA assessment and management may be inadequate. Respiratory therapists usually manage the ventilator, and nurses typically do not have expertise in this area. Empirical evidence of nurses' ability to assess and manage PVA is lacking. **Method:** A descriptive, cross-sectional design with a 37-item anonymous Web-based survey was used to elicit nurses' opinions; knowledge of PVA recognition, causes, manifestations, consequences, and management; and open-ended comments. The survey was based on literature, previous pilot work, and expert consultation. A convenience sample from the American Association of Critical-Care Nurses membership was recruited through a weekly e-newsletter. Inclusion criteria were age > 18 years and active nursing practice with patients receiving mechanical ventilation. The survey was posted for 9 weeks, maintained and downloaded by the University of Pittsburgh Center for Social and Urban Research. **Results:** Data reported here are from complete surveys (n = 266). A Wilcoxon signed-rank test showed that after survey, we elicited a statistically significant change in self-evaluation scores ($P < .001$). Nurses did not select forced exhalation, retractions as manifestations. Only 11% determine PVA type and 29% do not use graphics to interpret PVA. Graphic waveforms were identified for flow (51%), premature termination (41%), and ineffective trigger (34%). Proper management was identified 64%-76% of the time. Most helpful resources were from practice (44%) and dialogue with the respiratory therapist (42%) and physician (32%). Reported barriers to graphic use were the intensive care unit lacking

protocols (81%) and decreased confidence (64%). **Conclusion:** Nurses have a need to learn PVA recognition through behavioral and technological monitoring. Interactive and interprofessional ventilator rounds including patient and graphic assessment as well as ventilator/sedation management would optimize the care of patients receiving mechanical ventilation. Future areas for research are barrier reduction and development of guidelines/protocols to better integrate use of PVA data in nursing practice.

RS43 Feasibility and Safety of Implementing a Nurse-Driven Short-Term Intubation Swallowing Screening After Extubation in a Medical Intensive Care Unit

Patricia McCabe; Washington Hospital Center, Washington, DC

Purpose: To assess the feasibility and safety outcomes of an evidence-based, nurse-driven, short-term intubation swallowing screening protocol for critical care patients intubated < 48 hours. The secondary aims are to assess length of stay and patient care costs in a medical intensive care unit (MICU).

Background: In 2010, one-third of the short-term intubated patients were seen by speech language pathologists and received a swallowing evaluation. Two-thirds of patients were screened by nurses using various swallowing evaluations. This study will facilitate the use of a safe evidence-based standardized swallowing screening to evaluate all short-term intubated patients. The study will contribute additional significant evidence related to dysphagia after extubation and nurse-driven stroke swallowing protocols. **Method:** Our descriptive-exploratory study will include a convenience sample of 100 adult patients intubated < 48 hours in a 14-bed MICU. Nurses trained to perform swallowing screenings will assess and conduct the short-term intubation swallowing screening protocol modified from an established protocol for stroke patients. Feasibility will be measured at each protocol step. Safety will be measured by the number of patients who do not exhibit dysphagia during the screening process and eat their first meal without dysphagia. Data analysis will use descriptive statistics to assess feasibility and safety. Parametric or nonparametric proportions or means tests will be used to assess length of stay and patients' cost variables. **Results:** Eighty patients passed the screening, 11 failed and 126 did not receive the screening because they met the exclusion criteria. The screening is technically easy to administer and decreases the patient's length of stay and hospitalization costs by at least \$600. Safety outcomes were assessed by measuring the number of

patients who did not exhibit dysphagia after screening and eating their first meal. No incidence of aspiration was noted with the patients who passed the screening. **Conclusion:** The MICU short-term intubation nursing swallowing screening is easily administered to patients in an intensive care setting. Patients stated satisfaction at being able to quickly eat and/or drink rather than waiting for a formal swallowing evaluation to be administered to determine the risk of dysphagia/aspiration. The unit experienced a decrease in length of stay and patients' costs.

RS44 The Effect of Carriers on Continuous Intravenous Drug Infusions in Pediatric Patients

Amy Lisanti, Richard Lin, Michael Hamid; The Children's Hospital of Philadelphia, Philadelphia, PA

Purpose: Current nursing practice in our pediatric cardiac intensive care unit for administration of continuous intravenous drug infusions (CIDs) is based on unit tradition and has not been validated through research. The setup uses a manifold system that includes a crystalloid solution that acts as a carrier to assist in delivering the drug. The purpose of this study was to examine the effect of a carrier on CIDI administration and compare infusion administration via a manifold system and via a bifuse system. **Background:** No standard protocols for practice exist at our hospital for CIDI administration. No research was found elucidating how carriers affect drug delivery when administered intravenously at low, pediatric rates. A carrier may act as an additional port of entry for bacteria into a patient's central catheter, increasing the patient's risk for infection. Carriers also add to the total volume infused. In critically ill neonates with tight fluid restrictions, use of a carrier can reduce the number of calories they can receive. **Method:** We developed a bench model to simulate CIDI administration via a manifold and a bifuse system, with and without a separate carrier. A solution of methylene blue dye was used to simulate the CIDI. We monitored dye absorption with a flow spectrophotometer as a surrogate of drug concentration and monitored mass flow rate with a scale. Experiments were performed by using different flow rates of CIDI and carrier. By analyzing concentration over time graphs, we were able to characterize the length of time it took for the system to reach a steady state absorption (and thus dye concentration). **Results:** Our model of CIDI administration was successful at evaluating drug delivery over time. Data demonstrated that the time to steady state decreases as the infusion rate of the drug increases. A carrier decreased the time to steady

state at the start of the infusion within the manifold system. However, the time to reach steady state was shorter in the bifuse system, even without the use of a carrier, compared with a manifold system using a carrier. Other experiments suggested that there may be variation in dye concentration from interaction among infusion pumps when a carrier was used.

Conclusion: Based on the findings of this study, CIDI administration via a manifold system with a carrier appears to be less effective than a bifuse system with or without a carrier. The recommendation to change practice based on this study was made and our cardiac intensive care unit has switched to the bifuse system. This change in practice has standardized the care in the hospital for the administration of CIDs. The results of this study may help guide other hospitals on effective CIDI administration.

RS45 Factors Associated With Increased Laboratory Utilization in the Pediatric Cardiac Intensive Care Unit

Anna Fisk, Jean Connor, Sandra Mott, Kimberlee Gauvreau, Hillary Kuzdeba; Boston Children's Hospital, Boston, MA

Purpose: To identify and describe factors associated with increased laboratory utilization. **Background:** The appropriate frequency of laboratory testing in the pediatric cardiac intensive care unit (PCICU) is unknown. Excessive laboratory tests can have harmful effects such as iatrogenic anemia, administration of unnecessary medications, and increased risk of infection. Abnormal results in asymptomatic patients may be treated without synthesis of other patient data incurring costs for medication, retesting, and staff resources. Iatrogenic anemia may require blood transfusion, a risk factor for poor patient outcomes.

Method: Retrospective chart review of patients birth to <18 years of age admitted to the CICU after repair of congenital heart defects. Excluded were patients with a ventricular assist device, pacemaker placement, ligation of a patent ductus arteriosus, or failure to separate from cardiopulmonary bypass requiring extracorporeal membrane oxygenation. Demographic, clinical descriptors, The risk-adjusted classification for congenital heart surgery (RACHS-1) risk categories along with laboratory utilization in the first 48 hours after surgical repair were abstracted from the medical record. High laboratory use was defined as the top 10% of patients with the highest numbers of laboratory tests. Descriptive statistics were used to summarize characteristics and laboratory use.

Results: Age was a significant predictor of high laboratory use, with younger patients experiencing increased laboratory use ($P < .001$). Race, sex, and

insurance type were not significant. Multivariate analysis at the patient level demonstrated that bypass time >120 minutes was significantly associated with high laboratory use ($P < .001$) and RACHS-1 category 6 patients were 34.7 times more likely to have high laboratory use ($P < .001$). The area under the receiver operating characteristic (ROC) curve was 0.855. At the shift level, the model demonstrated significant nurse-related factors including nurses with 3-5 years of experience ($P = .004$) and those precepting new staff ($P = .02$). In this model, the area under the ROC curve was 0.72. **Conclusion:** Results confirmed the hypothesis that increased postoperative acuity is associated with increased laboratory utilization. Factors contributing to utilization were RACH-1 score of 4-6, young age, and bypass time > 120 minutes. Findings related to nurse experience and preceptor status warrant future investigation. These results will be used to inform an interdisciplinary group on standardization of postoperative laboratory utilization in the PCICU.

RS46 Critical Care Nurses Report More Positive Attitudes and Readiness to Engage in Research and Evidence-Based Practice

Lorraine Evangelista, Tykeysha Thomas; University of California, Irvine

Purpose: The use of evidence to guide nursing practice has received much attention in recent years. However, many nurses are reluctant to embrace evidence-based practice (EBP) as they provide patient care. Likewise, data to guide development of effective strategies to engage nurses in research and EBP are limited. The aims of this descriptive, cross-sectional study were to (1) assess registered nurses' attitudes and readiness for research and EBP and (2) identify factors that affect adoption of and engagement in clinical inquiry. **Background:** The Institute of Medicine has supported the need to restructure health care delivery to create systems that are both patient-centered and evidence-based. Despite the growing need to move toward instituting EBP, the nursing profession faces challenges with implementing a culture of clinical inquiry and continual learning at the bedside. A better understanding of nurses' attitudes and readiness for research and EBP may be key to planning effective strategies for empowering nurses to embrace a spirit of inquiry. **Method:** The study received exemption for full review from the institutional review board; 388 registered nurses completed a comprehensive 4-part questionnaire. Part I collected demographic data such as sex, age, race, years as a nurse, education, and nursing unit (critical care vs non-critical care). Part II (10 items)

used a 5-point Likert scale with which respondents indicated their agreement or disagreement with statements reflecting attitudes toward nursing research. Part III (7 items) measured perceptions related to EBP by using the 5-point Likert Scale from part II. Part IV (5 items) was adopted from the Nursing EBP Survey to assess EBP culture. **Results:** Most respondents (86%) agreed that research should guide nursing practice and will improve patient care. Similarly, 83% thought that EBP was essential to nursing practice and 78% thought it was useful in daily practice. However, only 64% and 73% thought that they could engage in research and EBP, respectively. Critical care nurses and nurses with a bachelor's or master's degree in nursing had more positive attitudes toward and were more likely than their counterparts to engage in research and EBP (all P 's < .001). Although older and more experienced nurses had more positive attitudes toward research and EBP, younger and less clinically experienced nurses were more likely to engage in a spirit of inquiry (all P 's < .05). **Conclusion:** Our data highlight the need for further education and training for nurses to improve attitudes toward clinical inquiry. Nevertheless, the elements vital to adopting best evidence into practice (eg, positive attitudes, supportive culture) were present and can serve as the foundation for designing an EBP program for our facility. Certain nursing characteristics (eg, younger age, higher education, critical care experience) may affect adoption of research and EBP and warrant further study.

RS47 Examining the Predictors of Hospital Disposition and Functional Status After Stroke

Lisa Licon; Hoag Hospital, Newport Beach, CA

Purpose: To examine predictive factors for disposition after acute stroke. Early evaluation from physical therapy, occupational therapy, and speech therapy is important in determining the discharge disposition of the stroke patient. Considering predicting factors, such as comorbid conditions, prior strokes, and previous level of function using the modified Rankin Scale will help to expedite a comprehensive discharge plan for stroke patients. **Background:** Stroke remains a leading cause of functional impairments, with 20% of survivors requiring institutional care and up to 30% remaining permanently disabled after 3 months. However, few studies have investigated the predictive factors for disposition after acute stroke. Predictive factors may be used to determine the stroke patients with the most comorbid conditions to evaluate early intervention in order to determine discharge disposition. **Method:** A retrospective chart review of subjects who survived to hospital

discharge ($N = 236$) between June 1, 2012, and December 31, 2012, was conducted to measure 1- and 3-month outcomes (functional status, measured using the Modified Rankin Scale and discharge disposition classified in 5 categories: [1] home with no services, [2] home with home health, [3] acute rehabilitation, [4] skilled nursing facility, and [5] hospice). **Results:** Mean (SD) for age, comorbid conditions, and length of stay were 75.9 (13.7), 4.3 (5.2), 1.8 (2.0), respectively. Most were white (82%), female (51%), and married (52%); 44% were discharged home. The remaining patients were discharged home with home health (14%), acute rehabilitation (19.5%), skilled nursing facility (20%), and hospice (2.5%). Age, comorbid conditions, length of stay, and functional status on admission and at the time of discharge were significantly associated with discharge disposition and functional status at 3 months. In a multivariate analysis, older age, length of stay, number of comorbid conditions, and functional status on admission and discharge accounted for 76% and 64% of the variance in functional status at 1 month and 3 months, respectively. **Conclusion:** Our findings show that most stroke survivors are discharged home with no additional services, but a third of the patients benefited from additional home health care and acute rehabilitation services after hospital discharge. Patients with reduced functional status before the index stroke, older age, and increased length of stay, number of comorbid conditions, and level of disability after the stroke warrant increased scrutiny.

RS48 Poor Nutritional Intake and Malnutrition in Obese Patients With Heart Failure

Lorraine Evangelista; University of California, Irvine

Purpose: To identify the food and nutrient intake of the Pro-HEART trial participants and compare participant intake with national guidelines. **Background:** Poor nutritional status and unintentional cachexia have a strong association with survival in patients with heart failure. However, little research has described the dietary patterns of obese patients with chronic heart failure. **Method:** Pro-HEART is a clinical trial designed to evaluate the short-term and long-term effects of a high protein vs standard protein diet on body weight and adiposity and other health outcomes in overweight and obese patients with heart failure, complicated with diabetes and/or metabolic syndrome. Baseline food consumption for this cross-sectional analysis was assessed by using a validated 3-day food record. **Results:** Among 53 participants, a mean of 41% of the participants exceeded the recommended percentage of calories

from fat (20%-35% of daily calories), 73% exceeded the saturated fat recommendation (10% of daily calories), and 95% consumed too much sodium (2300 mg). Also, many did not meet the minimum recommended servings of several micronutrients and minerals that influence the underlying inflammatory processes associated with the catabolism of protein-based tissues and altered metabolism that characterizes heart failure. **Conclusion:** Our findings showed that obese patients with heart failure

exceeded recommended intake of fat and sodium. Likewise, data suggest that obese patients with heart failure are at risk for poor nutritional intake of key micronutrients and minerals essential for slowing disease progression and confirm that patients who do not appear cachectic may still be at risk for malnutrition. Thus, the risk for poor nutritional intake should be considered in all patients with heart failure, regardless of whether they appear malnourished or not.