RESEARCH ORAL POSTER PRESENTATION AWARD WINNERS

RS1 Aspiration and Ventilator-Associated Conditions With 2 Types of Endotracheal Tubes

Mary Lou Sole, Aurea Middleton, Melody Bennett, Lara Deaton; University of Central Florida, Orlando, FL

Purpose: Patients with an endotracheal tube (ETT) for mechanical ventilation often aspirate secretions around the cuff of the ETT, which can lead to ventilator-associated conditions (VACs). A subglottic suction ETT (SS-ETT) is available to facilitate removal of these secretions from above the cuff via continuous or intermittent suction. Many facilities regularly insert the SS-ETT. The study purpose was to compare VACs and tracheal amylase levels in patients with a regular ETT and those with an SS-ETT. **Background:** Practice guidelines recommend that an SS-ETT be inserted to reduce the risk of aspiration and ventilator-associated pneumonia (VAP). The SS-ETT has an extra suction port designed to remove secretions that accumulate above the cuff. Studies have shown reduced rates of VAP with SS-ETT use, but no data related to VACs, a current outcome measure. α-Amylase is a newer marker of aspiration that may also be used to assess effectiveness of an SS-ETT. **Method:** This was a retrospective, comparative study of data from an ongoing nursing intervention trial. Participants were older than 18 years, undergoing mechanical ventilation, and enrolled within 24 hours of intubation. Standard oral care was provided every 4 hours as part of study interventions. At baseline and every 12 hours, oral and tracheal specimens were collected to measure α-amylase level as a biomarker of aspiration of oral secretions. Amylase was analyzed using standard laboratory methods; a value of more than 396 U/L was considered positive. VAC was classified on the basis of the Centers for Disease Control and Prevention National Healthcare Safety Network surveillance criteria. VAC data were analyzed by χ^2 analysis, and amylase data were analyzed using median tests. **Results:** No differences in aspiration and VACs were noted between the regular and SS-ETT. Clinically, amylase values and VAC rates were lower with the SS-ETT. The lack of significant findings may be due to the various causes of VACs and the standard oral care provided. Findings indicate that aspiration of oral secretions occurs around the cuff of both types of ETT. Additional interventions to maximize secretion removal in patients with an SS-ETT, and strategies to maintain ETT cuff pressure, may be needed.

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RS2 Comparison of Level of Agreement for 3 Temperature-Measurement Devices and Methods

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Purpose: The primary aim of this study was to compare temperature readings from a nondisposable electronic oral thermometer with those from a temporal artery thermometer, a nondisposable axillary thermometer, and a disposable thermometer, using both the oral and axillary routes in acute care trauma patients with and without fever. We hypothesized that the temperature readings would not differ among the devices regardless of body temperature. **Background:** Body temperature is routinely assessed in acutely ill hospitalized patients, and accurate measurements are essential to guide diagnosis and treatment. Frequently, trauma patients have contraindications to oral temperature monitoring, and methods such as temperature measurement at the temporal artery may be beneficial. Additionally, disposable thermometers for patients in isolation may be preferred to prevent spread of infection. Little is known about the accuracy of these devices in acutely ill trauma patients. **Method:** The Bland-Altman comparison method was used to determine level of agreement between temperature measurement devices and methods. A convenience sample of 70 patients from a level I trauma acute care unit was used. Patients were included who were at least 18 years old, had no contraindications for thermometer placement, and could follow verbal instructions. A total of 6 single temperatures were taken in the same order by 4 trained staff nurses. First, the temporal artery temperature was taken, then body temperature was measured with the following thermometers: the reference nondisposable electronic oral, the nondisposable electronic oral from the patient's room, the disposable oral, the disposable axillary, and the nondisposable electronic axillary from the patient's room. **Results:** Compared with the nondisposable electronic oral thermometer, the temporal artery device overestimated temperature and the disposable axillary thermometer underestimated temperature. Although not statistically significant, the disposable oral and nondisposable axillary thermometers had clinically important wide limits of agreement. Overall, for acutely ill hospitalized trauma patients, temporal artery thermometers and disposable thermometers for axillary temperature are not recommended.

RS3 Assessment of Decision-Making of Nurses Who Activate the Rapid Response Team

Gary Bouley, Janet Parkosewich; Yale New Haven Hospital, New Haven, CT

Purpose: Timely activation of the rapid response team (RRT) depends on nurses' willingness and ability to make the call. This study's purpose was to examine nurses' decision-making regarding RRT activation. The following questions were asked: (1) What are nurses' perceptions about their ability to call the RRT? (2) What triggers nurses' decision to call the RRT? (3) Who is involved in making the decision to call the RRT? (4) What factors are associated with nurses making the decision to call the RRT independently? **Background:** RRTs are activated to manage patients with deteriorating conditions to prevent cardiac and/or respiratory arrest. The decision to call the RRT is complex. Nurses' inability to make the decision to call the RRT independently leads to delays in lifesaving care. To our knowledge, no studies examining nurses' RRT decision-making have used multivariate analysis to adjust for covariates affecting this decision (ie, confidence to do so without validation from others, years of nursing experience, educational preparation). **Method:** A cross-sectional study design was used with a convenience sample of 245 medical-surgical nurses (mean age, 34.4 years; mean years in practice, 6.9) who worked 24 to 40 hours per week at a 1541-bed Magnet hospital. A 30-item electronic survey with 4-point Likert scale responses was created, and face validity was determined by a panel of experts. Institutional review board approval was received. Nurses' informed consent was indicated by survey completion. Statistically significant demographic, nurse perception, and RRT trigger variables ($P < .10$ in the bivariate analyses) were selected for entry in the logistic regression model to determine factors associated with the nurses' decision to call the RRT independently. **Results:** Although nurses reported feeling confident with independent RRT decision-making, they often consulted other nurses. Activating the RRT is an infrequent decision, which may create this need. Nurses should value their intuition and take action to call the RRT for assistance. Medical staff's lack of responsiveness to nurses' concerns is a powerful trigger for independent RRT activation by nurses, suggesting that efforts need to be made to improve collaborative planning to manage patients' urgent needs.

RS4 Health Professionals' Perceived Knowledge, Attitudes, and Behaviors Regarding Palliative and End-of-Life Care

Deborah Price, Jillian Grabowski, Marcos Montagnini, Linda Strodtman; University of Michigan Health System, Ann Arbor, MI

Purpose: To complete a comprehensive baseline assessment using a validated assessment tool across health care disciplines to identify self-perceived deficits in providing competent palliative and end-of-life (EOL) care to hospitalized patients. The aims of this study were to assess health care professionals' knowledge, attitudes, and behaviors regarding the provision of palliative/EOL care to hospitalized patients around 7 palliative/EOL care domains. **Background:** Quality palliative/EOL care is a dynamic process moderated by individual values, knowledge, and preferences for care. The perception of a low level of competence or of discomfort can adversely affect palliative/EOL care provided to the dying. These skills are rarely natural and must be first assessed, then learned. The need to address complex illness care requires that clinical staff recognize the limits of their professional expertise and the need for collaboration across disciplines. **Method:** This descriptive study electronically surveyed participants using the End-of-Life Questionnaire (EOLQ). The EOLQ consists of 28 specific questions about knowledge, skills, and attitudes, with subscale items related to the 7 domains of palliative/EOL care. The survey includes 10 demographic items and 4 open-ended questions to ascertain issues deemed important by participants. Interdisciplinary professionals from 25 pediatric and adult hospital units participated in the study. Quantitative data analysis was descriptive and correlational. Qualitative data analysis identified themes and subthemes of participants' concerns. **Results:** Educational needs related to palliative/EOL care may differ depending on the acuity level, unit population, and experience of staff. Interventions should be focused on improving communication, collaboration, and decision-making behaviors among the disciplines, with earlier palliative care consultation. This study provided baseline measurements and direction to new research initiatives in the provision of palliative/EOL care.
Institutional review board approval no. HUM 00100263 (5/1/15).

RESEARCH POSTERS

RS5 The Patient's Perspective of the Intensive Care Unit (ICU) Diary in the Cardiac ICU

Melanie Nedder, Kathleen Ryan-Avery, Karen Reilly, Sharon Levine; Brigham & Women's Hospital, Boston, MA

Purpose: To explore the patient's perceptions of an intensive care unit (ICU) diary kept by family, friends, and nursing staff during their stay in the cardiac intensive care unit (CICU). **Background:** Many patients who survive an ICU admission have postintensive care syndrome (PICS) and face long-term physical, cognitive, and mental health impairments. ICU diaries are an effective reality-sorting strategy to help combat confusing memories and decrease mental health impairments related to an ICU stay. Most of the research on ICU diaries is from

European medical and surgical ICU populations. This study focuses on the population of a CICU in the United States. **Method:** The study "The Patients' Perspective of the ICU Diary in the CCU," approved by the institutional review board, used a descriptive qualitative design to explore patients' perception of the ICU diary in the CCU. English-speaking patients in the CICU who were intubated for more than 24 hours who had no history of PICS or posttraumatic stress disorder were eligible. Diary entries were made by family, friends, and nurses during the patient's ICU stay. Study participants received a follow-up visit 1 week after ICU discharge to review the study and confirm consent. Patients were interviewed by telephone 2 months after hospital discharge; open-ended questions were used to explore their perceptions of the ICU diary. The responses were analyzed and coded to identify common themes. **Results:** The findings are consistent with previous research showing that ICU diaries are useful reality-sorting tools for patients after discharge from other ICUs. The results suggest that patients in CICUs in the United States may also benefit from ICU diaries. Additional research is needed to examine further the impact of ICU diaries on PICS in the CICU population.

RS6 Comparison of 2 Endotracheal-Tube-Cleaning Devices in Reducing Airway Resistance for Patients Undergoing Mechanical Ventilation

Linda Schofield, Nicholas Prevo; McLaren Northern Michigan, Petoskey, MI

Purpose: The primary objective of this study was to determine the noninferiority of the new Mucus Shaver (MS) device in daily removal of adherent endotracheal tube (ETT) secretions before weaning trials compared with the endOclear Restore device (ERD). The MS device is a flexible, sterile, single-use, concentric inflatable catheter, and the ERD is a rigid, sterile, single-use, mechanically operated wiper. **Background:** Mechanical ventilation is an essential, lifesaving therapy for patients with critical illness and respiratory failure. Researchers have estimated that more than 800 000 patients receive mechanical ventilation in the United States each year. These patients are at high risk for complications and poor outcomes, including death. ETT intraluminal volume loss due to mucus and biofilm is associated with longer duration of mechanical ventilation and increased imposed work of breathing. **Method:** This noninferiority, prospective, randomized, controlled, single-center study to evaluate the efficacy of the MS device (study group) compared with the ERD (control group) was approved by the institutional review board. The primary end point of this study was the detection of a difference in airway resistance reduction (ΔRaw) from before to after the cleaning maneuver no greater than 3 cm H_2O/L/s between the 2 treatment groups. Based on our previous study, a ΔRaw of 3 cm H_2O/L/s or less between the 2 groups can be considered not clinically relevant. A sample size of 170 patients was calculated for power of 90% with a 2-sided α of 0.05. **Results:** The MS device is as effective as the ERD at removing adherent secretions from the ETT before weaning trials, resulting in lower ETT resistance and, therefore, decreased work of breathing for patients after treatment with either device. Cleaning the ETT should be considered part of the daily ventilator-care processes and should be done before spontaneous breathing trials.

RS7 They Looked Clean to Me! Cleaning Reusable Electrocardiogram Leads Using a Standardized Protocol

Crystal Sanchez, Jessica Reeb, Lacie Masi; University of New Mexico Hospital, Albuquerque, NM

Purpose: To compare the effects of a standardized evidence-based cleaning protocol versus nonstandardized cleaning methods on the amount of biological residue on reusable electrocardiography (ECG) leads. Can an intervention involving a cleaning protocol reduce the amount of biological residue to an acceptable level? **Background:** The lifespan of microbes allows biological debris to remain on medical equipment for months, serving as potential vectors of hospital-acquired infections. Reusable ECG leads frequently come into contact with skin, placing patients with impaired skin integrity at risk for infection. A large public hospital did not have a hospital-wide established protocol for cleaning ECG leads, which can lead to potential inconsistencies in cleaning methods both across units and among unit personnel. **Method:** Randomly selected and cleaned ECG leads were tested from an intensive care unit (unit A) and 3 progressive care units (units B, C, and D). The intervention protocol was implemented in unit A. Staff were trained on proper use of the 2-step cleaning process using mechanical debridement, performed with a chlorhexidine surgical brush, followed by a chemical cleaning with bleach wipes. Units B, C, and D staff continued to use unit-specific cleaning methods. ECG wires and clips were swabbed and then tested using a luminometer to determine levels of adenosine triphosphate to identify the presence of microbial debris on the telemetry leads. A passing grade was a reading of less than 500 reflective light units. **Results:** Disposable ECG leads can be costly, and many hospitals still use reusable ECG leads. This study shows that the use of a standardized cleaning protocol is effective in reducing the amount of biological residue on ECG leads to an acceptable level. Current unit-specific

cleaning methods have varied results. Implementing a standardized cleaning protocol may reduce patients' exposure to microorganisms and, potentially, the risk of hospital-acquired infections.

RS8 Accuracy of In-Bed Weights Versus Stand-Up Weights in Patients With Congestive Heart Failure

Jeannine Johnson, Amanda Sanders, Katherine Herbst, Christopher Erfourth; St John Hospital and Medical Center, Detroit, MI

Purpose: To evaluate the agreement among weights obtained with an in-bed scale by caregivers and recorded in the medical record, with an in-bed scale by investigators following a standardized protocol, and with an in-bed scale by investigators after bed recalibration following a standardized protocol as compared with weights obtained with a stand-up, bedside scale. **Background:** Most institutions rely on changes in daily weights as the best approach to estimating fluid balance in hospitalized patients with heart failure. Despite in-bed scales being accurate for weight measurement, experts have cautioned clinicians that lack of standardization in how the weights are obtained could be a significant contributor to errors in weight measurement. Other sources of measurement error could be from calibration drift over time and/or inappropriate preadmission calibration. **Method:** A prospective, method-comparison study design was used to compare patients' weights measured by using 3 different methods (in-bed weight done by the caregiver and recorded in the medical record; in-bed weight obtained with a standardized protocol; in-bed weight obtained with a standardized protocol after bed recalibration) with the clinical reference standard of a stand-up scale weight. Each patient had weight measurements done with all methods within 20 minutes. Differences and limits of agreement between weight measurement methods were calculated and graphed according to the Bland-Altman method. Data were analyzed with paired *t* tests. Level of significance was set at $P < .05$. **Results:** Weight discrepancies were largest for weights recorded in the medical record by the caregiver, indicating a lack of attention to standardization of linen and/or equipment. The only accurate weighing method was when recalibration was done immediately before weighing, indicating that weight discrepancies occurred either because the bed was calibrated incorrectly before admission and/or calibration drift occurred over time. If knowledge of weight changes is important for clinical management, stand-up scales should be used, if possible.

RS9 Evaluation of Dwell Time for Field Intravenous Catheter Starts for Geriatric Patients With Blunt Trauma

Darcy Day, Francisco Conde; The Queen's Medical Center, Honolulu, HI

Purpose: The Centers for Disease Control and Prevention recommends replacing peripheral intravenous catheters (PIVs) within 48 hours if "placed under emergency conditions where adherence to aseptic technique cannot be assured." This recommendation, although sensible, is not specific to field PIV starts or to geriatric patients with trauma. The purpose of this study was to evaluate dwell time of 2 days or less versus more than 2 days for development of signs of sepsis in geriatric patients with blunt trauma who had a PIV started in the field. **Background:** A recent Cochrane review advised replacing PIVs for clinical indications only, versus routinely, but excluded or did not discuss PIVs started before the patient arrives at the hospital. Maintaining aseptic technique in the field in difficult environmental conditions can be challenging. Trauma may predispose patients to immunosuppression. Geriatric patients may be unable to mount a vigorous response to infection. Replacement time to minimize sepsis risk with field PIV starts for geriatric patients with blunt trauma is unclear. **Method:** Patients with blunt trauma who were older than 64 years were eligible for this retrospective case-series analysis. Data obtained from the Trauma Registry and electronic medical records consisted of demographics, trauma characteristics, vital signs, Glasgow Coma Scale (GCS) score, and PIV data. The Quick Sequential Organ Failure Assessment (qSOFA) score was used to describe potential sepsis and was analyzed relative to PIV dwell time. The Surviving Sepsis Campaign guidelines define a positive qSOFA score as 2 of the 3 following data points: respiratory rate faster than 21/min, systolic blood pressure less than 101 mm Hg, GCS score less than 14. Pearson χ^2 and Fisher exact tests were used for data analysis with statistical significance set at .05. **Results:** Dwell time of more than 2 days for PIVs initiated in the field for geriatric patients with blunt trauma led not to an increase in the percentage of positive qSOFA scores, but rather to the opposite. Consistent with previous studies, these data support consideration of longer PIV dwell times, which may increase patients' comfort by decreasing invasive procedures and may decrease staff workload with potential cost savings. Further studies of field PIV dwell time and geriatric patients with trauma are needed.

RS10 Evaluating Sleep in a Surgical Trauma Burn Intensive Care Unit: An Elusive Dilemma

Claire Du, Heather Trinks, Theresa Simons, Luella Glanzer; University of Virginia Health System, Charlottesville, VA

Purpose: To determine the perceived quality of sleep in critically ill patients in a surgical trauma

burn intensive care unit (ICU) and to identify common elements that disrupt sleep. Patients in ICUs are highly vulnerable to the negative effects of poor sleep environments. Accordingly, identification of patients' perceptions of the sleep experience is crucial to implementing practices that promote feelings of rest and sleep in ICUs. **Background:** The literature demonstrates that sleep is a vital function for healing and surviving a critical illness. Sleep deprivation can cause weakened immune systems, delirium, extended ICU stays, and worsened outcomes. Causes of sleep deprivation during hospitalization include factors such as noise, pain, and medications. Some causes cannot be readily resolved, but many of them can be alleviated with education and targeted interventions. **Method:** After the study was approved by the institutional review board, patients were screened to meet inclusion criteria. Patients were administered the 6-question Richard Campbell Sleep Questionnaire (RCSQ), consisting of a 0 to 100 scale, with a low score indicating poor sleep quality. Patients were also asked an open-ended question to attain their perceptions of what affected their sleep experience. A total RCSQ score was calculated for each patient. Descriptive statistics were computed for each RCSQ question and element of demographic information. Correlations were explored between RCSQ scores and demographic information. Qualitative analyses were performed on the open-ended question to identify primary themes. **Results:** Overall, participants reported their sleep quality as poor. Although patients fell asleep quickly, they recounted sleeping lightly. Once awakened, patients struggled to get back to sleep. The results show opportunity for targeted interventions in ICUs to improve sleep quality. Potential interventions may include reducing noxious stimuli, increasing comfort, and improving pain control. A sleep bundle would assist nurses to initiate measures to limit interruptions and improve overall sleep quality.

RS11 Clinical Trial of an Educational Program to Decrease Monitor Alarms in a Medical Intensive Care Unit

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Purpose: Despite calls by national regulatory groups and professional associations urging clinicians to decrease monitor alarms, limited clinical research has been conducted to identify effective interventions for decreasing false alarms. The study objective was to determine if a staff educational program on individualizing alarm settings on bedside physiological monitors decreased alarms in a medical intensive care unit (ICU). **Background:** Bedside monitor alarms are designed to alert nursing staff to a physiological change in a patient's condition requiring investigation and/or situations requiring intervention. Some alarm signals also occur when there are no actual clinical problems. High frequency of the latter can desensitize staff's reaction to alarms. This situation, called "alarm fatigue," may cause staff to react more slowly to alarm signals or to ignore them altogether. **Method:** A pretest/posttest, nonequivalent group design was used to evaluate an educational program on alarm management to reduce alarms in a convenience sample of registered nurses employed on the medical ICU. Nursing staff received a 15-minute educational session on the importance of preventing nuisance alarms and the need to personalize alarm limits to each patient's clinical situation provided during 1 week. Low-oxygen-saturation alarm history was extracted from monitor computer log files and adjusted by the number of patients per day. Alarm data were collected for 15 days before and after the educational intervention. Data were analyzed with χ^2 analysis, with $P < .05$ considered significant. **Results:** A simple, brief educational program for medical ICU nursing staff on individualizing alarm settings rather than using default alarm values significantly decreased the most common bedside monitor alarm by 39%.

The article "Clinical Trial of an Educational Program to Decrease Monitor Alarms in a Medical Intensive Care Unit" was published in the July-September 2016 issue of *AACN Advanced Critical Care*.

RS12 Prevalence and Characteristics of Infusion Pump Alarms in the Intensive Care Unit: A Retrospective Data Analysis

Rachel Vitoux, Jennifer Lehr, Mark Dekker, Catherine Schuster; B. Braun Medical Inc, Bethlehem, PA

Purpose: To evaluate the prevalence and clinically relevant characteristics of infusion-pump alarms in the intensive care unit (ICU) environment. Alarms were quantified on the basis of frequency, duration, type of alarm, type of infusion, time of day, and day of week. By understanding infusion-pump alarm trends, we can begin to identify strategies to minimize preventable alarms and optimize response to actionable alarms. **Background:** Alarms affect patient safety, healing, and satisfaction and may cause alarm fatigue in clinicians. The technology-laden ICU presents a unique challenge in addressing alarms, with alarm occurrence as high as 45 times per patient per hour and with 77% of alarms ineffective or ignored. Although infusion-pump alarms contribute to approximately 10% to 12% of ICU alarms, compared with other medical device alarms, pump alarms can last the longest and can account for approximately 5% of infusion time. **Method:** Retrospective infusion data were collected for the period from May 2013 through April 2016 from 29 US hospitals (62-942 beds, combination

of adult and pediatric ICUs) using the same model of large-volume infusion pump. For each of the hospitals, up to 18 months of infusion data were collected within an on-site infusion management application and transferred to a central server after being deidentified per the Health Insurance Portability and Accountability Act. ICU data were identified by the programmed drug-library care unit and extracted and analyzed using Microsoft SQL server. **Results:** This study has provided insight into the type and frequency of pump alarms in ICUs across 29 hospitals, suggesting opportunities for awareness and education to potentially decrease unnecessary alarms, such as by adjusting pump configurations, reinforcing best practices to avoid preventable alarms, and assessing weekend staffing and resource support. Future studies could assess the effectiveness of implementing some of these interventions and measure their impact on the frequency of pump alarms.

RS13 Secondary Analysis of CORTRAK-Related Adverse Events in the US Food and Drug Administration's MAUDE Database

Annette Bourgault, Lillian Aguirre; University of Central Florida, Orlando, FL

Purpose: To examine the Manufacturer and User Facility Device Experience (MAUDE) database to identify and describe reported adverse events related to the use of CORTRAK-assisted feeding-tube insertions. Adverse events are any events that cause patient injury or death. The goal of this study was to determine which factors are associated with CORTRAK-related adverse events and make recommendations for clinical practice. **Background:** Blindly inserted feeding tubes are used to provide nutrition for patients; however, lack of valid verification methods is a barrier to safe placement. CORTRAK, an electromagnetic placement device, has shown promising results. CORTRAK is the only device approved by the US Food and Drug Administration (FDA) to confirm placement of blindly inserted feeding tubes in lieu of a radiograph. Some concerns have been expressed that a high level of user expertise may be required for safe use. **Method:** A retrospective, comprehensive, secondary analysis of the FDA MAUDE database was performed to assess adverse CORTRAK events. A total of 273 results were retrieved when *CORPAK* (the manufacturer) was used as a search term; this also captured 80 reports under the heading of CORTRAK. All 273 reports were manually reviewed and an additional 10 unique reports were identified. Thirty-six reports were excluded from the final analysis because they did not meet inclusion criteria. Ninety reports (from January 1, 2006, to February 29, 2016) were included in the final review. A systematic approach was used to review all fields, including clinician and manufacturer comments. **Results:** Lung placement is an inherent risk of all feeding-tube insertions and is not unique to CORTRAK. If lung placement is suspected or known, radiographic confirmation should be performed to assess for pneumothorax. Additionally, institutional policies should encourage confirmation by a second clinician when there is uncertainty about feeding-tube placement. All users require specialized training and must be able to discriminate lung from gastric placement on CORTRAK insertion tracings.
The article "CORTRAK-Assisted Feeding Tube Insertion: A Comprehensive Review of Adverse Events in the MAUDE Database" was published in the March 2017 issue of the *American Journal of Critical Care.*

RS14 Environmental Light and Delirium in the Intensive Care Unit

Paula Cairns, Jason Prater, Cindy Munro, Karel Calero; University of South Florida College of Nusing, Tampa, FL

Purpose: To compare levels of environmental light during the first 24 to 72 hours of intensive care unit (ICU) admission between 2 groups of critically ill adult patients (group 1: patients in whom delirium developed; group 2: patient who remained delirium free). We expected that the delirium-free group would have experienced higher levels of light during the day and lower levels of light at night than the group with delirium. **Background:** Delirium in adult patients in the ICU is common and is associated with increased complications, mortality, length of stay, and long-term cognitive effects. Poor sleep quality and sleep disturbances have been associated with ICU delirium. Critical care activities and anomalous diurnal variations in light levels may contribute to sleep disturbances. Understanding the effects of environmental light levels on delirium is critical to developing effective prevention and treatment strategies. **Method:** A retrospective descriptive design was used to compare levels of environmental light (which were not set or adjusted by the researchers) during the first 3 days of ICU stay in 9 patients (4 with delirium and 5 without). The sample was drawn from the control group of a randomized, controlled pilot study of an ICU delirium intervention. Delirium was evaluated by the Confusion Assessment Method–modified ICU version. Environmental light levels at the bedside were recorded continuously from wrist actigraphy monitors. Descriptive statistics, means, and standard deviations were calculated. White-light measures for each group were analyzed at 4 times (6 AM, 12 noon, 6 PM, and 12 midnight). **Results:** Surprisingly, in this small sample, we found higher daytime and lower nighttime light levels in the delirium group. Increased light levels in the ICU room may indicate increased critical care provider

activity or increased agitation and reflect underlying increased risk for delirium. Lower light levels may be related to increased sedation. Additional study of factors affecting levels of environmental light and their relationship to delirium is needed.

RS15 Education as an Intervention to Improve Nurses' Support for Family Presence During Resuscitation

Kelly Powers; University of North Carolina at Charlotte, Charlotte, NC

Purpose: As part of a correlational study investigating factors associated with critical care nurses' support for family presence during resuscitation (FPDR), data were collected to determine the prevalence of FPDR education among a national sample of critical care nurses. In the study sample, only 33% of 396 nurses had received any education on FPDR. A systematic review of the literature was conducted to determine educational interventions for improving nurses' support for FPDR in future research. **Background:** FPDR is supported by 90% to 100% of patients and their families. Patients report that FPDR provides a sense of comfort, whereas families benefit from improved grieving. Yet, FPDR remains controversial among nurses. In their entire career, 33% of the study sample had never invited FPDR and another 33% had invited it only 1 to 5 times. Education improves nurses' support for FPDR; however, research on this topic has been limited, and no systematic review has been done to guide nurse educators and researchers. **Method:** Data on FPDR experience and education were collected in 2016 from a national sample of 396 critical care nurses recruited through study advertisements on the American Association of Critical-Care Nurses' eNewsline and social media sites. Based on the results, which showed low rates of experience and education, a systematic review of the literature on educational interventions for improving FPDR support was conducted. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses model, as well as specific exclusion criteria, were used to guide article inclusion. Articles selected for inclusion were evaluated for rigor in study design, sample, setting, and data collection and analysis. Key findings were summarized to present the current evidence on FPDR educational interventions. **Results:** Critical care nurses want to be educated on FPDR. Nurse educators can use results of the systematic review to guide FPDR education efforts. Continued research on FPDR education is recommended. The systematic review revealed a need for further design and testing of educational interventions to strengthen the evidence on this topic. Research to compare learning methods is important to determine the educational interventions most effective at improving nurses' support for FPDR.

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RS16 Descriptive Study of Surgical Critical Care Nurses' Perceptions of End-of-Life Care

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Purpose: To administer a survey to the registered nurses in an adult surgical trauma intensive care unit (ICU) in a major level I trauma center within a county-funded public safety-net hospital to determine their current perceptions of end-of-life (EOL) care measures. To this end, the survey Quality of Dying and Death (QODD) in the Intensive Care Unit (University of Washington) was administered to objectively evaluate nursing perceptions about EOL care experiences. **Background:** Medical advances continue to lengthen life expectancy. The population of people aged 65 years and older continues to increase; predictions are that they will account for more than 28% of the population by 2060. In the younger population, approximately 48% of all deaths are the result of unintentional injuries. Despite medical advances, not all hospitalizations will result in a discharge to home. These statistics highlight the significance of having standardized quality measures for EOL across the age spectrum. **Method:** The QODD in the Intensive Care Unit survey was administered to all registered nurses in the adult surgical trauma ICU at Parkland Health and Hospital System. This survey was used to objectively identify and evaluate perceptions of EOL care experiences and measures currently used. **Results:** The findings corroborate existing knowledge regarding EOL care and may inform unit-based and organizational opportunities for improvement. Development of hospital-wide standards holds promise for improving the quality of EOL care. Additional studies among nurses in other institutional critical care areas with larger sample sizes may further lead to enhanced understanding of nursing perceptions.

RS17 Active Sleep Promotion in the Cardiothoracic Intensive Care Unit

Myra Ellis, Heather Pena, Kelsey Decker, Debra Farrell; Duke University Hospital, Durham, NC

Purpose: This project evaluated an integrated strategy to actively promote sleep in patients in a cardiothoracic intensive care unit (ICU). A multidisciplinary sleep guideline was developed to create a patient-centered environment that maximizes opportunities to promote sleep and rest. Practices addressed by the guideline are keeping the patient care environment quiet at night, clustering nursing care to

minimize disruption, and scheduling patient care activities during awake times as a priority instead of at nurses' convenience. **Background:** Hospitalized patients commonly experience poor sleep and report poor sleep quality. Sleep is an essential biological function that is crucial to supporting immune function and promoting recovery and restoration of health. In the presence of illness, sleep deprivation may complicate illness and impair recovery. Our unit research team identified poor sleep and its consequences as a source of patient dissatisfaction and a modifiable patient outcome. **Method:** The team collected baseline data on unit noise, patients' sleep satisfaction, and modifiable tasks that disrupt patients' sleep. Before the new sleep guideline was implemented, staff was educated on the importance of sleep for hospitalized patients, what patients in our unit report, and how to use the guideline to provide a multifaceted approach to promote quiet and sleep. This training included strategies to improve environmental light and noise, attention to assessing and providing sleep hygiene for patients, and rescheduling nonessential tasks. After the implementation of the guideline, 6-month and 1-year data were collected at 2-week intervals. **Results:** Improvements in practice were achieved in areas of quietness, decreased number of nighttime baths, and discussing sleep with patients. The barriers to sleep cited by patients show the inherent problems in providing sleep for postoperative patients in the ICU and areas for improvement. Changing embedded practice patterns is a recursive, long-term process that requires ongoing feedback for staff and persistence of the intervention to achieve the stated goal.

RS18 Safety of Ambulating Patients With an Intra-Aortic Balloon Pump Inserted in the Femoral Artery

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Purpose: The benefits of early mobility over bed rest are widely known. Patients with a femorally inserted intra-aortic balloon pump (IABP) have traditionally remained on bed rest in cardiac intensive care units (CICUs) until removal of the device. Evidence supporting early ambulation for these patients is lacking. Our team evaluated the safety and effectiveness of early progressive ambulation in patients with a femorally inserted IABP awaiting further cardiac intervention. **Background:** Patients requiring an IABP as mechanical circulatory support have typically had a recent cardiac event resulting in cardiogenic shock. Until interventions can be performed, patients may unnecessarily be put at risk for complications related to prolonged immobility. Although current evidence supports ambulation for patients with IABP devices inserted via the subclavian or axillary arteries, it is not considered in those who have these devices inserted via the femoral artery. **Method:** During the 8-month study, 7 male patients were identified as candidates for early ambulation. These patients had femorally placed IABPs. We monitored for the presence of complications and hemodynamic changes before, during, and after ambulation. Complications were defined either as major (eg, limb ischemia, arterial dissection, balloon rupture, significant hemodynamic changes, death) or minor (eg, balloon migration, balloon augmentation changes, hematoma at insertion site).Two physical therapists, 2 registered nurses, and an intensivist assisted in the ambulation. Additionally, a tilt table was used (by the physical therapist) to safely move patients from the supine position to standing upright. **Results:** Early ambulation in our small sample of patients with femoral IABPs appeared to be a safe, effective, and well-tolerated activity for patients who would otherwise be on complete bed rest while awaiting further cardiac intervention. Early, progressive ambulation may prevent the deleterious effects of bed rest. Further benefits may also include reduced length of stay and increased satisfaction of patients and their families. Further research is needed to validate these early findings.

RS19 Does Longer Indwelling Time for Peripheral Intravenous Catheters Increase Risk for Complications?

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Purpose: To compare indwelling time and complication rates for adult patients in the intensive care unit (ICU) with peripheral intravenous catheters (PIVs) replaced per standard 96-hour guideline versus only when clinically indicated. **Background:** PIV insertion is the most common invasive procedure for hospital patients and has been associated with complications such as phlebitis and infection. To limit complications, the Centers for Disease Control and Prevention established a guideline in 2011 recommending PIV replacement every 72 to 96 hours. This guideline is based on moderate-quality evidence: Results of recent studies indicate that longer indwelling times may not increase complication risk, so routine replacement may not be necessary. **Method:** This retrospective cohort study was conducted in the medical/cardiac ICU at a southern California academic teaching hospital. All patients with PIVs and length of stay of 4 days or longer were eligible. Participants were identified and data collected through electronic chart review. The routine-replacement cohort included all eligible patients admitted 3 months before the ICU instituted a new

policy of PIV replacement only when clinically indicated. The clinically indicated cohort included all eligible patients admitted 3 months after the policy change had stabilized. Outcome variables were PIV device days, complications, and indication for removal. Data were analyzed using *t* tests and χ^2 tests. **Results:** The results suggest that the incidence of complications with clinically indicated replacement of PIVs is equivalent to the incidence of complications with routine replacement of PIVs. However, clinically indicated replacement did show an increased risk of occlusion. This risk may be acceptable because clinically indicated replacement may also improve patients' experience, decrease nursing workload, and increase cost savings. This study adds to the literature demonstrating that clinically indicated replacement of PIVs may be a safe practice to adopt throughout the inpatient setting.

RS20 The Relationship Between Critical Care Nurses' Clinical Experience and Physical Restraint Processes

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Purpose: To examine the relationships between and among registered nurses' clinical experience, clinical decision-making processes, and nursing practice issues with physical restraint (PR) use, and attitudes regarding PR use in the critical care environment. The participants were 413 critical care nurses from 19 to 68 years old (mean, 45.6 years) from across the United States and recruited through the American Association of Critical-Care Nurses. **Background:** The use of PRs remains a controversial, yet often necessary, practice in the world of critical care nursing. PR use in the critical care environment is more likely than in other hospital units because of the frequency of invasive procedures and the use of mechanical ventilation. Published reports show that the initiation and maintenance of PR devices is largely a nursing responsibility. Previous clinical experience is a variable often suggested to be related to ICU nurses' use of PR. **Method:** A descriptive, correlational study was conducted using 2 instruments for data collection: a demographic scale created by the researcher and the Physical Restraint Questionnaire subscales 3 (nursing practice issues) and 4 (attitudes toward physical restraint use). A multiple regression was conducted to assess the relationships between and among the study variables of clinical experience in nursing in general, clinical experience in critical care, nursing practice issues with PR use, and attitudes toward PR use in critical care. **Results:** One strength noted with this study is the work done in regard to practice issues and attitudes about PR use in the critical care environment, using a large national study sample. There is no existing research on this topic, to the researcher's knowledge, that has been conducted in the United States. This study's results, though limited, can be used to guide decisions and directions of future PR quality initiatives in critical care environments and nursing education curricula in the United States.