2019 National Teaching Institute Research Abstracts

Presented at the AACN National Teaching Institute in Orlando, Florida, May 20-23, 2019.

RESEARCH ORAL POSTER PRESENTATION AWARD WINNERS

RS1 Fewer Pneumothoraces With Electromagnetic Devices Than With Blind Feeding Tube Insertions

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

Purpose: To explore the incidence of pneumothoraces during feeding tube (FT) insertion that is done with the assistance of an electromagnetic placement device (EMPD). The incidence of reported pneumothoraces associated with EMPD-assisted FT insertion was compared with that for blind FT insertion. This study is aligned with the American Association of Critical-Care Nurses' mission to drive excellence and rely on expert knowledge and skill. **Background/ Significance:** A 2018 letter from the US Food and Drug Administration warned clinicians about the risk for pneumothoraces during FT insertion despite the use of an EMPD. The incidence of pneumothoraces during blind FT insertions (1.3%-3.2%) is thought to be underreported. Unfortunately, FT insertion into the pulmonary system may occur without clinical signs. Pneumothoraces associated with FT insertion have led to patient death. EMPD's real-time insertion tracing can assist a trained operator with early recognition of pulmonary placement. **Method:** An integrative review of the literature on EMPD-assisted FT insertion was performed using the Cumulative Index of Nursing and Allied Health Literature, MEDLINE, and Cochrane databases. Inclusion criteria consisted of research, Cortrak-assisted FT insertion, reported FT outcomes, human study participants (adult and pediatric), and English language. Nonresearch or studies that focused on gastric motility were excluded. Sixty-three studies were screened and 32 were included in the final analysis. Twenty-nine studies reported explicitly on the presence or absence of pulmonary FT placement. **Result:** Pulmonary placement occurred in 209 out of 19 217 FT insertions; 202 (1.05%) were observed on the CORTRAK insertion tracing and 7 (0.04%) were confirmed by a non-EMPD method. Of the studies that reported pulmonary placement, 3 out of 17 039 (0.02%) insertions resulted in pneumothoraces. EMPD operators failed to identify 2 of these pulmonary placements, which were later confirmed by radiography. Skilled operators prevented 199 out of 202 (99%) FTs from being inserted into distal airways by immediate FT removal once pulmonary placement was suspected on the basis of the EMPD insertion tracing. **Conclusion:** Pneumothorax occurred less often with EMPD-assisted FT

insertion (0.02%)than it did with blind FT insertion (1.3%-3.2%). Pulmonary-placed FTs may cause harm before clinicians are aware of malplacement. Skilled EMPD operators may avert distal pulmonary FT placement by early identification of pulmonary placement and immediate FT removal. EMPD-assisted FT insertion by a trained and skilled operator may reduce risk for distal pulmonary FT placement and pneumothoraces. Blind FT insertion should be avoided. Disclosure: Annette Bourgault and Lillian Aguirre have previously received funding and equipment loaned for research by Halyard Sales, LLC, Alpharetta, Georgia. Jan Powers has previously received compensation from Halyard Health for research and consultation services provided. Halyard recently changed their name to Avanos Medical, Inc. Avanos was not involved in the design, execution, analysis, or reporting of results for this study.

RS2 An Evaluation of Early Warning Scores in Predicting Intensive Care Unit Readmission and Hospital Mortality

Heather Cook, Shonda Morrow, Holly Losurdo, Jonathan Shipley, Brittany Wells; Rush University Medical Center, Chicago, IL

Purpose: To identify the best early warning score to assist in identification of patients at risk for readmission to the intensive care (ICU) within 72 hours of transfer and prediction of in-hospital mortality. The National Early Warning Score (NEWS), Modified Early Warning Score (MEWS), and Quick Sepsis-Related Organ Failure Assessment (qSOFA) were the predictor variables in this study. **Background/Significance:** Readmission to the ICU is positively correlated with longer hospital stays and increased mortality rates. Early detection and management of patient deterioration is critical to reducing ICU readmission rates and out-of-ICU cardiac arrests. Multiple early warning scores have been developed to aid critical care outreach teams and acute care nurses in early identification of patients whose condition is deteriorating. Little research has been performed comparing these different tools to determine which may be the best indicator. **Method:** All adult patients transferred from an ICU to a medical-surgical unit in an urban academic medical center during 3 months were included in the study. Patients with a code status other than "full code" for 72 hours after transfer and those who underwent a surgical procedure during the 72 hours after transfer were excluded. A retrospective chart audit (N = 1181) was used to compile vital signs at time of transfer from ICU and at 12, 24, and 48 hours after transfer (± 4 hours). The NEWS, MEWS, and qSOFA scores were generated for each set of vital signs (N = 4004), and

a receiver operating characteristic curve was constructed for each score. The end points identified were ICU readmission within 72 hours and in-hospital mortality. **Result:** The NEWS had the highest area under the curve (AUC) among the 3 early warning scores for identifying ICU readmission at each identified time point: acute care arrival (AUC, 0.746; 95% CI, 0.684-0.808), 12 hours after transfer (AUC, 0.829; 95% CI, 0.770-0.889), 24 hours after transfer (AUC, 0.845; 95% CI, 0.777-0.912), and 48 hours after transfer (AUC, 0.868; 95% CI, 0.757-0.980). NEWS also had the highest AUC among all 3 early warning scores for identifying mortality at discharge (AUC, 0.868; 95% CI, 0.803-0.931). **Conclusion:** NEWS outperformed both MEWS and qSOFA in identifying patients at risk for ICU readmission and in-hospital mortality. NEWS, while not yet commonly used in the United States, may be more sensitive in predicting patients' outcomes. Improved understanding of the differences between early warning scores and the objective data obtained from this study have garnered physician support and guided the nurse-driven critical care outreach team in recommending and implementing hospital-wide adoption of NEWS.

RS3 Relationship Between Patient Delirium in the Medical Intensive Care Unit and Ventilatory Outcomes

Jessica Zangmeister, Molly McNett, Kathleen Kerber; MetroHealth Medical Center, Cleveland, OH
Purpose: To identify the prevalence of delirium types (hypoactive, hyperactive, mixed) within the first 7 days of intensive care unit (ICU) admission and to determine the relationship between delirium type and ventilatory outcome (unplanned extubation [UE], length of stay, ventilator days). **Background/Significance:** Patient delirium is common in ICUs and leads to extended hospital stays and complications. Delirium is categorized as hypoactive, hyperactive, or mixed. Agitation often accompanies hyperactive delirium and is predictive of UE. However, little has been published on the incidence of hypoactive delirium, which does not include agitation, and its relationship to ventilatory outcomes, specifically UE and ventilator days. **Method:** The study used a retrospective cohort study design. Consecutive adult patients admitted to a medical ICU within an urban academic public health system during 12 months were enrolled. Data were abstracted on patients' demographic variables, daily clinical variables (morning and evening delirium, coma, and sedation scores), and outcome variables (length of stay, number of ventilator days, and incidence of UE). Descriptive, bivariate, and multivariate regression analyses were performed. **Result:**

Hypoactive delirium was present from day 3 to day 7 in 44% of patients. Of 25 instances of UE, 20% occurred on day 1, before the development of delirium. Of the remaining cases of UE, up to 74% of patients had hypoactive delirium. The presence of UE resulted in longer stays and more ventilator days (*P* < .05). Delirium was not a predictor of UE; rather, smoking history, chronic obstructive pulmonary disease, and failed breathing trials were the best predictors of UE (odds ratios: 3.2, 5.2, and 12.6, respectively; *P* < .05). **Conclusion:** Hypoactive delirium is common among ICU patients and may precede UE. Patients' history and comorbidities remain the strongest predictors of UE. Many of the patients in this study did not display evidence of delirium until day 2 or 3 of their ICU stay. Hypoactive delirium was documented most frequently, with increasing incidence during days 3 to 7. This finding raises important clinical considerations, as this type of delirium may often go undetected with traditional screening methods.

RS4 Examining the Outcomes of a Critical Care Hospital–Based Fellowship

Rose Hansen; St Louis Children's Hospital, St Louis, MO
Purpose: To evaluate a hospital-based fellowship in pediatric high-acuity settings within an established senior synthesis nursing course with 4 bachelor-of-science-in-nursing–school partners. The research questions were the following: What are the student's changes in self-efficacy? What is the relationship between self-efficacy and critical care clinical skills? What are the changes in pediatric critical care clinical skills experienced? What "readiness to practice" issues are reported? **Background/Significance:** Pediatric critical care is a highly specialized area of expertise, but schools of nursing provide few pediatric or critical care skills. Pediatric nurse residency programs increase confidence, commitment, and retention of novice nurses; however, this transition from a student to a registered nurse occurs in the hospital organization orientation and thus does not occur until the nurse has completed formal education. **Method:** In a mixed-method evaluation, data were collected through 3 questionnaires. Pretest and posttest assessments of self-efficacy and knowledge were accomplished by using the General Self-efficacy Scale (GSES) and the Basic Knowledge Assessment Tool (BKAT) for critical care nursing. The Casey Fink Readiness to Practice Survey was used as a posttest to assess nursing students' perceptions of readiness to practice. Data were collected for 2 years in 4 cohorts of 12 students selected from 4 schools of nursing. The hospital-based fellowship included was 24 hours of classroom didactic time based on pediatric critical care principles and a specified number of precepted shifts in 2 intensive

care unit specialties based on the student's preference. **Result:** A significant difference was noted between the pretest and posttest scores for both the GSES ($P = .005$) and the BKAT ($P < .001$). A significant increase was noted in self-reported self-efficacy, which positively predicted self-reported confidence in caring for 4 patients ($P = .05$) as demonstrated by linear regression analysis. Prefellowship critical care clinical skills showed a marginal positive correlation with prefellowship ($r = 0.25$, $P = .09$) and postfellowship general self-efficacy ($r = 0.27$, $P = .07$). The paired samples t test revealed significant mean change in BKAT score between prefellowship and postfellowship responses ($t_{47} = -5.43$, $P < .001$), with a mean increase of 3.2 across all participants. **Conclusion:** Nurse confidence and readiness for practice improved as a result of the program. The fellowship provided a solid clinical and didactic experience in pediatric critical care. The outcomes are consistent with the knowledge and skills necessary for safe and effective care. Other specialty areas should consider the implementation of a similar program. An indirect outcome was that the results showed a benefit for the hospital in terms of retention statistics. The article "Outcomes of a Critical Care Hospital-Based Fellowship for Senior Nursing Students" was published in the August 2018 issue of the *Journal of Nursing Education*.

RESEARCH POSTERS

RS5 Comparison of Activated Partial Thromboplastin Times for Blood Samples Drawn From a Heparin Infusion Catheter Versus Venipuncture
Ann McRae, Avis Allen, Paul Hargarten; VCU Health, Richmond, VA
Purpose: To compare the activated partial thromboplastin time (aPTT) results from blood samples used to monitor the effects of intravenous heparin that were obtained by 2 different methods of blood sampling. This study compares the aPTT results from blood drawn via venipuncture with those from blood drawn from the intravenous heparin infusion catheter with a standardized flush and waste method. **Background/Significance:** Patients receiving intravenous heparin for anticoagulation require frequent blood sampling to monitor aPTT levels. In order to ease discomfort, nurses may choose to collect the blood sample from the intravenous catheter through which the heparin is infusing when it is the only existing intravenous access. Previous studies show that heparin contamination leads to inaccurate aPTT results. **Method:** This is a quantitative, quasi-experimental study comparing 2 methods of blood sampling. A convenience sample of 110 adult patients receiving intravenous heparin for anticoagulation who were admitted to a cardiology

unit were recruited. A total of 88 usable pairs of samples were obtained. A demographic data form was used to identify patient characteristics and a research calculation form was used to document aPTT results and related variables. The data were transferred into the Research Electronic Data Capture system and analyzed by using SAS 9.4 software. **Result:** The assessment between the 2 samples was done using the Cox frailty model and the Kaplan-Meier survival curve. It showed a significant difference between the sample drawn by venipuncture and the sample drawn from the heparin infusion catheter using the prescribed blood draw method. The venipuncture sample was 4.47 (95% CI, 3.02-6.60) times more likely to clot than the heparin catheter sample ($P < .001$). **Conclusion:** Blood samples for aPTT drawn from the heparin infusion catheter using the standardized flush and waste method result in a significantly higher aPTT than do blood samples drawn by venipuncture.

RS6 Experiences of Pre–Heart-Transplant Patients Using Fitbit as An Ambulation Measuring Device
Holly Rodriguez, Rizalina Bonuel, Frederick Macapagal, Emma McClellan; Houston Methodist Hospital, Houston, TX
Purpose: An innovative approach using Fitbit as an ambulation-measuring device to accurately measure patients' activity was implemented in the coronary intensive care unit at Houston Methodist Hospital. Experiences of these patients needed to be explored. Descriptive phenomenology was used to uncover the commonalities of the experiences the patients underwent while using a Fitbit as an ambulation-measuring device. **Background/Significance:** Heart failure is a chronic disease that often progresses to end-stage disease. Patients with end-stage disease experience refractory symptoms despite guideline-directed therapies. Heart transplant is the definitive treatment. While waiting for a transplant, patients with heart failure are managed with inotropic and/or mechanical support. Patients with heart failure are prone to suboptimal mobility. Prolonged immobility results in severe deconditioning, which affects multiple organs and systems. Patients listed as heart transplant status 1A were provided a Fitbit. **Method:** Descriptive phenomenology was used in the study. Purposive sampling of 8 heart transplant candidates with orders to ambulate and inotropic and/or mechanical support was performed. A semistructured interview was done to understand the phenomenon. Researchers returned to the participants to enhance credibility and validate findings. Researchers collected detailed data to report with sufficient detail and precision. A colleague of the researcher, an expert in phenomenology, examined the transcripts' interpretations and attested that the findings

were supported by the data and were internally coherent. An audit trail will be available upon request. Colaizzi's method of data analysis was used. **Result:** Colaizzi's method was used to identify 144 significant statements during the participants' interviews, which yielded 48 formulated meanings, 43 themes, and 4 clusters of themes: happy, motivator, beneficial, and future potential. Participants were happy/overjoyed while using the Fitbit. It motivated them to be active while awaiting a heart transplant. Participants walked more than the standard ambulation activity designed for patients listed as status 1A. Patients expressed that they slept better at night and had sustained stamina. Overall, patients had a positive experience while using the Fitbit as an ambulation measuring device; they felt it had future potential for prospective status 1A patients. **Conclusion:** Fitbit, as an ambulation-measuring device, could help future heart transplant candidates to be active while waiting for a heart during their hospitalization in the coronary intensive care unit. Measurable variables were identified during the interviews, and the team plans to incorporate those variables in their next Fitbit study using quantitative methods.

RS7 Nonpharmacological Methods to Help Prevent Intensive Care Unit Delirium

Susan Molitoris; Riddle Memorial Hospital, Media, PA
Purpose: To determine if reducing nighttime noise with the use of earplugs (from midnight until 5 AM), allowing sleep within the hospital, prevents the new onset of delirium in patients in the adult intensive care unit (ICU). **Background/Significance:** According to the American Association of Critical-Care Nurses, delirium develops in up to 80% of ICU patients, which costs the health care system between $4 billion and $16 billion a year. Patients with delirium have a higher 6-month mortality rate and spend 10 days longer in the hospital than do non-delirious patients. Published reports suggest that sleep disturbance is associated with the development of ICU delirium. Factors associated with sleep disruption include light, noise, and frequent interruptions for care and monitoring. **Method:** This study was a randomized controlled trial in an adult, Beacon-awarded ICU of a community Magnet-designated hospital. Patients were selected randomly by room number: patients in even-numbered rooms wore earplugs between midnight and 5 AM and patients in odd-numbered rooms did not wear earplugs. Inclusion criteria included length of stay (LOS) in the ICU of ≥72 hours. Exclusion criteria included history of recent substance abuse, dementia, severe

brain injuries, and receiving paralytic agents. The Confusion Assessment Method for ICU was used to measure delirium at 8 AM and 8 PM. Data were collected on the presence of delirium, LOS in the ICU, and total hospital LOS. **Result:** The control group had 50 participants and the experimental group had 32 participants. The mean age of patients in the control group was 68.7 years, and the mean age of patients in the experimental group was 68.9 years. The study did reveal that an uninterrupted period of time to sleep facilitated by the use of earplugs between midnight and 5 AM did decrease the incidence of delirium. Delirium developed in 3.12% (1 out of 32) of the patients in the study group and 36% (18 out of 50) of the patients in the control group ($P<.001$). In addition, the LOS in the study group was shorter than the LOS in the control group, 5.5 days versus 8.1 days in the ICU and a total hospital LOS of 11 days versus 13.4 days ($P<.001$). **Conclusion:** After the end of the study, a sleep protocol was initiated for hospitalized patients. The protocol outlines steps that the nurse will take to ensure an uninterrupted period for sleeping during the night, including the use of earplugs, comfort measures, and avoiding routine care between midnight and 5 AM. This protocol will decrease the development of delirium by allowing the patient to sleep, thus decreasing LOS. The sleep protocol can be easily adapted to any unit in any health care setting.

RS8 Usefulness of the National Early Warning Score in Predicting Sudden Change in Japanese Patients

Mio Kitayama; Kanazawa Medical University Hospital, Kahokugunn, Ishikawa, Japan
Purpose: The National Early Warning Score (NEWS), one of the methods of promptly detecting sudden change in hospitalized patients, can be used in the acute or chronic period and is known for enabling the prediction of critical illness in patients. The purpose of this study was to retrospectively evaluate the usefulness of NEWS with respect to sudden change in Japanese patients. **Background/Significance:** NEWS is easy for nurses to use to evaluate a patient's condition, because the score is calculated on the basis of points assigned to 7 observation points: respiratory frequency; SpO_2, with or without oxygen administration; body temperature; systolic blood pressure; pulse rate; and level of consciousness. The NEWS has been studied to verify its usefulness in various Western populations. However, the usefulness of NEWS has not been established in East Asians. **Method:** The study was designed as a retrospective cohort study. Adult patients who were admitted to the intensive care unit (ICU) because of sudden changes in their condition in the general care area in our hospital were enrolled. SpO_2, body temperature, systolic blood pressure, pulse rate, and level

of consciousness were extracted from the hospital record, and NEWS was calculated at the time of sudden change and 1 day, 3 days, and 5 days before the event. The patients were divided into 2 groups, survival or death, based on the prognosis 14 days after admission to the ICU. The groups were compared on the basis of the factors in the NEWS, disease severity (Acute Physiology and Chronic Health Evaluation [APACHE II] score), and ICU length of stay. **Result:** Seventy patients were divided into a survival group (n = 30) and a death group (n = 40). The mean (SD) APACHE II score in the survival group was lower than that in the death group (16 [9] vs 29 [8], $P < .001$). The cutoff value of the NEWS total score was 12 (sensitivity, 0.641; specificity, 0.833) at sudden change, 7.0 (sensitivity, 0.846; specificity, 0.600) 1 day before, 4.0 (sensitivity, 0.727; specificity, 0.538) 3 days before, and 4.0 (sensitivity, 0.586; specificity, 0.600) 5 days before the sudden change. Logistic regression analysis indicated that the cutoff value was independently associated with death 6.8 times (95% CI, 2.24-22.7; $P = .01$) at sudden change, 5.9 times (95% CI, 1.7-20.1; $P = .004$) 1 day before, and 5.7 times (95% CI, 1.7-20.7; $P = .004$) 3 days before the sudden change. **Conclusion:** NEWS total scores in the death group were significantly higher than those in the survival group at sudden change and 1, 3, and 5 days before events. Moreover, higher scores at sudden change and 1 and 3 days before events were all independently associated with patients' prognosis. The NEWS total score appears to be useful with respect to predicting sudden change in Japanese patients.

RS9 Safety and Patients' Response to Ambulation With a Pulmonary Artery Catheter in a Cardiac Intensive Care Unit

Bienvenido Tabuzo, Prasama Sangkachand, Elisa Mattioli, Marjorie Funk, Janet Parkosewich, Liberty Reyes; Yale New Haven Hospital, New Haven, CT

Purpose: To describe the safety of and physiological/emotional responses to ambulation of patients with stable heart failure (HF) who require a pulmonary artery catheter (PAC) to monitor their hemodynamic response to medical treatment. Specific aims were to determine if ambulation (1) changes PAC position, as evidenced by PAC migration and changes in waveform and cardiac rhythm; (2) is associated with patients' feelings of exertion and fatigue; or (3) affects patients' perceptions of their sense of well-being. **Background/Significance:** Benefits of early mobilization in critical care units are well established. Patients requiring monitoring with a PAC are maintained on bed rest because of their unstable hemodynamic status. Once the patient is stable, the catheter is removed and mobility progression is started. Patients with stable end-stage HF who have a PAC to guide medical management are at risk for complications from prolonged bed rest. Evidence is insufficient to support whether ambulating patients with a PAC is safe. **Method:** The sample for this prospective descriptive study had 19 patients with HF monitored with a PAC in a 14-bed cardiac intensive care unit in an academic medical center. After obtaining written informed consent, we initiated a nurse-led ambulation protocol. The patient, accompanied by a nurse, walked with continuous observation of heart rate and rhythm and pulmonary artery waveform by means of a transport monitor. Data on PAC position and waveform, arrhythmias, and perceived levels of exertion (Borg CR-10) and fatigue (0 to 4 scale) were obtained before and after each walk. The distance ambulated was documented. The nurse administered a questionnaire addressing the patient's sense of well-being 1 to 3 times per week. **Result:** The sample of 19 patients had a mean (SD) age of 51.1 (13.2) years. Most patients were men (68.4%), and 63.2% had a diagnosis of nonischemic cardiomyopathy. Sixty-eight percent of patients either had a heart transplant or were listed for a transplant. There was a total of 303 walks (range, 1-68; median, 7). During 7 (2.4%) patient walks, catheter migration of 1 to 5 cm occurred, but no arrhythmias or waveform changes were observed. Changes in exertion and fatigue were significant (paired t test, $P < .001$), but levels of both were minimal after walking. Patients expressed appreciation for the opportunity to walk and indicated that they experienced physical and emotional benefits of walking. **Conclusion:** This study's results challenge the traditional nursing practice in which patients with a PAC are restricted to bed rest. It provides evidence that, for hemodynamically stable patients with HF, ambulating with a PAC is safe and enhances their sense of well-being. For those listed for a heart transplant, regular ambulation can help prepare them physically and emotionally for recovery. Our research offers clinicians a safe approach to ambulation for patients with HF and an indwelling PAC. The article "Safety and Patients' Response to Ambulation With a Pulmonary Artery Catheter in the Cardiac Intensive Care Unit" was published in the March 2018 issue of the *American Journal of Critical Care.*

RS10 Socialization of Newly Graduated Registered Nurses Into Critical Care

Jennifer Hostutler; Cleveland State University, Cleveland, OH

Purpose: To gain a better understanding of the experiences of the registered nurse (RN) during the first year of employment as a newly graduated registered nurse (GRN). This research was undertaken to understand the meaning of the lived experience of

being a GRN, the meaning of self-identification as an RN, and the meaning of feeling like a team member at work. **Background/Significance:** Nationwide, there has been a trend for acute care facilities to hire a high percentage of GRNs. It has been estimated that, in acute care, 42% of newly hired RNs are likely to be new graduates, and turnover rates for these new hires can range from 35% to 60%. A high turnover rate of RNs can have several negative consequences, including increased cost in training and recruitment and decreased quality of patient care. **Method:** A hermeneutic phenomenology study was conducted in a 500-bed acute care facility in northeast Ohio. Ten GRNs agreed to participate in the study and completed one-on-one interviews with the researcher, who used a hermeneutic phenomenology method. Data collection ended when evidence of saturation was apparent. Saturation was evident when there was emergence of themes and subthemes within the stories told by the participants and eventually no new themes emerged during interviews. Nine participants were from critical care units. One participant was from a step-down telemetry unit. **Result:** This qualitative research yielded many rich stories of the experiences during the first year as an RN. Data analysis of the participants' stories showed the following key themes: changes in role (from student to RN), amount to learn (skills, technology/equipment, expectations), first code (feeling overwhelmed), confidence (development over the year), critical thinking, high expectations (wanting to be perfect), and bullying. The themes found in published reports overlapped somewhat with the themes identified in the participants' stories. The results can be used by prenursing educators, hospital managers, and staff development instructors to improve the transition period. **Conclusion:** This research allowed GRNs to tell their stories relating to their socialization process. Themes that emerged are supported in current publications. This information can be used by managers and educators to plan and develop nursing orientation programs that better meet the needs of the GRNs. Improved orientation programs could result in a less stressful transition period, and the end result could be less RN turnover, better financial outcomes, and safer patient care.

RS11 Lose the Pillow: Liberating Sternal Precautions for the Poststernotomy Patient

Caitlyn Groh, Andrea Landry; St Peter's Hospital, Albany, NY

Purpose: To determine the effect of a less restrictive (LR) approach after median sternotomy for cardiac surgical patients in an acute care hospital. Our hypothesis was that the LR approach group would have no negative change in their sternal healing and would have less difficulty during functional mobility, have a shorter stay, and be more likely to discharge to home (vs rehabilitation) than patients in the strict precautions (SP) group. **Background/Significance:** Guidelines for movement following median sternotomy are not universally defined, but typically include strict sternal precautions that limit mobility and independence with activities of daily living in poststernotomy patients. The SP protocol is not well supported by evidence and is reported to impede functional recovery. Recently, alternative approaches that impose fewer functional restrictions while avoiding excessive stress to the sternum have been validated as safe and effective. **Method:** This quasi-experimental design study ran in 2 consecutive phases and compared 2 groups of patients who had undergone median sternotomy at a community-based hospital. Phase 1 participants and families, the SP group, were instructed to follow SP restrictions. Phase 2 (LR) participants and families received instructions on the less-restrictive approach. Three weeks after discharge, patients completed a self-reported survey and surgeons performed an objective Modified Sternal Instability Scale (MSIS) assessment. The survey included questions on perceived pain, sternal instability, and functional mobility. Chart review provided data on length of stay and discharge disposition. **Result:** The 2 groups were compared by using the Mann-Whitney U test for continuous variables and the χ^2 test for discharge disposition ($P<.05$). No significant differences were found between the 2 groups for all the outcomes: MSIS (mean [SD]: SP group, 0.02 [0.1]; LR group, 0.02 [0.1]; $P=.88$), pain rating (SP group, 3.4 [1.9]; LR group, 3.4 [1.7]; $P=.87$), pain frequency (SP group, 1.7 [0.6]; LR group, 1.6 [0.7]; $P=.46$), sternal instability (SP group, 0.08 [0.2]; LR group, 0.05 [0.2]; $P=.24$), difficulty with functional mobility (SP group, 1.5 [2.0]; LR group, 1.2 [1.9]; $P=.09$), length of stay (SP group, 7.7 [5.1] days; LR group, 8.0 [6.1] days; $P=.56$), and discharge disposition ($P=.09$). **Conclusion:** The implementation of the LR approach had no adverse effect on outcomes 2 to 3 weeks following median sternotomy. Although no statistically significant differences were noted for any outcome, patients in the LR approach group reported less difficulty with functional mobility with no increased risk of complications. This study provides valuable data to clinicians on alternative approaches for mobility following median sternotomy.

RS12 Detection of Opioid-Induced Respiratory Depression by Using Electronic Monitoring Data

Carla Jungquist, Lora Cavuoto, Varun Chandola, Cheryl Spulecki; University at Buffalo, The State University of New York, Buffalo, NY

Purpose: To explore the use of electronic monitoring data to detect opioid-induced respiratory depression (OIRD) in patients recovering from anesthesia. This research program strives for a paradigm shift: to promote the use of electronic monitoring data to identify patients at high risk for OIRD developing during recovery from surgery. **Background/Significance:** Opioid analgesics pose risks for serious adverse events such as respiratory arrest. About 1% of hospitalized patients will experience preventable opioid-related adverse events and will typically have poorer clinical outcomes, such as (1) 55% longer hospital stays, (2) 47% higher costs associated with their care, (3) 36% higher risk of 30-day readmission, and (4) 3.4 times higher risk of inpatient mortality than patients with no opioid-related adverse events. **Method:** An observational study was performed of 60 postsurgical patients in the postanesthesia care unit (PACU). Baseline data were collected from patients before they received any medications and again throughout their PACU stay. Electronic monitoring data included oxygen saturation, end-tidal carbon dioxide, and minute ventilation. Forty-nine patients wore the electronic monitoring devices while they were recovering from back, neck, hip, or knee surgery in the PACU. Other measures recorded during observation were presence of supplemental oxygen and medication names, doses, and times of delivery. Machine learning analysis was performed on data to determine which monitor was best able to detect an OIRD event. **Result:** The main outcome variable was an OIRD event. An event was defined as a change in respiratory status within 10 minutes of intravenous administration of an opioid: (1) oxygen saturation via pulse oximetry dropping below 90% saturation within 10 minutes of administration of an opioid, (2) end-tidal $CO_2 \geq 50$ mm Hg, or (3) minute ventilation <40% of predicted. Fifty-nine percent of the 49 participants (mean [SD] age, 58 (10) years; 55% males; mean [SD] body mass index, 31[6]) exhibited OIRD. All were receiving supplemental oxygen. Preliminary observations reveal that the minute ventilation and end-tidal CO_2 measurements exhibit a higher sensitivity than oxygen saturation as measured by pulse oximetry to detect OIRD. Models were developed revealing a high detection rate (>0.8) when the detection horizon is 10 minutes before the actual event. **Conclusion:** Electronic monitoring data can be used to detect OIRD in patients recovering from anesthesia. Nurses should be provided the most sensitive and specific monitoring devices (capnography and/or minute ventilation) and should be educated on using electronic monitoring data to inform safe monitoring practices once the patient is transferred to the general care unit. Minute ventilation and pulse oximetry are more comfortable for the patient than capnography.

RS13 Compassion Satisfaction and Burnout Among Pediatric Intensive Care Unit Nurses in Relation to Patients' Deaths

Kyle Richardson, Meredith MacKenzie Greenle; Villanova University, Villanova, PA

Purpose: To examine the impact of resuscitation events, rapid responses, and patients' deaths on compassion satisfaction, burnout, and secondary trauma experienced by pediatric critical care nurses. A secondary goal was to examine nurse characteristics associated with compassion satisfaction, burnout, and secondary trauma. **Background/Significance:** The death of a patient can be devastating for a nurse and for the entire nursing unit. The intensity of the grief may be heightened when the patient is a child. Repeated exposure to patient death and near-death experiences (resuscitation events, rapid responses) can create professional and personal stress that could lead to low compassion satisfaction, burnout, and secondary trauma. **Method:** This was a descriptive, comparative study. A JotForm survey was distributed via email and LinkedIn groups to pediatric and neonatal intensive care nurses. A $5 gift card was offered as an incentive for completion. The survey contained demographic questions; a question about codes, rapid responses, and patients' deaths in the past month; and the Professional Quality of Life Scale, which has 3 subscales measuring compassion satisfaction, burnout, and secondary trauma. Multivariate linear regression modeling was used to identify correlates of compassion satisfaction, burnout, and secondary trauma. **Result:** Of the 65 respondents, the majority (94%) were female, were age 41 to 45, and had a bachelor's degree (71%). Patients' death and near-death experiences were not significantly correlated with nurses' compassion satisfaction, burnout, or secondary trauma. Higher educational attainment was significantly correlated with lower compassion satisfaction ($P = .01$). Similarly, a higher educational degree was correlated with higher burnout ($P = .005$). Last, significant correlates of secondary trauma included age ($P = .005$), burnout ($P = .001$), and compassion satisfaction ($P = .05$); greater age, higher burnout scores, and lower compassion satisfaction were linked to greater secondary trauma. **Conclusion:** Contrary to our hypothesis, we found no relationship between patients' deaths or near-death experiences and nurses' outcomes. Further research is needed to evaluate the impact of educational

attainment on nurses' outcomes. In addition, examination of possible differences between adult and pediatric intensive care nurses in relationship to compassion satisfaction, burnout, and secondary trauma is needed.

RS14 Comparison of Oral and Axillary Temperatures in Endotracheally Intubated Pediatric Patients

Danielle Wood; Rush University Medical Center, Chicago, IL

Purpose: In a pediatric intensive care unit in a Midwestern medical center, it was questioned whether oral temperatures are inaccurate in intubated patients as a result of heated gases passing through the patients' airways. Practice within the studied unit was to obtain axillary temperatures, but research shows that this method has greater variability than other forms of measurement. Staff within the unit wanted to know if oral temperatures could be a more reliable form of temperature measurement in the intubated population. **Background/Significance:** Published reports about adult intensive care unit populations show that oral temperature in intubated patients was not significantly affected by heated gases passing from the ventilator through the airway. This study aimed to determine if the same is true in pediatric patients. **Method:** Patient age groups were delineated into neonate (<28 days), infant (29 days to 1 year), and children (>1 year to <19 years). These age ranges were chosen because they are typical ages of patients seen within the studied unit. Oral and axillary temperatures were obtained at normal intervals for assessment of vital signs within the unit. A group of nursing staff members were recruited and trained for accurate temperature measurement within the study parameters. Twenty-five sets of data were collected for each age group. Descriptive statistics were calculated and Bland-Altman plot interpretation was conducted to evaluate confidence intervals for each age group. **Result:** High positive correlation was seen via Bland-Altman interpretation for all age groups. Infants showed slightly lower positive correlation than the neonates and children showed. The infant age group also encompassed some data sets with outliers of lower oral temperatures than axillary temperatures. **Conclusion:** Oral temperature measurement proved an accurate option for intubated patients. Correction factors for oral to axillary temperature conversion were calculated. This study served as evidence for practice change within the studied unit.

Disclosure: Grant received from the Center for Clinical Research and Scholarship at Rush University Medical Center.

RS15 What Do Families of Dying and Deceased Patients in the Cardiac Intensive Care Unit Experience and Need During Bereavement?

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

Purpose: To describe the bereavement experiences and needs of family members of dying and deceased patients in the cardiac intensive care unit (ICU). **Background/Significance:** Intensive care unit deaths have been associated with poor physical and psychological outcomes for families. Because of this, critical care consensus groups recommend providing bereavement support to affected families. However, few research results are available to guide best practice in this area, and little is known about the specific experiences and needs of cardiac ICU families. **Method:** This secondary analysis used an exploratory, descriptive design to study cardiac ICU families' bereavement experiences and needs. Families from a cardiac ICU in a tertiary medical center in the western United States participated. Audiotaped telephone interviews were conducted 13 to 15 months after each patient's death using a semistructured questionnaire. A qualitative, descriptive technique was used for data analysis. Two independent raters coded the interview transcripts and then categorized comments from families into themes. Twelve family members were interviewed. Most were female (n = 8, 67%), spouses (n = 10, 83%), and white (n = 10, 83%), and their mean age was 58.4 (SD, 16.7) years. **Result:** Five main themes emerged from the data: (1) families' bereavement work during the first year of grief included both practical tasks and emotional processing, (2) bereavement needs are individual and most families felt that support should be based on those individual needs, (3) ICU families show resilience by finding their own resources and coping mechanisms, (4) sudden versus chronic illness influences bereavement needs in terms of when support should be offered and how receptive the family will be, and (5) family interactions with ICU professionals can aid or hinder aspects of their bereavement experience. **Conclusion:** Descriptions of the bereavement experiences and needs of cardiac ICU family members provided insight into what these families go through during their ICU experience and during their first year of bereavement. The findings from this study may be useful for ICU professionals working with bereaved individuals and for cardiac ICUs considering adding bereavement support.

Disclosure: Faculty Scholarship Grant from Samuel Merritt University for $20 000.

RS16 Improving Sepsis Identification and Treatment With a Self-Activating Sepsis Response Team Nurse

Joseph Leoni, Kelsey Bakalar, Nancy Doane; University of Kansas Hospital, Kansas City, KS

Purpose: Because of the complex diagnoses and comorbidities seen in the emergency department, early sepsis identification and treatment are challenging. The purpose of this study was to determine whether a sepsis response team nurse could increase identification of patients with sepsis and provide early treatment according to evidence-based bundles through screening and self-activation. We also determined whether mortality, length of stay, and sepsis deterioration were affected upon admission. **Background/Significance:** Despite our having a sepsis response registered nurse (RN) on call 24/7, sepsis in its earliest stages remains very difficult to identify and treat in our facility. In spite of educational and quality improvement efforts, our compliance with the Centers for Medicare and Medicaid Services (CMS) sepsis bundle (SEP-1) remains below our goal. In addition, 1 of every 2 patients who die at our facility has a sepsis diagnosis. This highlights the importance of a proactive approach to early identification and treatment of sepsis that includes implementing a full-time, self-activating sepsis response RN. **Method:** During the study, a sepsis-trained intensive care unit RN autonomously reviewed the electronic medical records of all patients coming to the emergency department. Each patient was scored using the National Early Warning Score (NEWS) tool. The RN would self-activate in the case of a patient with a NEWS score of 4 or 3 who is more than 65 years of age. Upon activation, the RN implemented initial sepsis-bundle care according to SEP-1 while working with emergency department staff to provide fluid management and broad-spectrum antibiotics. Our sample included 956 patients with sepsis from 2 comparative quarters (fourth quarter 2017 and fourth quarter 2016). Data collection and analysis were performed by using electronic medical records and an internal data warehouse. **Result:** The use of NEWS criteria for self-activation allowed for a mean sepsis recognition time of 1.6 minutes after triage, whereas the average sepsis recognition time was 22 minutes when criteria for systemic inflammatory response syndrome (SIRS) were used. We observed overall CMS bundle compliance of 59% with sepsis response self-activation and 8% without a sepsis RN present. We also noted a 0.36-day decrease in length of stay as well as a decrease in mortality index in patients with septic shock, from 1.24 to 0.96. Furthermore, the percentage of patients with sepsis requiring rapid response activations after being admitted to the acute care units decreased from 8.2% to 5.2% after the self-activating sepsis nurse intervention. **Conclusion:** Our results strongly support the role of an autonomously self-activating sepsis RN in improving outcomes of sepsis and SEP-1 compliance. Furthermore, NEWS may be a better trigger for activation than SIRS, given the decreases in length of stay, mortality index, and rapid response activation and the increase in bundle compliance. Further research is needed to confirm the outcomes of this study to address the global sepsis crisis.

RS17 Inpatient Nurses' Perceptions of Workplace Violence

Leslie Wood, Kimberly Walker, Han Estep, Lauren Morata, Morgan Perkins, Thaisha Soler; Lakeland Regional Medical Center, Lakeland, FL

Purpose: In a comprehensive, tertiary referral hospital in Central Florida, researchers sought to evaluate perceptions of workplace violence among inpatient nurses. To effectively intervene and prevent workplace violence, one must first understand the type and prevalence of violence that nurses experience. Underreporting is common as "no one got hurt" or violence is an "expected part of my job," further complicating identification of the true prevalence. **Background/Significance:** Sixty-two percent of nurses experience physical and/or verbal abuse, and the prevalence of incivility among nurses ranges from 27% to 85%. Workplace violence in the emergency and psychiatric departments is well studied; however, research among inpatient nurses is less robust. The association between nursing specialty and workplace violence is not identified in the literature. **Method:** Once approval was received from the institutional review board, a single-center, cross-sectional study was implemented that used an anonymous, adapted version of the Survey of Violence Experienced by Staff. From August 1, 2018, to August 31, 2018, 1133 inpatient nurses were administered the survey via their organizational email. Descriptive statistics were used to summarize the data, and the χ^2 test was used to analyze categorical data. The primary outcome was the type, prevalence, and reporting of workplace violence among inpatient nurses, as well as the prevalence of workplace violence by specialty. Specialties included trauma, medical, surgical, cardiac, maternal-child, critical care, oncology, and pediatrics. **Result:** A response rate of 22% was observed (n = 253). Verbal abuse was most common (85%), followed by physical assault (61.3%) and threatening (57.7%). The occurrence of verbal abuse and threats was similar among the different specialties, but physical assault differed

significantly between specialties (χ^2: $P=.19$; $P=.16$; $P=.002$, respectively). The frequency of violence differed significantly between nursing specialties for those experiencing verbal abuse, threats, and physical assaults from patients, as well as verbal abuse from coworkers. The majority of inpatient nurses, more than 50%, never or only sometimes reported acts of violence, depending on the type and source. **Conclusion:** Workplace violence is a global nursing concern, extending beyond mental health and the emergency department. Although future research is necessary, identification allows the opportunity for research into interventions to reduce workplace violence, such as implementation of Healthy Work Environment standards. Trends identified within specialties regarding the increased exposure to violence warrant further investigation. The study supports previous published reports citing the lack of reporting.

RS18 Perceived Value of PCCN Certification

Stephanie Nursey; St John Medical Center, Tulsa, OK
Purpose: To determine the perceived value of PCCN certification among progressive care unit nurses within specialty progressive care units at a single institution. A secondary aim was to determine if the perceived value of PCCN certification is different among certified and noncertified nurses. Understanding these outcomes is important because certification is currently a focus for national hospital scoring systems, satisfaction, and quality improvement. **Background/Significance:** Evidence has shown that specialty certification improves patients' outcomes, validates knowledge, increases retention, and improves nursing satisfaction. PCCN is a relatively new nursing certification with variable adoption among existing progressive care nurses. Perceived value is a concept to delineate the intrinsic and extrinsic benefits of certification among nurses, which can be used to facilitate certification adoption. **Method:** A descriptive, comparative, cross-sectional study that used an online survey to measure progressive care nurses' perceptions of the value of PCCN certification. The online survey used the Perceived Value of Certification Tool (PVCT), a previously validated questionnaire that measures nurses' perceptions of the intrinsic and extrinsic benefits of specialty certifications. A convenience sample of bedside progressive care unit nurses within a single-site, 1280-bed quaternary medical center was used. Statistical analysis was performed with a Student *t* test to evaluate the difference between certified and noncertified nurses. **Result:** We received 52 of 423 distributed surveys, a response rate of 12.3%. The overall PVCT mean cumulative score was 58.5 out of 72, the mean intrinsic score was 39.9 out of 48,

and the mean extrinsic score was 19.5 out of 24. PCCN-certified nurses reported higher mean overall perceived value of PCCN certification than did non–PCCN-certified nurses (59.9 vs 58.5, $P=.05$). PCCN-certified nurses also reported increased mean perceived value across clinical competency, confidence in clinical abilities and achievement, professionalism, and professional growth, which was indicated by higher intrinsic PVCT scores (41.2 vs 39.9, $P=.046$). No significant difference was found for extrinsic PVCT scores (18.7 vs 18.6, $P=.07$). **Conclusion:** PCCN certification had a high overall perceived value among progressive care nurses. Perceived value of certification was lower among non–PCCN-certified nurses, particularly their perception of the positive effect that the certification will have on the individual. These results suggest that efforts to enhance PCCN certification that aim to increase the perceived value of certification are likely to markedly improve PCCN certification rates, which would lead to improved retention and better outcomes for patients.

RS19 Smart Staffing: Reinventing Rapid Response Through Critical Care Nurse Leadership

Fiona Winterbottom, Beverly Rainey, Amy Ott; Ochsner Medical Center, New Orleans, LA
Purpose: To evaluate the addition of 24/7 proactive expert nurse rounding to an existing rapid response system (RRS). Expected outcome measures included a decrease in cardiac arrests outside of the intensive care unit (ICU) and an increase in support perceived by frontline staff. **Background/Significance:** RRSs have been used reactively to decrease rates of cardiopulmonary arrest (CPA) outside of the ICU. Proactive expert nurse rounding models have demonstrated influence on staff support. A preintervention survey showed that nurses in general care areas lacked confidence in knowing when to escalate concerns about clinical deterioration and trigger rapid response calls. The survey also showed that existing RRS responders were struggling to manage competing priorities of on-demand rapid response consultations and ICU care. **Method:** This mixed-methods study was done to evaluate a proactive expert nurse rounding program in a 550-bed academic facility. The study period was December 2017 and June 2018, and the sample included 12 000 patients. A 24/7 expert critical care nurse (ie, a rapid response nurse [RRN]), proactively rounded on high-risk patients in general care areas and responded to nurse calls and inpatient emergencies. High-risk patients were identified by use of an electronic version of the Modified Early Warning Score. Any patient with a score >4 had their chart reviewed by the RRN to assess the need for a proactive round. Nurses in

general care areas were given a phone number to call if they had concerns about a patient but did not want to trigger the RRS. **Result:** RRNs reviewed 4000 charts, made 1700 proactive rounds, responded to 400 RRS activations, facilitated 300 ICU transfers, intubated 46 patients, and participated in 36 non-ICU CPAs. Cardiopulmonary arrests outside of the ICU decreased from 10.5 to 2.7 per 1000 discharges (74% decrease), and inside of the ICU they decreased from 7.8 to 5.0 per 1000 discharges (36% decrease). The risk-adjusted mortality index decreased from 0.85 to 0.77. Peer-group ranking improved on the Hospital Survey of Patient Safety, which suggests a positive cultural shift in perception of patient safety. Postintervention survey data showed that 77% of staff thought that proactive rounding by the RRN supported staff and patients. **Conclusion:** Implementation of a proactive expert critical care nurse rounding program that leverages technology to identify high-risk patients and allows penetration of critical care expertise outside of the ICU can decrease CPAs outside of the ICU and can increase support to frontline staff.

RS20 Descriptive Analysis of Intensive Care Unit Patients Who Transition to Comfort-Focused Care

Sharon O'Donoghue, Ann Anderson, Noah Tocci, Ashley O'Donoghue; Beth Israel Deaconess Medical Center, Boston, MA

Purpose: The Institutes of Medicine has established comfort-focused care (CFC) as a national safety goal, because approximately one-fifth of Americans die during or shortly after an intensive care unit (ICU) stay. Care at the end of life should be patient-centered; however, many patients in the ICU are not able to make their decisions known because of the severity of their illness. The purpose of this research was to describe characteristics of acutely ill ICU patients who transitioned to CFC. **Background/Significance:** Many adults have given little or no thought to their end-of-life wishes and thus have not captured their desires in writing or through conversation with family members. Additionally, ICU patients are generally extremely ill and often unable to articulate their goals of care. Improving our collective understanding of ICU patients who transition to CFC may assist critical care clinicians in better aligning interventions with patients' goals of care. **Method:** A descriptive, retrospective secondary analysis was conducted in 2 medical ICUs at a single institution in Boston. All patients admitted in a 4-month period were included, and those who transitioned to CFC were compared with those who chose to be full code. Demographic data consisted of gender, race, age, Sequential Organ Failure Assessment (SOFA) score, and length of stay. Pain scores and the Richmond Agitation-Sedation

Scale (RASS) were investigated to compare pain and alertness levels. **Result:** Of the 196 patients, 20.4% (40) were made CFC and 79.6% (156) were designated as full code. Of those who transitioned to CFC, 38% (15) were female, whereas the full-code group consisted of 49% (77) females. The mean age for the CFC group was 66.7 years, and the mean age of the full-code group was 60.7 ($P = .03$). Length of stay in the ICU was much longer in the CFC group: 8.3 days vs 4.6 days ($P < .001$). Patients in the CFC group were sicker (SOFA score, 5.9) than those in the other group (4.4; $P = .02$). The pain scores for the 2 groups did not differ significantly, but the RASS scores for the CFC group were drowsy and lightly sedated versus lightly sedated to alert in the full-code group ($P < .001$). **Conclusion:** Older, sicker patients who spent a longer time in the ICU were more likely to transition to CFC. Given that the CFC group had a higher severity score, ICU clinicians must be better at providing families with information about chances of survival. Patients who received CFC were drowsy or slightly sedated, including on the day before the transition to CFC. This is an encouraging finding, suggesting that patients who transition to CFC may be able to participate in this process more than originally thought.

RS21 Pressure Injury Among Extracorporeal Membrane Oxygenation Patients

Deborah Burns, Mae Ann Del Fierro; New York Presbyterian Columbia University Medical Center, New York, NY

Purpose: To determine if the risk for pressure injury (PI) increases after extracorporeal membrane oxygenation (ECMO) decannulation. Question: Does ECMO decannulation increase the risk of a hospital-acquired pressure injury (HAPI) developing? Hypothesis: ECMO decannulation increases the incidence of HAPI. **Background/Significance:** Pressure injuries significantly increase patients' pain and suffering and are associated with longer hospital stay and higher risk of mortality. Postoperative cardiac surgery patients who receive ECMO therapy may be at an even higher risk of a PI developing. No research is currently available on the risk of a HAPI developing after discontinuation of ECMO (ECMO decannulation). **Method:** Study inclusion criteria included patients with reported HAPIs who had received ECMO from January 2015 to December 2017. A trained research assistant abstracted data from patients' electronic medical records. We analyzed the effect of post-ECMO decannulation on the incidence of PI at the patient daily level. The final multilevel regression model accounts for the clustering effect of each patient day nested within each patient and controls for the hospital day from admission to the current calendar date, sex, age, and race. This

study was approved by the Columbia University Institutional Review Board. **Result:** There were 18 patients in our study with 44 distinct pressure injuries—4 female patients and 14 male patients, with a mean age of 60 years (range, 22-79 years) and a mean stay of 104 days (range, 23-395 days). The mean PI incidence per day was 0.003 before ECMO, 0.540 during ECMO, and 0.810 after ECMO decannulation. As compared with the ECMO phase, the PI incidence per day doubled after decannulation (incidence rate ratio, 2.0; 95% CI, 1.61-2.48). **Conclusion:** Compared with the ECMO phase, the PI incidence per day after ECMO decannulation almost doubled. The data indicate that additional preventative strategies may be necessary to help reduce the development of PI after ECMO decannulation.

RS22 Facilitating Early Extubation in Cardiac Surgery Patients Using a Protocol-Driven Approach

Debra Farrell, Myra Ellis, Kelly Kester, Emily Robinson, Alexandra Rudolph, Bradi Granger, Mollie Kettle, Heather Pena, Carrie Parker, Tonda Thomas, Allen Cadavero; Duke University Hospital, Durham, NC

Purpose: To reduce intubation time in postoperative cardiac surgery patients by using a standardized extubation protocol and redesigned patient care processes. The ability to extubate patients soon after cardiac surgery is based on a number of factors, including the patient's baseline physiological condition and comorbidities, workflow processes, and provider preferences. Targeting factors that influence unnecessary intubation time is essential to improve practice. **Background/Significance:** The Surgical Thoracic Society defines prolonged ventilation as >24 hours and defines early extubation as occurring within 6 hours of surgery. Early extubation is associated with fewer adverse outcomes, shorter stays in the hospital and intensive care unit, and lower costs. Longer ventilation times are associated with higher health costs and increased risk of pulmonary complications. Standardized weaning protocols effectively reduce the duration of mechanical ventilation. **Method:** We used a pre-post improvement science approach to evaluate the use of an evidence-based fast-track extubation (FTE) protocol in stable postoperative cardiac surgery patients. Intubation time and barriers to extubation were tracked in a baseline cohort (cohort 1; n = 101) in one quarter of 2016. An interdisciplinary team developed a nurse-driven FTE protocol designed to provide guidance for patient progression and address barriers identified in the baseline cohort. We monitored postimplementation data the same quarter after implementing the protocol (cohort 2; n = 211). A data form was designed and institutional review board approval for exemption was obtained. Data

collection was done in Excel and analysis was done in SPSS. **Result:** There was no statistical difference in demographic characteristics by cohort. The mean age was 61 (SD, 13.7) years, and a majority of the patients were male (n = 209; 67%) and white (n = 253; 81%). Cases were similar for both groups: 266 elective (85%), 46 urgent (15%), and 0 emergent. In cohort 1, 48.5% (49 of 101) of patients were extubated in <6 hours. Following implementation of the FTE protocol, 72.5% (153 of 211) of patients in cohort 2 were extubated less than 6 hours following cardiac surgery. Patient barriers to extubation are similar in both groups; system-specific barriers were significantly decreased. Overall, the median time was 6.1 (SD, 3.7) hours in cohort 1 and 4.6 (SD, 9.3) hours in cohort 2. **Conclusion:** Use of a standardized FTE protocol improved the likelihood that a stable cardiac surgery patient would be extubated within 6 hours after surgery. Collaboration among the interprofessional team to develop the FTE protocol and address barriers to early extubation identified in the preintervention data collection was central to the success of the project. Practice drift is less likely to occur in an intervention with full team input and support.

RS23 Visitation Practices in Magnet and Pathway to Excellence Facilities With Adult Intensive Care Units

Kerry Milner, Sheryl Cosme, Susan Goncalves, Suzanne Marmo; Sacred Heart University, Fairfield, CT

Purpose: To describe visitation policies in US facilities with adult intensive care units (ICU) that have been designated as Magnet or Pathway to Excellence. **Background/Significance:** Practice organizations recommend unrestricted or open visitation in adult ICUs to support family-centered care. Results of a 2009 national study indicate that 70% of adult ICUs had restrictive visitation. Nurses working in Magnet and Pathway to Excellence facilities are required to routinely translate best evidence into practice and demonstrate improved outcomes to keep their designation. These facilities may provide a unique perspective on successful implementation and sustainment of open visitation in the ICU. **Method:** This study used a cross-sectional, descriptive survey design. We obtained a list of facilities designated as Magnet (n = 471) and Pathway to Excellence (n = 155) from the American Nurses Credentialing Center website in January 2018. We searched the websites of facilities with an adult ICU for specific ICU visitor policies between February and April 2018 and interviewed health care workers employed at these facilities between May and September 2018. Policies were evaluated for 24-hours-a-day, 7-days-a-week visitor access and restrictions on visiting hours, visit duration, visitor number, visitor type (eg, immediate

family only), and visitor age. **Result:** A total of 404 Magnet facilities and 133 Pathway to Excellence facilities had operating adult ICUs. Of these, 51% (n = 274) reported open visitation for the ICU on their website, and interviews with mostly ICU nurses revealed that only 18.44% (n = 99) of facilities had implemented open visitation policies without any restrictions. In facilities with restrictions (n = 167), interviews revealed restrictions on number of visitors (61.68%), visitor age (55.69%), and visitor hours (eg, change of shift report or rounding; 18.56%). Only 7 (4.19%) facilities defined visitor type as immediate family only. **Conclusion:** In this national sample of adult ICUs, we found that less than 20% of facilities designated as Magnet and Pathway to Excellence were following the recommended practice of unrestricted visitation. Research is needed to identify effective practices for implementing and sustaining open visitation in adult ICUs.

RS24 Effect of an Enhanced Oral Suction Intervention on Aspiration and Clinical Outcomes

Mary Lou Sole, Xin Yan, Steven Talbert, Melody Bennett, Elizabeth Penoyer, Devendra Mehta, Aurea Middleton; University of Central Florida, Orlando, FL

Purpose: Intubated patients are at risk for aspiration of oral and gastric contents that leak around the cuff of the endotracheal tube and into the lungs. Complications such as inflammation and infection can result, contributing to negative outcomes such as prolonged ventilation and lengths of stay (LOS). This study tested a standardized, enhanced oropharyngeal suction intervention delivered every 4 hours on prevention of aspiration, ventilator-associated conditions (VAC), and clinical outcomes. **Background/Significance:** Except for backrest elevation, existing bundles for ventilator patients do not address interventions to prevent aspiration. The volume of oral secretions is often large, which contributes to aspiration risk. Amylase (oral) and pepsin (gastric) are not normally present in the lungs and are biomarkers for aspiration. We hypothesized that an enhanced oral suction intervention (NO-ASPIRATE) would lead to less aspiration, fewer VACs, fewer ventilator hours, and a shorter ICU/hospital LOS than usual oral care. **Method:** A clinical trial design was used. We enrolled 513 patients > 18 years of age within 24 hours of intubation and randomized the patients into groups. Every 4 hours, we performed oral care and deep oral suctioning with a catheter in NO-ASPIRATE patients and performed usual oral care in control patients. We collected oral and tracheal specimens for amylase at baseline and every 12 hours. Analysis for pepsin was added during the study. We recorded demographic and outcome data including VAC, ventilator hours, and ICU/hospital LOS. Patients who were enrolled for at least 36 hours (n = 410) were included in the analysis: 206 patients in the NO-ASPIRATE group and 204 patients in the control group. Data were analyzed with the χ^2 test, the t test, and the general estimating equation. **Result:** Demographic data were comparable between groups ($P > .05$). Patients' characteristics were as follows: mean age, 58.6 years; 59% male; 26% racial minority; mean Acute Physiology and Chronic Health Evaluation II score, 23. Although values were lower in the NO-ASPIRATE group, no significant differences were found between groups for mean level of tracheal amylase (15 462 vs 13 251 U/L; $P = .49$), mean level of tracheal pepsin (5 vs 4 U/L; $P = .55$), ventilator time (159 vs 147 hours; $P = .21$), or ICU LOS (10.8 vs 9.8 days; $P = .16$). VAC rate and time to VAC were similar between groups ($P = .86$). The general estimating equation subanalysis showed that the NO-ASPIRATE treatment was superior to the control treatment in patients with a baseline amylase level of 1500 to 5000 U/L. Also, patients in the NO-ASPIRATE group had 4 fewer days in the hospital (23 vs 19 days; $P = .05$). **Conclusion:** The NO-ASPIRATE group had a shorter hospital LOS, and a subgroup had reduced aspiration of oral secretions. Although not statistically significant, shorter ventilator hours and ICU LOS for the NO-ASPIRATE group are clinically significant outcomes. The lack of statistical significance may be the result of standard oral care delivered by the study team every 4 hours and a small effect size for some outcome measures. Oral care, including oral suction, remains an important nursing intervention.

RS25 Transitioning Into Critical Care With Interprofessional Education

Kelly Rossler, Katherine Hardin, Jennifer Taylor; Louise Herrington School of Nursing, Baylor University, Dallas, TX

Purpose: To compare the effectiveness of simulation-based interprofessional education with the effectiveness of online interprofessional education in promoting interprofessional socialization and collaboration of newly licensed registered nurses transitioning into critical care practice. This proposal addressed research priorities focused on optimizing the contribution of the critical care nurse and defining best methods for interactional team-based learning. **Background/Significance:** It is vital for newly licensed registered nurses to enter critical care practice with exposure to the interprofessional

collaboration core competencies of values, role responsibilities, communication, and teamwork skills. Unfortunately, many nurse internship programs emphasize unit-specific education and demonstration of nurse-related skill competencies. This research informs transition into practice by identifying effective interprofessional teaching strategies. **Method:** A convergent, parallel, mixed-methods design addressed the research questions. A convenience sample consisted of new nurses (N = 57) accepted into a critical care internship and randomized into either a control group (interprofessional online module) or an experimental group (interprofessional simulation-based education). The American Association of Critical-Care Nurses Synergy Model for Patient Care provided theoretical context. An experimental pretest-posttest design examined group differences and change over time. The Interprofessional Socialization and Valuing Scale (ISVS) and the Interprofessional Collaborative Competency Attainment Survey (ICCAS) were analyzed with SPSS. Hermeneutic phenomenology was used for qualitative data collection and analysis. **Result:** Wilcoxon signed rank test results revealed statistically significant changes in interprofessional attributes of values/socialization and competency attainment from pretest to posttest scores in both the control group ($z = -3.447$, $P < .001$) and the experimental group ($z = -3.91$, $P < .001$). The Mann-Whitney U test results revealed no significant differences in these interprofessional attributes, with $U = 295.5$, $z = -0.54$, $P = .59$ for the ISVS and $U = 264$, $z = 1.14$, $P = .26$ for the ICCAS. Qualitative themes emerged as humanizing communication and feeling safe with interprofessional rounding. Quantitative and qualitative data merged within interprofessional socialization, values, and collaboration. **Conclusion:** Online modules and simulation-based interprofessional teaching methods provided a means for newly licensed registered nurses to gain exposure to and learn about interprofessional core competencies. Participants verbalized how learning their role prepared them to become effective interprofessional team members. Findings inform best practice initiatives centered on identifying effective teaching strategies for new critical care nurses to develop an interprofessional collaborative practice.

RS26 Effects of a Phase II Cardiac Rehabilitation Program on Patients' Depression

Michael LeGal; Banner Health System, Phoenix, AZ
Purpose: To describe how many patients who have come through a cardiac rehabilitation (CR) program after a cardiac event self-identified as depressed with the Center for Epidemiologic Studies Depression Scale (CES-D) tool and to determine the severity of the depression. Differences in levels of depression of patients were evaluated before and after the CR program and were assessed by procedure, gender, and age. **Background/Significance:** Screening for depression upon intake and completion of a phase II CR program may influence the type of interventions implemented by CR staff and reduce depression. We examined patients before and after a phase II CR program who self-reported as depressed via the CES-D score and we also assessed scores by procedure, gender, and age. We further identified the types of interventions used for those who were depressed. **Method:** We conducted a pre-post intervention study. Using a convenience sample, we collected data on CES-D scores before and after the program and by type of procedure, gender, and age from May 1, 2013, to April 30, 2017. We conducted independent and paired t test and analyses of variance. **Result:** Among 132 patients, 25 (19%) self-reported as depressed and most who were depressed had at least 1 intervention (n = 22, 88%). For the total group, patients had significantly lower CES-D scores at the end of the CR program (mean [SD], 6.87 [6.64]) than they did before they started the program (8.79 [8.09], $t = 0.53$; $P = .003$). For only depressed patients, CES-D scores were also lower at the end than they were at the start of the program ($P < .001$). No differences were found in level of depression based on type of procedure, gender, or age. **Conclusion:** Interventions used by CR staff were effective in decreasing depression scores from intake to completion of a phase II program. Our results and recommendations were reviewed and discussed with the stakeholders to improve and standardize depression interventions.

RS27 Audible Pause Alarms During End-of-Life Care: Implications for Alarm Fatigue

Sukardi Suba, Michele Pelter, Xiao Hu; University of California, San Francisco, CA
Purpose: To describe electrocardiographic (ECG) arrhythmia alarm frequencies following a decision for end-of-life care. **Background/Significance:** Studies show that a high number of alarms, of which the vast majority are false or nonactionable, is associated with alarm fatigue. Continuous ECG monitoring is generally not recommended at the end of life. Few studies have described how often audible ECG alarms occur after the initiation of comfort care. This issue is important because unnecessary monitoring alarms during end-of-life create noise for patients and families and can significantly contribute to alarm fatigue. **Method:** This was a secondary analysis from an alarm study conducted at a tertiary academic medical center. In the primary study, the investigators collected data on all physiological

alarms from the bedside monitors in 461 intensive care unit patients during a 31-day study period. For the present study, we conducted chart reviews in all patients who died during the study period and determined which patients had pause rhythm alarms and transitioned to comfort care. We then determined the frequency of pause alarms after the initiation of comfort care and the alarm audio level. We specifically focused on pause alarms because our preliminary data showed that pause alarms commonly occurred among patients with comfort care. **Result:** Of 461 patients, 42 patients (9%) died during the study period. Out of those 42 patients, 10 patients (24%) had transitioned to comfort care because of various diagnoses (eg, liver failure, chronic myelomonocytic leukemia, cholangiocellular and hepatocellular carcinoma, non–small cell lung cancer, and hemorrhagic stroke). These 10 patients had a total of 116 pause alarms, 87 (75%) of which occurred after initiation of comfort care. Of the 87 alarms, 48 alarms (55%) were audible, 29 alarms (33%) were manually muted, and 10 alarms (12%) were of unknown audio level. All pause alarms were set at a warning level, which means the bedside monitor will sound 2 beeps. **Conclusion:** In 10 patients on comfort care, 50% of pause alarms remained audible. The 29 muted alarms indicated that nurses had spent unnecessary time to silence the monitor. Nurses who are unaware that the patient is on comfort care also may mistakenly treat these alarms and cause undue distress (ie, administer medication, pacer, call code blue). Since these arrhythmia alarms are unnecessary, changing the alarm setting into inaudible could reduce alarm noise and could alleviate alarm fatigue.