RESEARCH ORAL POSTER PRESENTATION AWARD WINNERS

RS1 Efficacy of a Bioburden Reduction Intervention on Mobile Devices of Critical Care Nurses

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Purpose: To evaluate the efficacy of an intervention designed to decrease the measured bioburden and fomite potential of nurses' mobile devices in a cardiovascular intensive care unit over 12 months. Personal mobile devices and shared, unit-provided mobile (Voalte) devices were evaluated. **Background/Significance:** Mobile devices have become an extension of our hands, which is especially true in modern health care delivery. A high contamination rate of hospital staff mobile devices with pathogenic organisms has been demonstrated in numerous studies. Because of the substantial use of mobile devices in patient care areas, there is concern that staff mobile devices may be vectors for hospital-acquired infections. To our knowledge, there is no recommended best practice for mobile-device decontamination. **Method:** Sanitization stations, with visual guidance for use, were installed on the intensive care unit. A convenience sample of 300 mobile devices of critical care nurses was sampled. UltraSnap ATP swabs (Hygiena), analyzed by a Hygiena SystemSURE luminometer, were used to estimate bioburden on the surface of personal and Voalte mobile devices. Mobile devices were collected without prior staff notification and then swabbed using a standardized, aseptic technique. The samples were analyzed using a SystemSURE Plus luminometer; results were expressed in relative light units. Swab samples were collected preintervention and at 1, 3, 6, and 12 months postintervention. **Result:** At 1 month postintervention, a 53.8% reduction was noted in personal device contamination, and a 39.9% reduction was noted in Voalte device contamination. Reductions (from baseline) in personal device and Voalte device contamination were 59.6% and 54.1%, respectively, at 3 months; 60.7% and 58.2%, respectively, at 6 months; and 84.1% and 78.3%, respectively, at 12 months. **Conclusion:** The installation of sanitization stations and encouragement of staff to routinely decontaminate mobile devices in the patient care area can sustainably reduce contamination of staff nurses' mobile devices. This intervention may reduce the potential for transmission of hospital-acquired infections in the intensive care unit and promote a safer work environment for staff and patients. Additional research is warranted to define appropriate sanitization intervals and the ideal method of decontamination.

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RS2 Experiences of Nurses Caring for Patients Diagnosed With COVID-19: A Qualitative Study

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Purpose: To understand the experiences of intensive care unit (ICU) nurses located in central Texas caring for patients with a diagnosis of COVID-19. **Background/Significance:** Coronavirus disease 2019 has spread rapidly throughout the world and was characterized by the World Health Organization as a pandemic in March 2020. The care of patients with COVID-19 is predominantly carried out by the nurse at the bedside, resulting in extended exposure and potential infection. Qualitative studies exploring nurses' experiences internationally have emerged in the literature. Nurses are experiencing fear, anxiety, stress, physical exhaustion, emotional exhaustion, and feelings of powerlessness to handle patients' conditions. **Method:** A qualitative descriptive design was used. From a purposive sample, 11 nurses from 1 ICU participated in semistructured interviews. Interviews were audio recorded and transcribed verbatim. Data were analyzed using content analysis. Line-by-line coding was performed, themes and subthemes were created, and consensus about the findings was achieved among the research team. An audit trail was maintained and member checking was used. **Result:** Most participants identified as female (n = 7; 63.6%) and White (n = 8; 72.7%); the median age was 30 years (range, 23-60 years). The mean years of critical care experience was 7.2 years (range, 1-28 years). The experiences of ICU nurses caring for patients with COVID-19 resulted in 4 themes: emotions experienced, physical symptoms, care environment challenges, and social effects and coping strategies. Nurses described stress and anxiety related to contracting and transmitting COVID-19. They described physical symptoms: primarily headaches and sleep problems. All participants described personal protective equipment challenges. Coworker support, verbalizing experiences, and distractions were used to cope. **Conclusion:** Providing care for patients diagnosed with COVID-19 during the pandemic adversely affected this group of ICU nurses. They experienced psychological, physical, and social hardships. The findings from this study inform health care leaders about ICU nurses' psychological and physical experiences during extended exposure to patients with COVID-19. Resources that are focused on nurses' psychological and physical symptoms experienced as a result of the pandemic are needed.

RS3 Relationship of Enteral Feeding to Microaspiration in Critically Ill Adults

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Purpose: To explore the association between pepsin A in tracheal secretions and enteral feeding. A secondary purpose was to explore the relationship between pepsin A and other feeding-tube variables, such as the overall number of gastrointestinal tubes and distal feeding tube location. This study is aligned with American Association of Critical-Care Nurse's research mission to develop a culture of inquiry and seeking answers to questions. **Background/Significance:** Pepsin A, a gastric proteolytic enzyme, is associated with esophageal epithelial damage and ventilator-associated pneumonia when aspirated into the pulmonary system. Pepsin A subclass is a proxy measure to confirm tracheal microaspiration of gastric secretions. Our cut score was not previously reported. **Method:** Secondary data analysis was performed from a clinical trial of adults who were intubated and receiving mechanical ventilatory support to assess a suctioning intervention on aspiration outcomes (the NOASPIRATE study, US National Institutes of Health [NIH] project no. 1R01NR014508-01A1). All 513 patients received ventilatory support (range, 36 hours to 14 days), head-of-bed elevation was 30°, and oral care was performed every 4 hours. Tracheal aspirates were collected every 12 hours. From a subset of 283 patients, tracheal pepsin A was measured using a proteolytic enzyme assay method. Pepsin A concentration of 6.25 ng/mL or greater was considered positive for microaspiration. Abundant microaspiration was defined as positive pepsin A concentrations measured in greater than 25% of patient events. Data were analyzed with χ^2 and Fisher exact tests. **Result:** Positive pepsin A concentrations were measured in 111 of the 283 patients (39%) at least once (n = 307 of 2408 events; 13%). Abundant microaspiration (>25% of the time) was present in 56 of the 283 patients (20%). The majority of patients were White, non-Hispanic men (mean age, 60 years), and most (222 of 283; 78%) received enteral feeding. Enteral feeding was associated with positive tracheal pepsin A levels ($\chi^2 = 5.019$; $P = .02$). Enteral feeding occurred at 206 of 307 (67%) positive pepsin events. Abundant microaspiration was also associated with enteral feeding ($\chi^2 = 11.872$; $P = .001$). Enteral feeding was in progress at the time of 315 of 476 abundant microaspiration events (66%) versus no feeding at the time of 161 abundant microaspiration events (34%). **Conclusion:** This may be the first study to show a relationship between positive tracheal pepsin A concentration (≥6.25 ng/mL) and enteral feeding. Pepsin A concentration is a more specific measure of microaspiration because pepsin A is located only in gastric secretions. Patients receiving enteral feeding had more positive pepsin A and abundant microaspiration events than patients who did not receive enteral feeding. Strategies to mitigate microaspiration in this population require additional exploration.

Disclosure: This study received financial support from the NIH. The NIH grant number for the NOASPIRATE study is 1R01NR014508-01A1.

RESEARCH POSTERS

RS4 Common Infection Prevention and Cannula Care Practices Among ECMO Centers

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Purpose: With the surge in use of extracorporeal membrane oxygenation (ECMO), a portable heart-lung device used in intensive care units to support patients with heart and/or lung dysfunction, there is an increased need to identify best nursing practice. There is a lack of guidelines and limited published knowledge; thus, the purpose of this study was to discover the best practices related to ECMO cannula care, infection prevention, and early detection of infection in ECMO centers across the United States. **Background/Significance:** The prevalence of nosocomial infections in patients receiving ECMO is 10% to 12%, higher than in other critically ill patients, and the mortality rate is higher as well, at 38% to 56%. Variability in practice in caring for patients receiving ECMO has been noted in ECMO centers across the United States and worldwide. **Method:** A cross-sectional, qualitative survey design to discover unpublished common practices in ECMO centers was used. Member ECMO centers or centers that have achieved Center of Excellence Recognition from the Extracorporeal Life Support Organization were contacted. Health care providers who actively performed ECMO cannula dressing care and who were familiar with the hospital's policy and practices for infection prevention and ECMO maintenance care were surveyed through phone interviews. The content of the interviews and shared protocols were analyzed with descriptive statistics to identify common practices among ECMO centers. **Result:** In total, 16 of 20 ECMO centers participated in the study, which represented 7 adult centers, 7 pediatric and neonatal centers, and 2 centers with patients of all ages. Daily bathing with chlorohexidine gluconate (CHG) for infection prevention was performed in 93% of centers. For dressing care, 100% of centers reported using CHG as a cleansing solution. Use of alcohol pads or caps for disinfection when accessing the circuit was reported in 73% of centers. Also, 73% of centers did not perform systematic surveillance.

Increase in white blood cell count, fever, turning down the ECMO heater, hemodynamic changes, and signs of sepsis were commonly used terms to describe infection in patients on ECMO. **Conclusion:** Some common practices across ECMO centers were identified in this study. Findings also highlighted variability in practices across ECMO centers regarding infection prevention and cannula care. The knowledge gained from this study lays a foundation for additional research and development of an evidence-based protocol for infection prevention and nursing care for patients receiving ECMO.

RS5 Examining Validity of the Glasgow Coma Score as a Predictor of Patient Outcome in Patients Without Traumatic Brain Injury

Amy Li, Arianna Barnes, Sonja Stutzman, Aardhra Venkatachalam, DaiWai Olson, Folefac Atem; University of Texas Southwestern Medical Center, Dallas, TX

Purpose: This secondary analysis was done to analyze admission Glasgow Coma Scale (GCS) scores as a predictor of outcomes of patients admitted to a neuroscience intensive care unit (NSICU) who did not have a traumatic brain injury (TBI) diagnosed. The primary outcome was modified Rankin Scale (mRS) scores at discharge. **Background/Significance:** The GCS was created as an injury severity score that measures 3 independent components—best eye opening, best motor response, and best verbal response—to predict outcomes after TBI. The scale is now commonly used to evaluate the level of consciousness in patients with and without TBI despite the limited evidence validating the use of GCS in patients without TBI. **Method:** Patients were admitted to 4 hospitals between 2015 and 2019. Patients diagnosed with TBI were excluded from this study. To model admission GCS as a predictor of discharge mRS, with potential confounding variables of age, race, sex, ICU length of stay (LOS), and hospital LOS, SAS (version 9.4) was used. Analysis of variance was used to analyze the relationship between the 3 levels of admission GCS by continuous variables, and χ^2 test was used to determine the relationship among the 3 categories of admission GCS in reference to admission mRS and discharge mRS. A generalized estimating equation (GEE) was used to test the primary hypothesis that admission GCS is a predictor of outcome in patients without TBI. **Result:** The mean age of the 3507 patients in this study was 57 years, 52% were female, 77% were White, and 89% were non-Hispanic. Upon admission, 2488 patients (72%) had a GCS score ranging from 13 to 15 (mild injury), 402 (12%) had a GCS score of 9 to 12 (moderate), and 535 (16%) had a GCS score of less than 8 (severe). Most (3085 patients; 90%) had an admission mRS score of 0 to 3; 340 (10%) had an admission mRS score of 4 to 6. At discharge, 2194 patients (63%) had an mRS score of 0 to 3, 1930 (55%) had an mRS score of 4 to 6. The GEE modeling showed that GCS scores at admission do not predict outcomes, such as mRS score, at discharge in patients who are not diagnosed with TBI (GCS score <8: $Z=-7.89$, $P<.001$; GCS score 8-12: $Z=-4.17$, $P<.001$). **Conclusion:** There is insufficient evidence to support the use of the GCS score in patients without TBI to predict patient outcomes. Therefore, it is suggested that the scale should not be used in these patients and clinicians should use a more reliable and validated clinical assessment tool in this population.

Disclosure: Coauthor DaiWai Olson is editor in chief, *Journal of Neuroscience Nursing*.

RS6 Family Intensive Care Unit Video Rounds During the COVID-19 Pandemic

Mary Lough, Brian Phillips; Stanford Hospital and Clinics, Stanford, CA

Purpose: This prospective study was conducted to examine use of a video-enabled tablet with a secure online conferencing platform to involve remote family members during morning rounds in a surgical-trauma intensive care unit (ICU) at an academic medical center. The purpose was to identify facilitators and barriers to a tele-ICU intervention during the COVID-19 pandemic when families could not be physically present. Evaluation from the perspective of both family members and the ICU team was planned. **Background/Significance:** The *American Association of Critical-Care Nurses TeleICU Nursing Practice Expert Consensus Statement* (2018) states that "shared goals, shared knowledge, and mutual respect are the necessary elements to create the successful integration of the teleICU environment and bedside nursing practice." During the COVID-19 pandemic, a tele-ICU intervention was pilot tested at rounds to share the daily plan of care for patients receiving mechanical ventilatory support, and those who were were sedated or unresponsive, with the patient's family who were absent because of the pandemic. **Method:** This descriptive, iterative, mixed-methods study included families of patients in the surgical-trauma ICU and ICU nurses, physicians, and pharmacists. The study was conducted during 3 noncontiguous weeks during May and June 2020. It was approved by the local institutional review board. Families provided verbal consent by phone before rounds. Consent documents and video-conference information were sent via email. Family logged in before the start of rounds. A video-enabled tablet at the patient's bedside was used to transmit 2-way video and audio. After rounds, family members were interviewed about their experience

by phone, and ICU professionals completed an anonymous online survey. **Result:** A total of 14 families reported on their experiences with tele-ICU video rounds, and 28 ICU clinicians (19 nurses, 6 physicians, and 3 pharmacists) completed online surveys. After the first week, the families' feedback was that the video-tablet visual was excellent but the audio quality was poor. In week 2, an external microphone-speaker was added and, in week 3, families were requested to use headphones in the home setting. Even with these iterative changes, the audio remained problematic and was negatively affected by the facemasks worn by ICU staff due to COVID-19. Despite these challenges, family video participation at rounds was reported as beneficial by families and ICU clinicians. **Conclusion:** The ICU video rounds are a promising way to engage families in ICU care. However, technical difficulties hindered scaling of the intervention, because clinicians and families described the audio as inadequate for families to understand the content of ICU rounds. Other cost-effective technologies with high-fidelity audio are needed to allow families to remotely participate in ICU video rounds, especially when in-person attendance is restricted, such as during the COVID-19 pandemic.

RS7 Has the Current Opioid Epidemic Resulted in a Change in Distress for Nurses Administering Opioids?

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Purpose: Nurses are responsible for pain management, which is especially crucial in intensive care units (ICUs). Yet, this can be troubling as nurses weigh clinical variables such as opioid-induced neurologic impairment along with personal variables like clinical judgment. Many of these variables, however, often are not accounted for. The purpose of the study was to examine perceptions of pain management in neuroscience intensive care unit (NSICU) nurses through the use of a phenomenology qualitative approach. **Background/Significance:** Patients with subarachnoid hemorrhage require lengthy NSICU stays as a result of their risk for vasospasm. During this time, they rely on the use of opioids for pain management. Nurses are put in a position to weigh expansive sociological factors, such as the opioid crisis, against their patients' reported pain level. Nurses in the NSICU face this challenge with little direction on how to appropriately address both of these factors, and the literature on nurses' perception of pain management is limited. **Method:** This qualitative study used phenomenological inquiry. Nine nurses were interviewed regarding their perceptions of opioid administration among patients with acute subarachnoid hemorrhages in an NSICU setting. The level of saturation was met at 9 interviews. Interviews were transcribed and coded using hermeneutic cycling to uncover themes and subthemes. After individual coding of each interview, intra-analysis across interviews for themes and subthemes was performed. Rigor was addressed through member checks, rich and thick descriptions, and field notes, which were included in the analysis process. **Result:** Emerging themes included discernment, hesitation, process efficiency, security, and family involvement. The most prevalent, discernment, was supported by 20 codes organized into the subthemes of clinical judgment, education, presentation of pain, and nursing interventions. All nurses described a reliance on education or intuition to guide decisions to give opioids. Hesitation, the next main theme, was supported by 14 codes organized into the subthemes of preventing desired outcomes and creating undesired outcomes. Most nurses referenced hesitation in administering opioids due to the perception that the drug effects would result in a poorer neurologic examination. Member checks confirmed themes and minor modifications were made. **Conclusion:** Nursing perceptions are important in guiding quantitative research and evidence-based practice: both lead to better patient outcomes. This qualitative study of nurses' decision-making in opioid pain management for patients with subarachnoid hemorrhage showed that discernment and hesitation should be given careful consideration when providing nurses training on pain management in an NSCIU setting. Continued study of these perceptions is needed for staff and patient safety and satisfaction.

RS8 Health Care Providers' Perceptions of Treatment for Patients in the Intensive Care Unit With Ambiguous Treatment Wishes

Kanako Yamamoto; St Luke's International Hospital, Tokyo, Japan

Purpose: When patients in the intensive care unit (ICU) tell their proxies, "I do not want to be on life support," they rarely clarify what "life support" means to them. The aim of this study was to identify differences in the perceptions of medical professionals from different wards and specialties regarding their assessments of and treatment decisions for patients in the ICU who had ambiguous treatment preferences. The findings of this study could help support advance planning designed to protect patients' autonomy. **Background/Significance:** Patients in the ICU often have 2 or more decision makers (eg, an intensivist and attending physicians), as well as other providers. With the line between

life-saving treatments and life support often unclear, medical providers can have difficulty determining appropriate treatments for patients with ambiguous treatment preferences. Although providers may perceive treatment decisions for such patients differently according to their specialty, few studies have investigated these differences. **Method:** This cross-sectional study was conducted between September and December 2019. Of the 400 Japanese hospitals with ICUs that were asked to participate in the study, approval was obtained from 171. At each hospital, 1 to 5 providers were sampled from each of 4 wards/groups: intensivists, surgeons, ICU nurses, and surgical wards. Participants were asked about their awareness of and responses to cases in which patients had informed their proxies that they did "not want life support." Two specific events were identified: (1) a sudden change in a patient in the ICU after surgery, and (2) a sudden change in a patient being treated for aspiration pneumonia. **Result:** Responses were obtained from 598 participants. More than half of the intensivists and ICU nurses reported that they respected family members' preferences in cases where patients' treatment preferences were ambiguous. Intensivists were characterized by giving treatment explanations based on their values, including statistics about possible survival rates, while also considering the surgeon's wishes. Surgeons were more likely to choose life-saving treatments. Nurses sought information from the family to determine the patient's real treatment desires. In contrast to ICU nurses, surgical-ward nurses tended to respect the patient's prior wishes. **Conclusion:** The results indicated that the medical providers interpreted patients' intentions differently according to their specialty. In other words, professionals in different treatment areas had distinctive ways of respecting patients' autonomy. For this and other reasons, it is necessary to find ways for patients to communicate their wishes to their medical providers and agents when they enter the hospital, so these wishes can accompany them when they are transferred from one department to another.

RS9 Hospital-Acquired Pressure Injury Risk Prediction Among Critical Care Patients

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Purpose: To develop and evaluate models predicting hospital-acquired pressure injuries (HAPIs) among patients in the surgical intensive care unit (SICU), using data easily accessible from the electronic health record (EHR). **Background/Significance:** Hospital-acquired pressure injuries are considered preventable; however, prevention may require measures not feasible for every patient because of cost or competition for time of nursing care. Therefore, although routine HAPI risk assessment is standard practice, HAPI actionable risk-prediction tools do not have adequate predictive validity in the SICU population. **Method:** In this retrospective cohort study, EHR data from patients in the SICU who were admitted in 2014 to 2018 were used. The outcome variable was a HAPI worse than stage 2. Predictor variables included nursing assessment data, surgical factors, laboratory values, and vasopressor infusions. Data were split into training and testing sets. Five types of classification algorithms were developed using Python: Keras (artificial neural network), random forest, AdaBoost, Gradient Boost, and (weighted) logistic regression. The models' performance was evaluated on the basis of the area under the receiver operating characteristic curve (AUC) (balancing sensitivity and specificity) and the F1 scores (balancing precision and recall). **Result:** Among 5101 patients included in the analysis, a HAPI developed in 333 (6.5%). The F1 scores of the 5 classification algorithms proved to be a valuable evaluation metric for model performance. The best-performing model based on the F1 score was Gradient Boost (F1 = 0.35; AUC = 0.81), followed by Keras (F1 = 0.34; AUC = 0.82). Models developed with a parsimonious set of predictor variables (ie, albumin, partial pressure of arterial oxygen, surgical time, vasopressin infusion, and length of stay) had F1 scores similar to scores for the models developed with the larger set of predictor variables. In addition, models performed substantially better when addressing class imbalance (rare events) in model training. **Conclusion:** In this study, HAPI development was predicted using a few predictors produced during routine care. Results from this study show the feasibility of using EHR data for accurately predicting HAPIs and that good performance can be found with a small group of easily accessible predictor variables. Research is needed to validate the predictive models in external samples.

RS10 How Much is Too Much? Evaluating Fluid Responsiveness in Patients With Sepsis

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Purpose: To determine if using noninvasive pulse contour technology (PCT) is a feasible intervention to manage fluid responsiveness and resuscitation specifically in patients with sepsis in a community hospital's intensive care unit (ICU). The study data were used to answer the question: If using PCT is feasible, then does using PCT and a nurse-driven algorithm for fluid resuscitation improve patient outcomes overall with respect to death, ICU length

of stay, and ventilator-use days? **Background/Significance:** The leading cause of death of critically ill patients is sepsis. The Centers for Disease Control and Prevention reports that sepsis is estimated to be responsible for 1 of every 3 hospital deaths. According to the Providence Health and Services California Region Report from May to October 2017, 30.74% of patients admitted to the ICU with sepsis died. **Method:** This was a single-cohort feasibility study with 50 participants. Patients were admitted to the ICU directly from the emergency department with a primary diagnosis of sepsis or septic shock and enrolled in the study within 24 hours of admission. Pulse contour technology was used during care of these patients; use of PCT continued for 72 hours or until discharge of the patient from the ICU. A nurse-driven algorithm was used to determine when the patient was to be given intravenous fluids rather than vasopressors, based on fluid responsiveness. Retrospective and prospective data were collected using specific inclusion and exclusion criteria. A certified statistician consulting with our hospital analyzed all data using standard SPSS software (IBM Corp). **Result:** Of the 50 patients who were enrolled in the prospective study, the algorithm was applied 92.3% of the time. This indicated that a nurse-driven protocol for fluid management is feasible in a community hospital ICU. The PCT did guide fluid resuscitation. A comparison of the prospective and retrospective data showed that the mortality rate decreased from 31% to 22%, the number of ventilation-days decreased from 5.3 to 1.3, and length of stay decreased from 6.4 to 3.2 days. Finally, assessment of the prospective data showed that 62% of patients were considered in fluid overload, per definition. No statistically significant relationship was found between fluid overload and procedures performed. **Conclusion:** Using PCT and an algorithm to guide fluid management for patients with sepsis to determine if a patient needs vasopressors rather than fluids yielded positive outcomes. The combined strategy can assist in bed selection from the emergency department, assist the rapid response team, and identify if a patient with sepsis requires the ICU for vasopressor therapy or a step-down unit for fluid resuscitation. It would be beneficial to conduct a larger study to determine if the results translate beyond our community hospital setting.

RS11 Intravenous Smart Pump Usability: A Qualitative Descriptive Analysis

Jeannine Blake, Karen Giuliano, Sarah Fiske; University of Massachusetts, Amherst, MA

Purpose: To compare the user experience of critical care nurses with 2 currently available intravenous smart pumps (IVSPs) and a prototype IVSP designed for improved safety and ease of use. **Background/Significance:** Compliance with the use of the currently available IVSP dose-error reduction (DERS) systems is variable, and intravenous medication administration by current IVSPs is high risk and prone to error. Nurses cite the time required to program the DERS, incomplete drug libraries, and overall complexity of the IVSP user interface as common sources of error. The delivery of even a single dose of medication involves multiple steps and keystrokes, each of which introduces a potential opportunity for error. **Method:** This qualitative descriptive study included 14 critical care nurses in the Boston, Massachusetts, area with at least 2 years of experience. Each nurse completed 3 tasks in a simulation laboratory on 2 unfamiliar IVSPs: 1 currently used in critical care and a new prototype. Tasks included a secondary infusion, a weight-based infusion, and a morphine infusion with a bolus. After completion of the tasks, qualitative data on the programming experiences were collected using a semistructured interview guide. The interview data were line-by-line coded using constant comparison by the first 2 authors, who then performed an in-depth thematic analysis. **Result:** Overall, participants felt that the use of IVSPs improved patient outcomes, saved time, provided valuable error checking, reduced error, and improved the overall safety of intravenous medication administration. Thematic analysis revealed 3 major themes: the importance of supportive features, the IVSP as a key ingredient for effective care, and the value of intuitive IVSP use. All 14 critical care nurse participants strongly preferred the prototype IVSP user interface, especially the touchscreen. Nurses felt that the prototype's ease of use was high because the user interface was intuitive and, in contrast with current IVSPs, minimal training was required for safe operation of the prototype IVSP. **Conclusion:** To improve the safety of intravenous medication administration, the user experience demands that IVSP technology be as efficient and user friendly as possible. The results of this study indicate that the prototype IVSP user interface was perceived by nurses to have achieved a higher level of usability as compared with currently available devices. These findings can be used to inform future IVSP design and as a foundation for additional research on intravenous medication administration safety.

Disclosure: This study was funded initially by Ivenix, Inc, the company that manufactures the pump referred to in this abstract as the prototype pump. All financial support was awarded and disbursed before the authors' involvement, and the authors have no additional financial interest or affiliation.

RS12 Intravenous Smart Pumps: A Descriptive Comparison of Primary and Secondary Infusion Practices

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Purpose: To measure the impact of medication administration practices between 2 types of intravenous smart pumps (IVSP)—a head-height differential system and a cassette system—during actual clinical use. **Background/Significance:** The use of IVSPs has been associated with reductions in medication administration errors but has not eliminated error, including serious error. Secondary infusions, which are commonly used to deliver time-sensitive anti-infective medications and electrolyte replacement, have been identified as particularly error prone. System setup requirements can be complex, are difficult to achieve consistently at the point of care, and have associated failure modes that are not easily detected. **Method:** The study design was observational and noninterventional. Two large (n = 600 and 800 beds) urban hospitals were used as study sites; 1 used a head-height differential system (BD/Alaris; Becton, Dickinson and Co) and 1 used a cassette system (ICU Medical). Data were collected in the critical care and medical-surgical units, and compliance rates with manufacturers' recommended setup requirements for both primary and secondary infusions and secondary-medication administration delay were compared. **Result:** A total of 301 medication-administration observations were included: 102 (34%) for the head-height differential IVSP (medical-surgical unit, n = 51; critical care unit, n = 51) and 199 (66%) for the cassette-based pump (medical-surgical unit, n = 88; critical care unit, n = 111). There was 0% compliance for primary line setup, 84% compliance for secondary line setup, and 1 omitted medication due to a closed clamp with the head-height differential system. For the cassette system, there are no head-height requirements. Two roller clamps were found to be in the closed position upon initiation of the secondary infusion, but the clinician was alerted by an alarm and no medication delays occurred. **Conclusion:** In its most recent guidelines for IVSP safety, the Institute for Safe Medical Practices recommends the use of systems for secondary medication infusion that do not require a head-height differential. With the high level of demand for clinicians at the point of care, manufacturers have the responsibility to improve both clinical workflow and patient safety by creating innovative technology solutions to improve IVSP usability in this very important area of patient safety.

Disclosure: This study was funded by ICU Medical.

RS13 Moral Distress Among Interdisciplinary Critical Care Teams Members: A Descriptive Study

Angela Sandberg; Moffitt Cancer Center, Tampa, FL

Purpose: To describe perceptions of moral distress, using the newly refined Measure of Moral Distress for Healthcare Professionals (MMD-HP) scale among critical care interdisciplinary team members and to assess whether moral distress is associated with team member characteristics. **Background/Significance:** Consequences that occur as a result of moral distress can be numerous and include burnout, decreased job satisfaction, intent to leave the job or industry, as well as impacts on health care professionals' own health and well-being. Patients can be affected by an environment of decreased safety practices and, to a lesser degree, quality of care. The organization can also endure financial instability due to multidisciplinary approach, and examination of causes of moral distress may augment practice and quality care. **Method:** A descriptive cross-sectional design was used with a single set of measurements from interdisciplinary team members in an intensive care unit setting at a National Cancer Institute–designated Comprehensive Cancer Center in the southeastern United States. The MMD-HP is a 27-item instrument designed to measure moral distress. The MMD-HP was provided to registered nurses, oncology technicians, providers, respiratory therapists, and ancillary team members. **Result:** For our sample (N = 67), 3 items had a mean response of greater than 8 (the halfway point): "Follow family's insistence to continue aggressive treatment even though I believe it's not in patient's best interest" (mean [SD], 11.3 [5.25]); "Continue aggressive treatment for a patient most likely to die" (mean [SD], 10.3 [5.37]); and "Witness providers giving false hope" (mean [SD], 9.0 [5.25]). Higher responses for "Continuing to provide aggressive treatment" were associated with "Considered leaving due to moral distress" ($P = .03$) and "Considering leaving now due to moral distress" ($P = .02$). Higher total scores were related to having left or considered leaving a job ($P = .03$). Registered nurses with a master's degree (n = 5) exhibited the most moral distress (mean score, 202.2; $P = .04$). **Conclusion:** Our findings suggest that cases of moral distress associated with aggressive treatment and false hope are areas to explore further in our setting. Action plans can address communication between the team members and between team members and patients. The results of this study also suggest that the MMD-HP is useful in identifying areas for focused efforts at reducing moral distress.

RS14 Moving Intravenous Pumps Outside Patients' Rooms: Nurses' Perception of Safety and Personal

Protective Equipment Use in a Medical Intensive Care Unit

Annette Guerrero, Brittany Robert, Edward Lane, Hailey Kuzow; Stony Brook University Hospital, Stony Brook, NY

Purpose: To assess how the implementation of intravenous medication pumps outside of rooms housing patients who are positive for COVID-19 or whose status is patient under investigation (PUI) affected staff perception of safety and conservation of critical personal protective equipment (PPE) in the medical intensive care unit (MICU). **Background/Significance:** According to the Association for Professionals in Infection Control and Epidemiology, which conducted a survey in March 2020, "Nearly half (48%) of US healthcare facilities surveyed were already out of, or almost out of, respirators to use in caring for a patient with COVID-19." Nursing care had to be adapted to the needs of patients with COVID-19 or whose status was PUI, while trying to maintain PPE for safety. Different methods were used, such as clustering care and moving intravenous medication pumps out of patient rooms for infusion titrations. **Method:** A 5-point Likert scale survey was used to assess perceptions of staff working in an MICU at a tertiary care facility. The survey included questions focused on retrospectively evaluating nurses' perception of their safety, use of PPE, and quality of care provided. **Result:** A total of 32 MICU nurses responded. A majority (84%) of nurses surveyed reported with a rating of 4 or higher that putting intravenous medication pumps outside of patients' rooms improved nurses' safety. A rating of 5 was given by 88% of nurses responding that moving intravenous medication pumps decreased nurses' use of PPE, and 63% of nurses surveyed believed that putting the pumps outside patients' rooms helped with the care of patients with COVID-19 or PUI status. **Conclusion:** Placing intravenous medication pumps outside of rooms of patients with COVID-19 or PUI status was helpful in the care of these patients and made nurses feel safer while potentially decreasing use of PPE. More data must be collected on quality effects of placing intravenous medication pumps outside of patient rooms. Suspension of the requirement to report infection rates during the crisis limited our ability to assess effects on central line-associated bloodstream infections or catheter-associated urinary tract infections.

RS15 Nonventilator Hospital-Acquired Pneumonia Prevention: A 4-Unit Cluster Randomized Study

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Purpose: To determine the effectiveness of a universal, standardized oral-care protocol on prevention of nonventilator hospital-acquired pneumonia (NVHAP) in the acute care setting. **Background/Significance:** According to the Centers for Disease Control and Prevention (CDC), NVHAP is now the most common hospital-acquired infection. There is an emerging body of evidence on the effectiveness of oral care for the prevention of NVHAP. **Method:** This 12-month study (October 1, 2018 to September 31, 2019) was conducted at an 800-bed tertiary medical center. Patients on 1 medical and 1 surgical unit were randomly assigned to enhanced oral care (intervention) and matched with patients on 1 medical and 1 surgical unit that provided usual oral care (control). An American Dental Association oral-care protocol was delivered by nurses and nursing assistants (intervention) versus usual care. Frequency of oral care was tracked. Pneumonia cases were identified using *International Classification of Diseases, Tenth Revision,* codes and confirmed using CDC criteria. **Result:** Total enrollment was 8709. For medical intervention versus the control, the frequency of oral care per day increased from 0.95 to 2.25. There was an 85% reduction in NVHAP (1.40 to 0.21)/1000 patient-days, which was significant by χ^2 test ($P < .001$). The odds of an NVHAP was 7.1 times higher on the control units compared with the intervention units (odds ratio, 7.1, 95% CI, 2.01-24.1; $P = .002$), and Cramer V effect size was 0.52. For surgical intervention versus control, oral care frequency per day increased from 1.19 to 2.02, with a 56% nonsignficant reduction (1.17 to 0.51) in NVHAP rate per 1000 patient-days (post hoc actual power, 0.61). **Conclusion:** These findings add to the growing body of evidence that oral care as a primary source of infection control may have a role in NVHAP prevention. The implementation of effective strategies for consistency in providing frequent oral care during inpatient hospitalization requires more study. In addition, it is not yet understood how much oral care is required to influence dynamic changes in the oral microbiome during acute care hospitalization. Disclosure: This study was funded by Medline, Inc.

RS16 Take 15 Seconds: Stop the Bruise

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Purpose: To determine the effect of applying 15 seconds of pressure on the injection site to prevent bruising after the subcutaneous administration of heparin or enoxaparin. **Background/Significance:** Subcutaneous administration of heparin or enoxaparin can result in bruising and pain. Patients often complain of pain they experience from bruising associated with daily injections. Bruising may limit future sites for injections, and patients may refuse future treatments. **Method:** The nurse applied direct

pressure for 15 seconds with a 2 × 2 gauze immediately after the subcutaneous injection. The injection site was covered with a bandage and labeled with the date and time. A confidential logbook was maintained with the patient's initials, room number, and injection time. Relevant medical history, use of oral anticoagulants, and laboratory values were reviewed. The lead researcher, in collaboration with Biola University nursing students, assessed the injection sites, measured bruising, and recorded results in the confidential logbook. Data were collected for 3 months. **Result:** Of 137 assessments, 106 patients (77%) did not experience bruising when direct pressure was immediately applied to the injection site for 15 seconds. Although there were several relevant diagnoses and abnormal laboratory values that could increase the risk of bruising, the "no bruising" group was not affected. **Conclusion:** Applying 15 seconds of pressure after heparin and enoxaparin injections can decrease the occurrence of bruising, regardless of warfarin, bleeding disorders, or abnormal clotting factors. Reducing bruising improves patient care and patient compliance with treatment. These findings improve clinical practice and the current standard of care that requires basic education of staff, and the intervention requires 15 seconds of additional nursing time at no additional cost to the budget.

RS17 Therapeutic Sound and Agitation: A Systematic Review

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Purpose: Agitation can have a negative effect on the conditions and outcomes of patients in the intensive care unit (ICU), yet many such patients are agitated. There is a need for nonpharmacological interventions that can reduce agitation without the side effects that medications can cause. One possible intervention is therapeutic sound. In this systematic review, the question of how therapeutic sound affects the symptoms of agitation was addressed. **Background/Significance:** Patients with agitation are at risk for an increase in length of stay in the ICU, days receiving mechanical ventilatory support, and morbidity and mortality rates. That therapeutic sound (white noise) soothes agitation has been proven in infants, so it is a plausible intervention to explore for reducing agitation in adults. **Method:** A systematic review was conducted, considering studies in English; of any date; relating to the topics of agitation, dementia, and delirium; that included sound, sound masking, white noise, or acoustics as an intervention in the care of hospitalized patients or residents of nursing homes. The MEDLINE, CINAHL, and Web of Science databases were systematically searched using the following keywords: *dementia, psychomotor agitation, emergent delirium, delirium, white noise, sound masking, sound,* and *acoustic.* The literature was synthesized using the matrix method, and bias was assessed using The Joanna Briggs Institute critical appraisal tools for use in JBI systematic reviews. Last, a critical review was completed. **Result:** Five studies were included in the systematic review, all using a variation of therapeutic sound: white noise, nature sounds, and Tibetan singing bowls. In 3 studies, the Cohen Mansfield Agitation Inventory was used, and 2 studies each used the Richmond Agitation and Sedation Scale, physiological indicators of agitation, and the Mini-Mental State Examination to assess levels of agitation. In the 2 studies that looked at physiological signs, there were significant decreases in blood pressure and heart rate with the intervention of white noise; nonaggressive agitation behaviors decreased by 50% with Tibetan singing bowls, and agitated behaviors decreased significantly with white noise. **Conclusion:** Therapeutic sound is a safe, noninvasive initiative that has positive effects on agitation in adult patients. More research is needed to study its effect on patients in the ICU, but if effective, therapeutic sound could reduce the risks of morbidity and mortality due to agitation, and reduce days of mechanical ventilatory support and in the ICU. There are also potential implications for studying use of therapeutic sound in other conditions related to agitation, such as ICU delirium.

RS18 What Are the Preferred Methods of Communication in Intubated Patients Receiving Mechanical Ventilatory Support?

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Purpose: Impaired communication between intubated, and thus voiceless, patients and critical care nurses is laden with negative psychological and physiological sequelae. Research has focused more on the content patients need to communicate and nurse communication practices for this vulnerable population. Evidence of patient-preferred communication methods is limited. The purpose of this study was to identify the communication preferences of critically ill, intubated patients by using a phenomenological approach. **Background/Significance:** More than half of patients admitted to intensive care units (ICUs) require mechanical ventilatory support. Loss of verbal communication while intubated is prevalent and distressing for these patients. There are a variety of devices to assist communication; yet, their lack of use by nurses signifies minimal patient communication. Lack of vital communication in ICUs increases risk of negative patient outcomes, including complications during hospitalization and long-term effects on health of ICU survivors. **Method:** The study site was a level I trauma center

in Florida. Inclusion criteria were age 18 years or older, alert and oriented, English speaking, and being intubated and receiving mechanical ventilatory support. Palliative care, patients at the end of life, and those with a tracheostomy were excluded. Audio-recorded interviews were conducted within 7 days after extubation. Participants described their experience and how they preferred to communicate while intubated and unable to use their voice. Data collection included verbatim transcribed interviews, clinical characteristics, and demographics. A thematic analysis of participant interviews was completed independently by 2 researchers. Discrepancies were discussed until consensus was met. **Result:** Three major themes of experiences during intubation were identified: physical, emotional, and communication. Three subthemes under communication experience during intubation were identified: attempts, help from family members, and preferred methods. Participants identified technology as their communication preference during intubation. Specifically, tablets were reported as a communication preference because ease of use and adaptability were paramount while being critically ill and intubated. Participants further described their ability to use tablets to write, type, and select from drop-down boxes, pictures, and icons to support communication with nurses and family members during intubation. **Conclusion:** The findings from this study add essential knowledge for development of interventions that promote effective communication between critically ill patients receiving mechanical ventilatory support and critical care providers. Technology-based interventions (eg, tablets) that can personalize patient communication preferences may significantly improve patient outcomes, lower risk of complications during hospitalization, and prevent long-term negative effects on health in ICU survivors.