


Teaching in Clinics

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UTHealth Quality Symposium 2023 Abstracts-1

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2023 UT Health and Memorial Hermann Quality Symposium Abstracts

A Helicopter Air Ambulance Quality Improvement Initiative: Improving Access to Early Fibrinolysis and Percutaneous Coronary Intervention in the Management of Acute Myocardial Infarction

Lesley Osborn MD, Kristi JG King RN, Rodolfo Cabrera RN, Hearty Sarsoza RN, David E Meyer MD MS FACS

Introduction: Early reperfusion improves mortality in patients experiencing acute ST elevation myocardial infarction (STEMI). Definitive care is often delayed in the prehospital setting due to a variety of factors including distance to percutaneous coronary intervention (PCI) facility. Fibrinolysis is appropriate therapy in patients unable to undergo revascularization within 120 minutes. We hypothesized that difficulty accessing medical control and unfamiliarity with current STEMI management were factors limiting our flight crews' use of fibrinolysis guidelines. We further hypothesized that a quality improvement (QI) project involving re-education of flight crew personnel and regional EMS providers, patient care guideline (PCG) updates, and improved access to online medical direction (OMD), would increase mean monthly utilization of fibrinolytics in management of STEMI patients

Methods: A 16-month retrospective analysis (April 1, 2019 – July 31, 2020) of STEMI patients administered fibrinolytic by an urban hospital-based air ambulance (HAA) was performed. Demographic, prehospital, and in-hospital data were collected. A prehospital STEMI quality improvement (QI) project was implemented in August 2020 which included flight crew re-education, regional EMS education, revision of PCGs, and improved access to OMD. We compared post-QI prospective data of STEMI patients transported by HAA (August 1, 2020 – November 30, 2021) to the pre-QI group using Student's t-test.

Results: 28 patients received fibrinolytics during the study period. Each patient received 25 mg of tenecteplase. Prior to QI project, all prehospital fibrinolytic patients were from ground EMS/scene calls. Post-QI, 74% were scene calls and 26% interfacility transfers. Pre-QI mean age 61(+6), 86% male, and mean age post-QI of 59(+13), 87% male. 5 patients (17%) received fibrinolytic pre-QI and 23 (82%) post, equating to a mean increase from 0.31(+0.48) to 1.43(+1.31) patients per month, (95%CI 0.28-1.97, p = 0.003).

Conclusions: HAAs can improve patient access to PCI centers, and as part of a regional approach to STEMI management, fibrinolysis can be safely implemented in the prehospital setting when delay to reperfusion exists (i.e., interfacility transfers and rural areas). Further analysis of scene call location, time to PCI, and patient outcomes, is necessary to evaluate the effect of this QI initiative on regional STEMI care.

Scrub the Hub Challenge: Pediatric Residents Get Their Hands Dirty to Reduce CLABSIs

Background: Part of serious harm reduction includes minimizing central line associated blood stream infections (CLABSIs) with evidenced-based prevention bundles. These bundles include hand hygiene, proper dressing changes, aseptic technique for accessing needleless catheter, standardized tubing changes, and daily review of catheter necessity. These aspects involve both the physicians and nurses in caring for patients together.

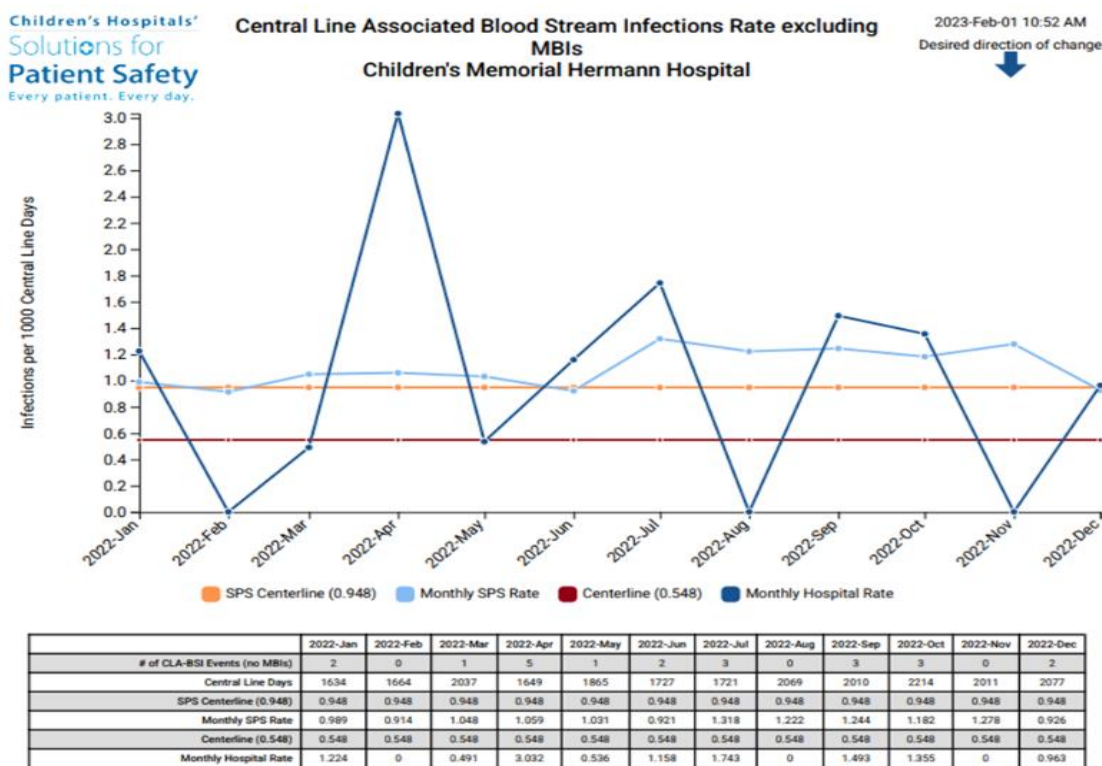
Objectives: Our goal was to emphasize the “aseptic technique for accessing needleless catheter” of the bundle.

Methods: Our pediatric residents participated in a “scrub the hub” exercise. We used Glow-germ on the needlless connector and each participant was instructed to “scrub the hub” as directed. We then assessed each hub using a black light flashlight to see how well they scrubbed.

Results: Our hospital center line for CLABSIs is 0.548 with a Solutions for Patient Safety (SPS) centerline of 0.948 (Figure 1). Our monthly hospital rate is 0.99. Though we are below the SPS centerline and TX Region (Figure 2), we want to advance toward our goal of zero.

Conclusions/Implications: Though pediatric residents do not usually access central lines themselves, it was a useful exercise for them to recognize the importance of aseptic techniques when accessing the needleless catheter. We also discussed other important facets of CLABSI prevention including clustering lab orders, daily discussions surrounding line necessity and assessing patient’s environment and dressing integrity.

Figures/Tables:



Good Catch QI Project

Jean Hsu, Kirthi Devireddy, Sarah Trippett, Rachel Jalfon, Emmalee Holt, Jessica To, Colin Jenkins

A good catch is an event or situation that *could have* resulted in an adverse event but did not reach the patient, whether by chance or through timely intervention. Good catches are an integral part of patient safety.

We aimed to increase patient safety at Children's Memorial Hermann Hospital by increasing good catches. Our goal was to have two good catches reported every month by a pediatric resident by April 2023.

Our first intervention in January 2023 was to educate the pediatric residents on what is a good catch, its importance, and how to record one. We also announced a prize for the first resident to enter a good catch. This intervention led to one good catch but we then found out that it was entered by one of the members in our group. We also learned that since they are entered in the Memorial Hermann variance reporting system, there is no way to identify which resident entered the good catch.

Due to the barriers for entering a good catch, our second intervention was to ease the process in March 2023. We decided to have the residents email our faculty with the good catch instead of entering it into the variance system. The faculty would then enter the good catch into the variance system. This process not only streamlines the process but also allows us to track which resident enters a good catch. This intervention led to another good catch but again was by a member of our group.

Social Determinants of Health Screening in a Pediatric Hospital

Sheela Gavvala, DO; Rebecca Ko1, MD; Daisy Ruiz, LMSW; Michele Cabeza, MD; Krishna Patel, MD; Radhini Bell, MD; Zoabe Hafeel, MD.

Social determinants of health (SDOH) contribute to health disparities and unmet social needs are associated with an increased risk of chronic diseases as well as unnecessary ER visits. Studies show <25% of pediatricians feel prepared to screen for or address social needs and SDOH screening is not currently standardized across US pediatric hospitals. Currently at Children's Memorial Hermann Hospital, we do not

routinely or consistently screen for SDOH. We aim to develop a protocol to identify families with social needs and a process for addressing these needs by efficiently referring families to appropriate resources. A validated 9-question SDOH screener was adopted in coordination with the UTHealth outpatient system and multidisciplinary hospital staff input. Caregivers of patients admitted to the pediatric floor (CCN) on weekdays are asked to complete a voluntary screening questionnaire. The medical team reviews completed questionnaires and determines, based on a set protocol, if unmet need(s) warrants social work consultation or a handout about local resources. The initial PDSA cycle began on April 18, 2023. Our primary outcomes are the percentage of patients screened out of total eligible. Our secondary outcomes include: (1) the number of patients with a positive screen and which question was positive, (2) the number of social work referrals completed out of total referrals made and (3) the number of patients who qualified for intervention but declined it. Ultimately, we hope that this novel SDOH screening process will improve individual patient outcomes while gathering community-level data to better assess factors impacting health inequities.

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Chest Tubes and Suction Removal During Patient Transport

Jeremy Walder, DO, Chithra Poonkunran, MD, Jason Chang, MD, Deptmer Martin, MD, Pushan Jani, MD

Problem Statement: Patients with indications for chest tube placement who require maintenance on suction have been found without suction during transport within Memorial Hermann-Texas Medical Center. Sentinel events have occurred due to chest tubes being inadvertently clamped or placed on water seal. We sought to evaluate the root cause of this interruption in suction.

Background: Specific indications for chest tube placement include pneumothorax, empyema, pleural effusions, and post-surgical management. Patients with pneumothorax may temporarily require continuous

suction on the chest tube to maintain lung expansion. Adverse events can occur if pneumothorax recurs without suction such as hypoxemia, chest pain, hemodynamic compromise, or death.

Methodology: We evaluated the medical charts of 100 patients from May-October 2021 who carried the diagnosis of “pneumothorax” during that encounter. These patients were admitted to any intensive care unit or the medical floor. We collected data which included: presence of chest tube, chest tube procedure note, and presence of chest tube orders.

Results: Among these 100 patients, 72 had chest tube procedures and 40 were performed for pneumothorax. Chest tube order sets were present for 16/72 (22%). Documentation for chest tube removal was only present for 18/72 (25%) patients.

Conclusion: We sought to investigate miscommunication in instructions for maintenance of chest tubes in patients with pneumothorax. With this information we found that some misdirection exists due to the lack of chest tube orders with explicit instructions. We will further meet with nursing management to learn the nursing process with chest tubes during transport to decrease adverse events in this patient population.

Quality Improvement of Nursing Led Oxygen Weaning Protocols

Mary Rouse, Nicola Harris, Jonathan Chow, Robert Faries, Nam Nguyen, Chandler Sargent, Natassa Liantono, Ryan Nguyen, Jebha Babu, Eduardo Somoza, Ray Parlar-Chun, Kristina Tebo

Background: Nursing led oxygen weaning protocols can increase efficiency however the CMHH protocol implemented in 2019 was not being used consistently.

Objectives: The primary objective was to increase awareness and utilization of the nursing-led oxygen weaning protocol in order to decrease duration of nasal cannula use.

Methods: Baseline retrospective data was collected from 11/2019 to 8/2020. Interventions included protocol updates, improving accessibility in CARE-4 EMR, and nursing educational sessions. Post-intervention data was retrospectively collected from 12/2021 to 2/2022. Data analysis used Wilcoxon rank-sum and Fisher

Results: Sixty-two patients were included with 41 (66%) and 21 (34%) in the pre- and post-intervention groups, respectively. There was a significant decrease in the time before attempting oxygen weans averaging 12.3 hours (14.5) down to 0.3 hours (0.41) ($p < 0.001$). There was a modest increase in escalations of respiratory support in the post-intervention group [1 (2%) and 3 (14%)], but it was not statistically significant and averaged < 1 L of flow. Both groups had no readmissions within 7 days. The interventions did not significantly affect duration of oxygen weaning, time on nasal cannula, or length of stay.

Conclusions: Improved use of a nursing-led oxygen weaning protocol significantly decreased the time to oxygen weaning attempts. Although the weaning time and duration of oxygen use both decreased, neither were statistically significant likely due to low sample size. Overall, these initial results indicate potential benefit and the need for further data collection.

Reasons for Discontinuation of Acute Electroconvulsive Therapy: A Descriptive Study

Chen, Joshua MD

Objective: Despite abundant evidence on the efficacy of electroconvulsive therapy (ECT) for major depressive disorder and other psychiatric conditions, there are a variety of reasons that patients discontinue ECT. However, currently little has been researched comparing the reasons for discontinuation of ECT. The objectives of the present study were to evaluate the frequency of reasons for discontinuation of ECT and its relation to demographic factors and patient diagnoses.

Methods: We studied the Texas Health and Human Service's Report on Electroconvulsive Therapy between the years 2017 through 2019 to determine the reasons for discontinuation of ECT. Descriptive statistics were used to assess the reasons for discontinuation across various demographic and diagnostic categories.

Results: The overall discontinuation rate was 17.52%. Among males, discontinuation rate was 20.90%, whereas among females it was 15.64%. Discontinuation rate varied somewhat among race: white (16.38%), Hispanic (21.15%), Black (28.98%), Asian (10.34%), other (4.88%), Native Hawaiian or Pacific Islander (9.09%), American Indian or Alaska Native (37.50%).

Among those who discontinued treatment, the most frequently documented reasons for discontinuation were “patient choice” (39.31%), “noncompliance” (19.19%), “no reason given” (8.76%), “patient improved or transitioned to maintenance” (7.44%), “transportation issue” (7.10%).

Comment: Discontinuation rate was similar to previous studies and varied only somewhat between gender, race, and psychiatric diagnosis, with a particularly high discontinuation rate among blacks compared to other races. Patient choice was by far the most common reason for treatment discontinuation across age group, race, and diagnosis, followed by noncompliance and no reason given. Of note, only a small percentage of patients cited no improvement as a reason for discontinuing ECT.

Use of Assistive Eye Gaze Technology for Communication with Non-verbal Intubated Patients Regarding Care Preferences

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University of Texas MD Anderson Cancer Center collaborators: Katherine Connelly, *Speech Language pathology, Nico Nortjé, Executive Director: Ethics, Department of Critical Care Medicine; Egbert Pravinkumar, Professor, Dept. Critical Care Medicine; Karen Terrell, MBA, Integrated Ethics; Rachel Lynn, Assistant Professor, Dept of Psychiatry.*

Background: Ventilator-dependent patients often experience difficulties with communication due to intubation. Critically ill patients and their loved ones often require crucial conversations to ensure goal-concordant care. Eye gaze technology has been used in people with disabilities or vocal impairments. We hypothesize that non-verbal mechanically-ventilated patients will be able to participate in discussions related to goals of their care using eye gaze technology to communicate

Methods: In this study (IRB number:HSC-MS-22-0211) we evaluated ease of use, accuracy and satisfaction of using the eye gaze device for communication. Purposeful and accurate communicative intent was established by a speech language pathologist (SLP). Five sessions were conducted to determine the appropriate access method, ease of use, accuracy, and satisfaction. Each endpoint was considered as a binary outcome and was considered clinically meaningful if at least 80% positive responses was achieved.

Results: 6/7 mechanically ventilated patients were included. In the preliminary data 83.3% patients had subjective ease of use and device use accuracy. 100% patients passed objective determination of ease of use. 100% patients wanted to use the device to communicate care preferences to the healthcare team(Figure 1), and 83.3% wanted to use device to communicate care preferences to their loved ones(Figure 2). All patients indicated that they recommended the device as a communication tool for themselves in the future and for other patients in similar situation.

Conclusions: In mechanically ventilated patients, eye gaze technology may be a clinically useful tool to communicate wishes and preferences related to their health care.

Figure 1: Communicating Care Preference to Healthcare Team

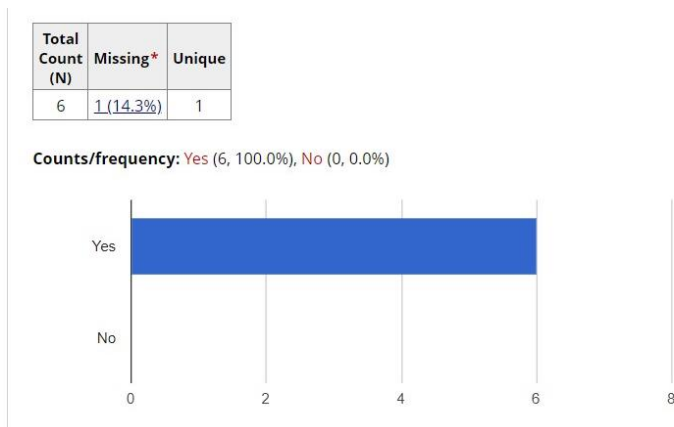
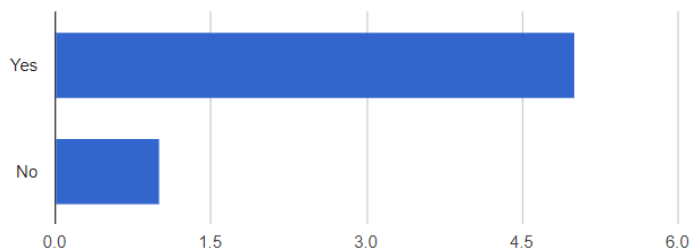


Figure 2: Communicating Care Preferences to Loved Ones

Total Count (N)	Missing*	Unique
6	1 (14.3%)	2

Counts/frequency: Yes (5, 83.3%), No (1, 16.7%)



Eye gaze device Images with sample screens



Review of objective measures of parent readiness for discharge in the Neonatal Intensive Care Unit (NICU)

Annika Gandhi BBA, Alexis Conley, RN, Kelsey R. Anderson, MD, Madelene J. Ottosen, PhD, RN

Background: Policy statements by the American Academy of Pediatrics and National Perinatal Association emphasize the importance of parental or caregivers’ preparedness for hospital discharge from the NICU. However, there is limited guidance on how to evaluate parental readiness for discharge of their infant. The transition from the NICU to home is a critical timepoint and parents may feel unprepared, especially in caring for infants with increased medical complexity and chronic health conditions. The purpose of this systematic review is to identify the objective measures used to assess parental readiness at discharge and to propose a standardized process of understanding parental readiness for NICU discharge.

Methods: A systematic review of MEDLINE, CENAH, Web of Science, and Embase was performed to identify objective measures used to analyze parental readiness for discharge. Inclusion criteria included publications 1) in the English language 2) original research 3) NICU population 4) Tool using objective measures given at discharge and 5) Measurement of parental readiness. After abstract screening, full-text papers were retrieved and their content analyzed.

Results: 56 articles were included in the final analysis. From these studies, information regarding the purpose and methods were extrapolated to create an understanding of the tools used in assessing parental readiness for NICU discharge.

Conclusion: There exists many tools that could be applied to assess parental discharge readiness in the NICU population and utilization of these tools at discharge might better help clinicians assess parental preparation for NICU discharge as well as examining and enhancing a NICU discharge program.

Cost analysis of performing elective hand surgery less than two hours in duration with and without antibiotic prophylaxis

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Objectives

- Design a decision tree to assist in determining when preoperative prophylactic antibiotics are indicated
- Determine cost-savings of holding preoperative prophylactic antibiotics in the setting of elective, soft-tissue hand procedures that are less than two hours in duration

Background: Preoperative antibiotic prophylaxis is not indicated when performing elective, soft-tissue hand procedures of less than two hours in duration. 1-3 However, many hand surgeons continue to administer prophylactic antibiotics, most often cefazolin or clindamycin. 4,5 Antibiotics are recommended for traumatic or bony procedures with implants. Clindamycin is less effective with prophylactic use. Our goal is to determine the cost-savings of not administering preoperative antibiotics in this setting and to create a tool to assist in determining when prophylactic antibiotics are indicated.

Methods: Deidentified data for all hand surgeries performed at the USPI TMC ASC from 12/2020-3/2023 including all elective soft tissue procedures with primary CPT codes 29848, 64721, 26055, 26116, 25000, 26040, 26123, and 64718 was obtained. Procedures with surgery times over 120 minutes were excluded. We determined the cost of administering antibiotics based on current pricing for this period.

inclusion criteria. If antibiotics were held for these cases, \$1,434.78 in direct cost savings and significant staffing time would be saved for the above study period.

Conclusion: Adhering to antibiotic recommendations for soft-tissue hand procedures throughout the Memorial Hermann system could yield thousands of dollars of savings annually and reduce risk to patients.

Implementation of an educational bedside guideline for pediatric traumatic brain injuries in the Pediatric intensive care unit

Thao L Nguyen DO, Danielle Salley, Yogesh Bangale, Kristen Orchard, Dr. Brandon A. Miller, MD, PhD

Abstract:

We devised a project to implement an evidence-based guideline for pediatric traumatic brain injuries (TBI) as an educational resource at bedside for medical staff and providers in the pediatric intensive care unit to improve communication and collaboration. The major objectives of the study were to increase the comfort level of bedside pediatric intensive care unit (PICU) nursing staff when providing care for pediatric TBI patients and to increase their baseline knowledge about pediatric TBI management, with the goal of surveying nursing staff every 3-4 months to assess these objectives. Since the start of the study, surveys from pre-implementation of the bedside guideline and 4-months post-implementation were obtained. There were no significant differences between years of nursing experience or PICU nursing experiences between pre-implementation and 4-months post-implementation. In terms of comfort level on a Likert scale of 1-7, no significant difference existed between the pre- and post-implementation groups. Questions asked included: knowledge of pediatric TBI; admitting pediatric TBI patients; recognizing deterioration in pediatric TBI patients; managing an external ventricular device; and interaction with different physician provider teams. Knowledge assessment scores increased from 5.3 to 6.15 out of a total score of 10 pre-implementation to 4-months after, though this was not statistically significant. Though the data is limited by only two timepoints, comfort levels of PICU nursing providers were at least maintained and assessment scores trended up. With increasing usage of the guideline, we expect the comfort level and baseline knowledge of the PICU nursing staff regarding pediatric TBI to increase.

Utilization in Children with Type 1 Diabetes

Lydia Sobhi¹, Michael Yafi

Hypoglycemia is one of the most severe and life-threatening complications of insulin therapy. The risk of severe hypoglycemia is higher in children with type 1 diabetes (T1DM) than the general diabetic population. Glucagon is a counter-regulatory hormone that is secreted to elevate blood glucose and is available in “Emergency Kits” via injection or nasal spray. We evaluated the experience of our diabetic patients and their caregivers on utilizing these kits by asking them to fill out a survey. In this study, fifty patients and their families participated, with 46 patients (92%) reporting having a kit. Upon verification, eleven families (22%) realized that the medication had expired, and eight families (16%) requested additional training on administration of the kit. Hypoglycemia risk reduction depends on patient education and self-empowerment. If the patient’s hypoglycemic episode is not severe, utilizing simple glucose intake orally is sufficient. Thus, the kit may expire in shelf life, get lost, or not be properly utilized when needed due to lack of experience or training. The results of this study suggest that patients and family members know what to administer during severe hypoglycemic episodes, however, do not always have access to the kits. Additionally, since only 14% of the patients ever used the kits, this suggests that families may forget or choose not to renew the medication due to lack of use and costs. To improve the quality of care of children with T1DM, we should routinely evaluate their access, usage, and knowledge on utilizing Glucagon emergency kits.

Improving Patient Care through Identifying Life-threatening Emergencies from Imaging by Family Medicine Residents

Michelle R. Klawans, MPH; Miguel Fabrega, MD; Tanima Jana, MD; P.D. Nguyen, MD; Jeffrey Chen, MD; Aidan Azher, MD; Jerome Jeevarajan, MD; Jude des Bordes, MBChB, DrPH; Nahid Rianon, MD, DrPH

Background: Inadequate training and lack of confidence in image interpretation by primary care trainees is commonly encountered in acute care settings. Trainees often have to come up with an immediate plan of action before the final report of a diagnostic imaging study is available. Inability to recognize common critical imaging findings may lead to delayed or unnecessary consults, avoidable costs, increased mortality, and poor quality of care. Through an educational intervention, we aimed to improve diagnostic accuracy and confidence in interpreting such images by family medicine residents.

Methods: All 36 residents completed a pre-test in which they were presented 12 imaging studies and selected the best diagnosis for each case from a list, then reported their comfort level in making that diagnosis. The intervention was a two-hour presentation by a radiologist on the significant imaging findings, differential diagnosis, and correct diagnosis for each case. Residents were provided a copy of the presentation slides. A post-test comprised 12 new cases with similar imaging findings and identical diagnoses to the pre-test.

Results: Thirty-five residents completed the post-test. The mean score for correct diagnosis (out of 12 possible) on the pre-test was 4.33 (SD=2.1) as compared to 3.89 (SD=2.5) on the post-test ($p=0.42$). The level of confidence for cases did not match their knowledge score.

One-on-One Quality Improvement Education in a Family Medicine Residency Program

des Bordes J, Goldstein S, Klawans M, Rianon N.

Background: Education in quality improvement (QI) is a requirement in many residency programs. This is to inculcate into the resident's knowledge and skills to continuously improve patient care and reduce medical errors. While QI education takes many forms, not all residents may be fully engaged in learning with traditional class lectures. Providing one-on-one instruction may offer a personalized learning experience and improve outcomes.

Methods: At the beginning of their QI month, each second-year family medicine resident meets with an Institute for Healthcare Improvement certified QI expert for one hour in-person session. A 10-item baseline survey on QI knowledge is administered. Principles of QI, QI charter development, and how QI differs from research are discussed. Residents complete a self-paced online module on QI by the American Academy of Family Physicians (AAFP-TIPS). This is followed by four weekly one-hour sessions where residents are guided to complete a QI charter on a topic of their interest. Each resident completes a post-test survey on QI knowledge at the end of the month.

Results: To date, eight residents have completed the program. Mean QI knowledge increased from 6.13 (± 2.1) to 9.29 (± 0.95) ($p=0.003$). All eight completed the AAF-TIPS QI module. Many felt the program was informative and helped them distinguish QI from research. They also felt comfortable developing their own QI projects.

Conclusion: One-on-one personalized learning experiences could help improve QI knowledge in family medicine residents. A survey will be used to assess the residents' perception of the program at the end of the year.

Gastrostomy Tube Pre-Operative Boarding Pass for Congenital Cardiac Surgery Patients Improves Time to Surgery and Hospital Discharge

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Background/Purpose: Congenital cardiac surgery patients requiring gastrostomy tubes (GTs) at our institution were found to have delays in care. We aimed to standardize the pre-operative process and utilize a stakeholder agreed upon boarding pass (BP) prior to consulting pediatric surgery for GT placement. We hypothesized time from consultation to surgery and hospital discharge would decrease.

Methods: A quality improvement study was performed at a tertiary pediatric center of cardiac surgery patients undergoing GT placement. In coordination with cardiac surgeons, cardiologists, anesthesiologist, and pediatric surgeons, the BP was implemented in May 2022. Stakeholder interviews, consensus building, and process mapping were used to develop the BP. Data was collected on pre-BP patients (n=35) from January 2021-April 2022, and post-BP patients (n=22) from May-December 2022. Patient demographics, clinical details, and post-operative complications within 30 days were collected. Frequentist and Bayesian analyses were performed. A P-value <0.05 was deemed significant.

Results: Of the 57 patients, there was no difference in baseline demographics between groups. Primary drivers of delays in care included pre-operative workup, coordination with anesthesia, and parent/family preparedness. Pre-BP patients had a longer hospital length of stay (65.2 days, IQR: 35.8, 131.1) compared to post-BP patients (40.6 days, IQR: 31.8, 49.9)(p=0.019). Likewise, pre-BP patients had a longer time from consultation to surgery (Pre-BP: 6 days, IQR: 4, 9)(Post-BP: 2.5 days, IQR: 1, 5)(p=0.001), and to hospital discharge (Pre-BP: 19.8 days, IQR: 13.9, 58.7)(Post-BP: 13.8 days, IQR: 11.3, 23.6)(p=0.028). Post-BP experienced a significant reduction in mean total hospital costs compared to pre-BP patients (\$475,922.50 vs \$247,283.50, RR: 0.5, 95% CI: 0.4-0.8)

Conclusion: Implementation of a pre-operative BP for congenital cardiac surgery patients requiring GTs was associated with decreased time from consultation to surgery of 3.5 days and time to hospital discharge of 6 days as well as significant cost savings.

Electromagnetic-Guided Feeding Tube Team – Results and Lesson Learned

Jenny Lee, Robyn Brown, Janelle Headley, Judy Harrelson, Amanda L'Italien, Bailey Weiner, Georgia Fabbrini, Germaine Ngog, Heather Hull, Jana Wieser, Jenna Bjork, Karla Medina, Kristin Scruggs, Olivia Rogal, Tondi Martin

Project Overview: Feeding tube insertion in critically-ill patients is challenging due to decreased gastrointestinal (GI) motility and abnormal GI anatomy. Moreover, blind placement technique sometimes leads to lung placement and pneumothorax. In order to improve outcome, a multi-disciplinary team began to use the Cortrak® system to visually guide tube placements. After about one thousand insertions, this team reduced x-ray exposure for placement confirmation by 50%, incurred no lung insertion, achieved high accuracy (87%) of post-pyloric feeding tube placements, and significantly shortened duration of tube placements to 19 minutes on average.

Background: Although delivering timely and adequate nutrition to critically-ill patients is important in reducing infectious complications, hospital length of stay, and treatment cost, conventional feeding tube placement method comes with several risks. First, traditional “blind placement” technique may not place the tube at the correct locations, especially in patients with decreased gastrointestinal (GI) motility and abnormal GI anatomy. Second, while waiting for a small-bowel feeding tube (SBFT), these patients often quickly accumulate a deficit of >10,000 calories. Third, blind placement technique sometimes leads to lung placements. It is estimated that 14,400 to 21,600 lung placement events occur annually in the U.S. (1.2%-1.8% of total placements). Complication rates range from 0.2% to 7.6%.

To tackle these deficiencies, a multidisciplinary committee evaluated the Cortrak® system that uses electromagnetic sensing technology to guide SBFT placement at bedside. The CNO, CMO, and Medical Director of the Neuroscience Service line provided resources and guidance regarding the pilot and subsequent programs. This presentation summarizes the results and findings after one year of implementation.

Smart utilization of new technologies and a multi-disciplinary approach are key drivers to achieve excellent quality care while reducing cost and adverse events. This project exemplifies this future trend.

Intervention Detail: In summer 2019, a multi-disciplinary committee determined that the Cortrak® system might improve feeding tube placements at bedside. Thirty Cortrak® tubes were placed during a 7-day pilot in winter 2020. Tube locations were 0% lung, 10% gastric, and 90% small bowel, which are in line with a large benchmark study (McClutcheon et al., 2018).

In fall 2021, nine Cortrak® superusers consisting of nurses, dietitians, and speech pathologists used one machine to start placing tubes Monday-Friday, 8am-4pm, after extensive training and competency tests. To prioritize high-risk patients, Cortrak® tube placements were limited to patients who required a post-pyloric feeding tube or had difficult bedside placements. However, this practice created some concerns. First, one Cortrak® machine did not meet the demand from a 800-bed hospital, including many with dysphagia. Second, superusers were too busy with their regular assignments. Lastly, approximately 40% of requests were placed outside Cortrak® hours. Despite these limitations, performance metrics show that this team successfully improved accuracy and efficiency of SBFT placement at bedside.

In winter 2022, this program was expanded by adding a second machine, two full-time and five supplemental tube team clinicians. The team now place tubes Monday–Friday, 7am-7pm, and weekends, 8am-4pm.

Outcomes and Impact: A total of 1100 Cortrak® feeding tubes were placed from October 2022 to January 2023. There have been zero tube placed into lungs or causing pneumothorax. The mean time for inserting a tube was 19 minutes, and the entire placement event took 35 minutes, which is much shorter than that achieved by conventional methods. Accuracy of inserting a tube into small bowel was high at 87%. This success rate agreed with that from a 6290-placements benchmark study (McCutcheon et al., 2018). In this study, SBFT locations were 12.8% gastric and 87% small bowel, with mean insertion time of 15 minutes. This project demonstrates that the new technology and the tube-team approach are safe and reliable for placing SBFT at bedside. It improves nutrition delivery to patients by shortening the time to place or replace a feeding tube. The average time from the physician order to the completion of an x-ray for placement confirmation was only 2.5 hours. More importantly, this method improved safety by reducing the frequency of x-ray exposure by 50%. Incidents of lung placement and pneumothorax were eliminated. The next step is to share our experience with other campuses and expand implementation system-wide over the next two years.

Innovative approach: In less than two years, the project team successfully introduced a new technology to improve SBFT bedside placement outcome and created a multi-disciplinary tube placement team. The technological innovation is to use electromagnetic sensor to allow the clinicians to visualize tube location in real-time, so that the placement is more accurate and safer as a result. Organizationally, the tube team consists of nurses, dietitians, and speech pathologists. This composition encourages collaboration among different disciplines, and frequent placements help maintain expertise. All team members acquired new skills in the process. Performance matrices are tracked and shared monthly to ensure progress.

Osteomyelitis Prevention in a High-Risk Population

Colett Asombang, DNP, Joseph G. Nevarez, MD*

Diabetes mellitus affects approximately 463 million people globally. Peripheral neuropathy and peripheral vascular disease are chronic complications of diabetes mellitus and are precursors for development of diabetic foot ulcers.

Approximately 26 million patients with diabetes develop foot ulcerations annually.

Approximately 83% of major limb amputations occur in patients with diabetic foot ulcers, many complicated by osteomyelitis. Patients, families, and communities suffer from the adverse effects of diabetic foot ulcers and osteomyelitis. Prevention and appropriate treatment of diabetic foot ulcers through staff education should improve patient outcomes and decrease healthcare costs.

Staff education project implemented in a teaching hospital inpatient wound and burn clinic in the southwest region of the United States. Data was collected using a questionnaire and analyzed using Statistical Package for Social Sciences (SPSS) version 27. The inclusion criteria were healthcare workers at the inpatient wound and burn clinic, and students undergoing clinical rotations at this clinic. Exclusion criteria were non-healthcare workers, physicians, podiatrists, and patients.

Comparison of pre- and post-intervention knowledge scores revealed a statistically significant improvement in knowledge of diabetic osteomyelitis amongst participants.

-Increasing staff knowledge through educational projects is shown to lead to better patient outcomes, improved patient satisfaction, and fewer hospitalizations.

-Knowledge deficit was identified amongst staff members for osteomyelitis prevention in high-risk patients.

-Staff knowledge increased following implementation of this educational project.

-Implementation within at risk populations and prompt identification and referral of diabetics at risk for osteomyelitis should result in similar benefits and should be investigated.

Results:

The mean age of the participants was 38.8 years. The majority had a master's level of education (37.5%, $n = 6$), were female (62.5%, $n = 10$), and were employed full-time (87.5%, $n = 14$). Table 1 below includes the outcomes of the knowledge scores from the participants. In short, a comparison of the pre- and post-intervention knowledge scores revealed a significant improvement in knowledge concerning diabetes osteomyelitis among the participants, $M_{\text{before}} = 69.19$ ($SD_{\text{before}} = 11.93$) and $M_{\text{after}} = 92.19$ ($SD_{\text{after}} = 7.63$), $t(15) = -8.80$, $p < .001$. The increase in knowledge was significant across the participants irrespective of gender, age, or educational level.

Table 1

Results of Paired Samples t-test for Staff Knowledge Levels

Outcome	Knowledge Pre		Knowledge post		df	95% CI	t	
	M	SD	M	SD				
Staff educational program intervention	69.19	11.94	92.19	7.63	15	[-28.57, -17.43]	-8.80***	*** $p < .001$

Identifying Gaps in Lipid Management Among Very High Risk Atherosclerotic Cardiovascular Disease Patients at Memorial Herman TMC

Justin N. Nguyen, Patrick H. Kee, MD*

Lipid-lowering therapies (LLTs) are recommended for patients with high-risk atherosclerotic cardiovascular disease (VHR ASCVD). However, identifying and addressing gaps in VHR ASCVD management is crucial to reducing the incidence of recurrent ASCVD events. The aim of this retrospective study is to examine lipid management and related issues among VHR ASCVD patients at Memorial Herman Health (MHH) after the implementation of the 2018 Guideline on the Management of Blood Cholesterol. We conducted a chart review of 500 cases at MHH from January 2019 to May 2020. The measured parameters included LDL testing at admission, LLTs prescribed, and adjustment in LLTs. Our findings revealed that 53% of VHR ASCVD patients at MHH received an LDL test at admission, and 56% had an LDL-C above 70mg/dL. Among admitted patients already on high-intensity statin, 58% of patients had an LDL-C level above 70 mg/dL. Of the patients with an LDL-C higher than 70mg/dL, 65% did not receive an increase in intensity or an additional LLT of non-statin such as Ezetimibe or PCSK9 inhibitor as recommended by the 2018 lipid guidelines. Our research has also identified some potential factors in the gaps of lipid management in these VHR ASCVD patients. By improving the management of VHR ASCVD patients, healthcare providers at MHH can help to reduce the incidence of future atherosclerotic events and improve patient outcomes.

Evaluating the Initial Imaging and LIRADS Utilization in Hepatocellular Carcinoma

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Background: In 2011, the Liver Reports & Data System (LIRADS) standardized the reporting and data collection of hepatocellular carcinoma (HCC) imaging. There is little data on compliance with LIRADS reporting. Variations in reporting can lead to delayed and incorrect diagnosis and mischaracterization of liver lesions. We aimed to identify variations in LIRADS reporting.

Methods: Retrospective study of 64 patients diagnosed with HCC at Memorial Herman Hospital from August 2018 to January 2022. Data were collected based on the ordering physician's specialty, type of modality, and number of additional scans ordered before diagnosis of HCC. Primary outcomes were to identify ordering physicians and if ordered correctly. Secondary outcomes were to review number of liver imaging protocols containing LIRADS.

Results: Most imaging was ordered by Internal Medicine (n=18, 28.1%) and mid-levels (i.e., NP/PAs) (n=23, 35.9%). Abdominal ultrasound (n=31, 48.4%) was the most common initial imaging for suspected HCC, followed by CT abdomen w/ contrast (n=20, 31.3%). MRI abdomen wwo contrast had 50% LIRADS reporting (n=32), CT abdomen wwo contrast had 31.3% (n=20). Of those that received CT abdomen wwo contrast or MRI abdomen wwo contrast, 37.7% of reports had missing LIRADS.

Discussion: Our study reveals low adherence to LIRADS reporting among radiologists. Also, there is an educational gap among physicians in understanding which radiology studies are needed to diagnose HCC. Our plan is to implement educational tools to improve widespread use of LIRADS reporting and awareness of diagnostic imaging.

Follow up: Measuring the Educational Effect of Transforming the Morbidity and Mortality Conference into a Culture of Safety

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Purpose:

The UT Houston Internal Medicine (IM) residency rebranded their M&Ms to “Culture of Safety” (CoS) conferences to promote a safe educational environment for the peer review process. In 2022, we studied these conferences and found them to be received well. However, the data had significant limitations. In order to better describe the effect of this conference, we standardized our data collection.

Methods:

Monthly CoS conferences were held at each of our two main institutions, Memorial Hermann Hospital and Lyndon B. Johnson hospital, from August 2022 to Feb 2023. Cases were submitted by residents and staff in the program. These cases were reviewed by a group of uninvolved residents for education value. After selection, additional case information was gathered from the submitting team as well as ancillary consultants involved in the case. CoS conferences were then carried out in a standardized format using the following structure: overview CoS goals, review of the previous case, presentation of the current case (with involved residents remaining anonymous), small and large group discussions, root cause analysis, and presentation by a faculty member over a related medical learning point. Surveys were administered via Qualtrics before and after the conferences to measure changes in participant confidence in managing the topic at hand.

Results:

Seven conferences were completed and their data was reviewed. See Table 1.

Conclusions:

Overall, we found this format to be effective at providing a productive, educational, and necessary review of safety events.

Table 1. Survey results for individual conferences with “Positive response” (i.e. Score > 3 on 5-point graded scale)

Date	Topic	Pre-Survey	Post- Survey	Delta
8/15	Rhabdomyolysis	n=40	n=15	
	Positive responses to “I feel comfortable diagnosing rhabdomyolysis”	62.5%	87%	24%
	Positive responses to “I feel comfortable treating rhabdomyolysis”	53%	87%	34%
	Positive responses to “I understand the ramifications of not adequately hydrating a patient with rhabdomyolysis in a timely manner”	80%	87%	7%
	Positive responses to “I feel comfortable ordering fluids (type, rate, volume) for my patients”	45%	87%	42%
	Positive responses to “I feel comfortable giving check out to night float on a patient with rhabdomyolysis”	61%	92%	31%
	Positive responses to “I enjoy the format of this conference”	58%	85%	27%
	Positive responses to “Things I learned in this conference will change how I practice medicine”	61%	100%	39%

9/12 Shock		n=21	n=27	
Positive responses to “I feel comfortable diagnosing shock”		71%	81%	10%
Positive responses to “I feel comfortable treating shock”		52%	65%	13%
Positive responses to “I feel comfortable differentiating the different forms of shock”		52%	65%	13%
Positive responses to “I feel comfortable treating the different forms of shock”		43%	58%	15%
Positive responses to “I understand how to recognize cognitive biases in medicine”		48%	92%	44%
Positive responses to “I understand ways to reduce cognitive biases in medicine”		50%	92%	42%
Positive responses to “I feel comfortable escalating care to the ICU”		80%	88%	8%
Positive responses to “I feel comfortable transferring a patient to another hospital”		55%	72%	17%
Positive responses to “I enjoy the format of this conference”		70%	96%	26%
Positive responses to “Things I learned in this conference will change how I practice medicine”		65%	92%	27%
10/10 Heart failure exacerbation		n=20	n=30	
Positive responses to “Do you feel comfortable with evaluation and management of acute on chronic HFrEF?”		80%	87%	7%
Positive responses to “Do you feel comfortable safely reinitiating GDMT in patients with HF exacerbation?”		70%	90%	20%
Positive responses to “How comfortable are you managing acute arrhythmias in the setting decompensated CHF with very low EF (<20%)?”		5%	90%	85%
Positive responses to “Do you feel comfortable recognizing cardiogenic shock and immediate management?”		35%	70%	35%
Positive responses to “Do you feel comfortable escalating care in case of patient deterioration?”		75%	83%	8%
Positive responses to “Do you feel comfortable communicating with consult services when you are concerned about your patient?”		80%	97%	17%
11/7 Adrenal insufficiency		n=5	n=15	
Positive responses to “I feel comfortable diagnosing adrenal insufficiency”		40%	67%	27%
Positive responses to “I feel comfortable treating		20%	73%	53%

	adrenal insufficiency”			
	Positive responses to “I feel comfortable doing a medication reconciliation”	60%	87%	27%
	Positive responses to “I enjoy the format of this conference”	60%	67%	7%
	Positive responses to “What I learned in this conference will change how I practice medicine”	60%	67%	7%
12/5	Acid-Base disorders	n=13	n=18	
	Positive responses to “Do you feel comfortable identifying acid-base disorders?”	81%	75%	-6%
	Positive responses to “Do you feel comfortable identifying the underlying cause of an acid-base disorder?”	69%	79%	10%
	Positive responses to “Do you feel comfortable identifying the etiology of a lactic acidosis?”	81%	83%	2%
	Positive responses to “Do you feel comfortable giving a high-quality hand-off to the night team?”	94%	83%	-11%
	Positive responses to “Do you feel comfortable escalating care in case of patient deterioration?”	75%	88%	13%
1/9	Thyroid toxicosis and amiodarone	n=18	n=37	
	Positive responses to “I understand how to interpret thyroid function tests”	94%	97%	3%
	Positive responses to “I understand how to differentiate the two types of amiodarone-induced thyrotoxicosis”	28%	89%	61%
	Positive responses to “I understand how to diagnose amiodarone-induced thyrotoxicosis”	28%	86%	58%
	Positive responses to “I feel comfortable in treating amiodarone-induced thyrotoxicosis”	17%	76%	59%
	Positive responses to “I enjoy the format of this conference”	67%	95%	28%
	Positive responses to “What I learned during this conference will change how I practice medicine”	56%	97%	41%
2/13	Alarm Fatigue?	n =16	n=26	
	Positive responses to “How comfortable are you with evaluating for the cause of a cardiac arrest?”	69%	81%	12%
	Positive responses to “How comfortable are you with identifying causes for bradycardia?”	50%	81%	31%
	Positive responses to “Do you know what alarm fatigue is?”	69%	100%	31%
	Positive responses to “How comfortable are you with recognizing signs of alarm fatigue in yourself?”	25%	85%	60%

	Positive responses to “How comfortable are you with managing diabetes in patients with renal failure?”	50%	88%	38%
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