# 47th Annual Advocate Aurora Scientific Day

**May 26, 2021 • 8:30 a.m. to 5 p.m.**

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Richard E. Rieselbach, MD

Distinguished Paper Sessions

Richard E. Rieselbach, MD, was born in Milwaukee, educated at the University of Wisconsin-Madison and Harvard Medical School, and trained in Internal Medicine at the University of Illinois and Nephrology at Washington University in St. Louis. Dr. Rieselbach has been a faculty member of the University of Wisconsin School of Medicine and Public Health since 1965.

Dr. Rieselbach served as Associate Dean and Chairman of the University of Wisconsin Medical School’s Milwaukee Clinical Campus from 1974 to 1991. He provided the inspiration and administrative leadership that created the Milwaukee Clinical Campus at Mount Sinai Hospital in 1974. He shepherded its growth from the initial 46 faculty (full-time and clinical) and 18 residents/fellows, to 90 full-time faculty, 158 clinical faculty and 108 residents/fellows in six departments by 1991.

Dr. Rieselbach’s high standards for clinical and academic excellence fostered the recruitment of leaders and the development of innovative programs in primary care, geriatrics, interventional cardiology and electrophysiology, and high-risk obstetrics, which came to characterize the campus. He maintained a strong commitment to caring for the medically indigent and fostering an expectation of community service in faculty and students. He projected a national vision in progressive reform of medical education and health care delivery.
An Innovative Transitions Model of Care to Prevent Cascade of Problems After Delirium: “DDEFY Delirium”: A Pilot Feasibility Randomized Trial

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Background: Delirium, an acute change in cognition, is a common but often preventable disorder in hospitalized older patients. In current standard practice, without a structured process for delirium follow up, older individuals and their family caregivers seemed to be lost, as they transitioned from hospital to home.

Purpose: To pilot test a theoretical post-hospital model of care (DDEFY delirium) to mitigate the complications in patients who had hospital delirium. Sub aims: To examine feasibility (recruitment of potential participants and attrition rate) of delivering this intervention to patients, assess fidelity (adherence) of the DDEFY delirium intervention, and to compare the differences in outcomes of 30-day readmits and 30-day emergency department (ED) visits.

Methods: A pilot feasibility randomized controlled trial for patients with hospital delirium who underwent a post-discharged in-home assessment and education by a delirium transitions nurse, and personalized interdisciplinary team patient recommendations. DDEFY delirium comprises: Diagnose cognitive disorder; review Drugs; Educate patient/family; assess Function; Your health goals. During the COVID-19 pandemic a virtual intervention group was created. Thus, three groups were analyzed: control, intervention (08/19–03/20), and virtual intervention (08/20–12/20).

Results: Among the 35 participants (mean age 80 years (10), 40% Black, 46% female), 40% had a diagnosis of dementia, mean Charles Deyo score of 6.4, mean number of medications 11.4 (3.2), and a mean anticholinergic medication burden of 2.4. The overall rates were: recruitment 44.6%, feasibility 97%, attrition 57.9%, 30-day readmission 21.6%, and there were two participants who had 30-day ED visits. The intervention group rates were as follows: recruitment 44.6%, feasibility 97%, fidelity 100%, 30-day readmission 28.6%, and zero 30-day ED visit readmissions. The virtual intervention group rates were: recruitment 8.8%, feasibility 97%, fidelity 100%, 30-day readmission 0%, and one 30-day-ED visit. A Fisher’s Exact Test yielded no differences in 30-day readmission rates between control vs intervention (p=1.0), control vs virtual intervention (p=.53), nor comparing all 3 groups (p=.49).

Conclusion: The results of this pilot study determined that delivering DDEFY intervention to patients with delirium is feasible. The lessons learned from conducting this study will help us design a larger trial with modifications for older patients with delirium who transition from hospital to home.

Effects of Hallux Valgus Surgery on Balance and Gait in Middle Aged and Older Adults

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Background: Hallux valgus (bunion deformity) is associated with poorer balance, and has been implicated as an independent risk factor for falls in older adults. However, it is unknown what effect hallux valgus surgery has on balance and gait in older adults.

Purpose: To explore the effects of corrective bunion surgery on static and dynamic (i.e., while walking) balance in a group of older adults.

Methods: We enrolled 13 middle-aged and older aged adults (mean age 54.3+/−12.7 yrs, range 47 to 70) who underwent isolated hallux valgus surgery and followed them for 12 months. Preoperative and postoperative gait and balance performance was assessed using non-invasive body worn sensors with standardized and validated testing protocols. Visual analog scale (VAS) for pain and radiographic angles were also assessed.

Results: All subjects reported improvements in pain (VAS mean change -38.3+/−10.3 mm), and all subjects demonstrated improvements in their hallux valgus angles and 1st/2nd intermetatarsal angles (mean change 16.3+/−8.8°, and 5.5+/−3.0°, respectively). While standing in full tandem, center of mass (COM) sway was improved upon by 59% at 1 year postoperative (p<0.05, paired t-test). While most gait parameters demonstrated little change postoperatively, patients tended to spend less time in double support (p=0.08, paired t-test), while gait variability increased by 55% (p=0.03, paired t-test) and medial-lateral sway while walking increased by 43% (p=0.08, paired t-test) 12 months postoperatively.

Conclusion: Balance improved after hallux valgus surgery in our population, particularly when subjects were forced to rely on their operative foot for support (e.g., full tandem). Patients also seemed to walk with greater variability in stride velocity and with greater medial-lateral sway postoperatively, suggesting perhaps increased ambulatory confidence after successful hallux valgus surgery.
Seroprevalence of COVID-19 IgG Antibody in Resident Physicians and Fellows in Metropolitan Milwaukee, Wisconsin

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Background: Resident and fellow physicians are likely at differential risk of exposure to COVID-19 (SARS-CoV-2), based on specific clinical activities. COVID-19 IgG antibody (Ab) is useful to retrospectively confirm prior infection and may help to inform our residency and fellowship programs about the risk of trainee infection.

Purpose: To determine the seroprevalence of Ab in relatively young, healthy resident and fellow physicians by specialty type with varying degrees of known and suspected exposures to COVID-19.

Methods: We performed a cross-sectional study in rotation block intervals during December 2019-June 2020 of all Milwaukee-based resident and fellow physicians. Demographic characteristics, pre-existing medical conditions, working conditions, household size, clinical symptoms, known exposures, acute testing, amount and timing of recorded COVID-19 (hazard) pay, test result prediction and reasons were ascertained by survey and payroll data. The SARS-CoV-2 IgG antibody test (Abbott ARCHITECT, cut-off >1.4) was performed following survey completion. Statistical comparisons utilized descriptive statistics, followed by a simple linear regression to evaluate the relationship between relevant continuous variables.

Results: Survey response rate was 62% (92/148). Of survey respondents, 61% were male, 44% non-White, mean age 31 years; 94% had no underlying conditions, 52% were either Family/Internal Medicine residents. During this time period, ≥32% reported cough, headache, or sore throat; 62% traveled outside of Wisconsin. Overall, 83% thought they had a COVID-19 exposure at work (70% were Family/Internal Medicine residents) and 33% outside work; 100% expressed any exposure. Of those exposed at work, 56% received COVID-19 pay, variously receiving 69 mean hours of such pay (range 0-452). Additionally, 64% wanted to test seropositive; primary reasons included immunity (71%), peace of mind (29%), and concern about an asymptomatic infection or possible transmission (24%). Ultimately, 82% (75/92) had an Ab test completed; one individual (1.3%; 0.0-3.9 95% CI) tested seropositive, was not previously diagnosed, and had received COVID-19 pay.

Conclusion: COVID-19 IgG seroprevalence was quite low in this population of residents and fellow physicians despite any known potential exposure. Our study was similar to the reported 2.3% Ab rate within various Wisconsin health system staff members. COVID-19 seroconversion may be low in properly protected resident and fellow physicians despite any known potential exposures.

Clinical Outcomes of Critically Ill Patients With Coronavirus Disease 2019: A Single Center Cohort Study

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Burns K, MD, Department of Emergency Medicine, Advocate Christ Medical Center, Advocate Aurora Health
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Presented by Esmail Mayar, MD

Background: A global pandemic due to Coronavirus 2019 (COVID-19) was declared in March of 2020 and Cook County Illinois was an early epicenter of the outbreak. Severe COVID-19 may result in respiratory failure requiring mechanical ventilation (MV) or multi-system organ failure requiring various organ support therapies.

Purpose: The objective of this study was to describe the outcomes of critically ill patients with COVID-19.

Methods: This prospective cohort study analyzed adult patients admitted to Christ Medical Center between March 1, 2020 and May 1, 2020 who were treated in a medical intensive care unit for laboratory-confirmed COVID-19. The primary outcome was in-hospital mortality. Secondary outcomes were discharge location and length of stay. Results are stratified by age and need for organ support (mechanical ventilation, renal replacement therapy, and extra-corporeal membrane oxygenation [ECMO]). The primary analysis is descriptive in nature.

Results: In total, 218 patients were admitted during the study period (mean [SD] age 65.2 [13.4]; 129 [59.2%] male; 91 [42%] white, 82 [38%] black, and 34 [16%] Hispanic). Incidence of organ support modalities included 79 (36%) mechanical ventilation, 34 (16%) renal replacement therapy, and 2 (1%) ECMO. In-hospital mortality was 29% (n = 80) overall. For patients requiring organ support, mortality was 33/79 (42%) for mechanical ventilation, 25/34 (75%) for renal replacement therapy, and 2/6 (33%) on ECMO. Rates of discharge home were 63/125 (50%) for patients who did not require organ support therapies, 24/79 (30%) for mechanical ventilation, 3/34 (9%) for renal replacement therapy, and 2/6 (33%) for ECMO. For patient requiring mechanical ventilation, the median (IQR) hospital length of stay was 17.3 (11.3-27.5) days. In patients older than 74 years old that required mechanical ventilation, in-hospital mortality was 11/16 (69%) and 0% were discharged to home.

Conclusion: Need for organ support modalities and increasing age were associated with higher mortality and lower rate of discharge to home during the early experience with COVID-19 at Advocate-Aurora Christ Medical Center. This study provides important baseline data for clinical planning and future research.
Implementing “MOVIN” to Prevent Hospital Acquired Disability

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Presented by Patricia Giovannini, MSN, ACNS-BC, APNP

Background: Older adults are at risk for losing their ability to ambulate independently during hospitalization, a condition known as hospital-acquired disability. Nurses are responsible for maintaining and promoting independent mobility for patients during hospitalization, but multiple personal and organizational barriers have been identified that prevent nurses from walking patients.

Purpose: This study was designed to use a multidisciplinary clinical team to plan and implement MOVIN (Mobilizing Older adult patients Via a systems-based INtervention), a multicomponent intervention to support nurse-led ambulation, change unit culture and improve outcomes for older adults hospitalized on a medical unit.

Methods: This implementation study involved a clinical team collaborating with the creators of MOVIN intervention to prepare and launch the intervention on a 23-bed medical unit in a large urban medical center. Preparation involved adapting MOVIN to fit the site, setting a timeline, engaging organizational stakeholders, and creating job descriptions and role responsibilities for the launch. Implementation involved orienting staff and activating the five MOVIN components including 1) providing psychomotor training to support nurses to gain knowledge/skills to mobilize patients, 2) implementing communication strategies including whiteboards and documentation to track outcomes, 3) providing resources including an ambulation aide and devices, 4) creating ambulation pathways, and 5) establishing a culture of ambulation with feedback and incentives. Evaluation was conducted before and after the 12-week intervention.

Results: The clinical team was successful in implementing MOVIN over 12 weeks with significant increases in percentage of patients ambulated (41% to 72%) and ambulation distance (2.4 to 16.5 miles/week - 361% increase). Post evaluation demonstrated effective deployment and a culture with fewer perceived barriers. Improvements in ambulation were sustained for 6 months after the active intervention was completed.

Conclusion: MOVIN is an innovative systems-based intervention to promote patient ambulation and improve outcomes for hospitalized older adults. Real-world testing demonstrated a significant improvement in ambulation and provided clinical staff with the opportunity to have input and improve the design to support feasibility and scalability for dissemination.

Early Results From a Comparative Study of Staged Hybrid Atrial Fibrillation Ablation With Addition Of Endoscopic Left Atrial Appendage Closure Versus Non-Staged Hybrid Without Closure

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Background: Management of persistent, and long-standing paroxysmal atrial fibrillation (AF) can be challenging, especially in those who have failed pharmacological therapy. Minimally invasive approaches utilizing both epicardial and endocardial ablation such as the hybrid, are widely used now. When used together, the hybrid procedure has synergistic effects. In a staged hybrid approach, the endocardial ablation is performed at least 30 days after epicardial ablation. This allows for epicardial lesions to develop and edema to resolve to aid in evaluating any lesion gaps during the endocardial ablation. Additionally, the left atrial appendage (LAA) has been shown to be a driver of AF arrhythmogenesis, as well as thrombus formation, and has been a focal point for management of persistent AF. Placement of a LAA closure device (AtriClip AtriClip) has been shown to electrically isolate the LAA.

Purpose: To compare recurrence outcomes of atrial arrhythmia between patients who received a staged hybrid ablation with the AtriClip versus those who underwent a nonstaged hybrid with no AtriClip.

Methods: Patients in persistent or long-standing paroxysmal AF underwent ablation using either a staged hybrid approach with AtriClip (n=22) or a nonstaged hybrid approach without AtriClip (n=127). Groups were compared by running a t-test (mean±SD) or Wilcoxon rank sum [median, interquartile range (IQR)]. Categorical data were compared with Pearson's chi-squared test.

Results: Baseline characteristics including sex and presence of hypertension, diabetes mellitus, and coronary artery disease were not significantly different between groups. Mean (±SD) age (years) of patients who had the staged hybrid with the AtriClip (68.2±7.4) was significantly higher than those with a non-staged hybrid without the AtriClip (63.8±8.2) (p=0.018). CHA2DS2-VASc score was significantly higher in the staged hybrid with AtriClip (3±1.51) compared to the nonstaged hybrid without AtriClip (2.25±1.48) (p=0.03). Fewer patients who had undergone a staged hybrid with AtriClip had recurrence of an atrial arrhythmia (n=6, 27.3%) between 3 to 12 months compared to those that underwent a nonstaged hybrid without AtriClip (n=54, 42.5%) (p=0.24).

Conclusion: A staged hybrid approach with LAA closure reduced recurrence of atrial arrhythmias up to 12 months compared to a nonstaged hybrid approach without LAA closure. Although not statistically significant, a higher-powered study would likely help recurrence outcome reach statistical significance.
Assessing the Impact of Geo-Demographic Factors on Antibiotic Prescribing Among Ambulatory Adults With Acute, Uncomplicated Bronchitis

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Background: Acute bronchitis is common and viral causes predominate. Yet, antibiotics are often prescribed despite limited evidence of clinical benefit. Interventions targeting antibiotic prescribing for acute bronchitis have reduced prescribing, but rates continued to remain higher than expected. There is also a paucity of data describing variability in antibiotic prescribing and its determinants; specifically, non-clinical, patient-level factors.

Purpose: To assess the impact of geo-demographic factors on antibiotic prescribing for ambulatory adults with acute, uncomplicated bronchitis.

Methods: A retrospective, observational study of adults discharged from an AAH Wisconsin emergency department, urgent care, or clinic with a primary diagnosis of bronchitis in 2019. Patient, prescriber, site, geographic, and socioeconomic characteristics were compared between patients who were and were not prescribed an antibiotic for an upper respiratory tract infection. As patients could have had multiple encounters during the study time period, we defined a new encounter as >21 days since last visit. Univariate analyses and a multivariable stepwise logistic model were used to determine predictors of antibiotic prescribing.

Results: There were 63,051 unique patients (mean age 48±18 years); 62.7% were female and 78.7% were non-Hispanic Caucasians. Of providers, 66.7% were physicians. Patients who were older (aOR 1.02, 95% CI 1.02-1.02), male (1.06, 1.03-1.10), black (1.21, 1.14-1.29), smoked (1.16, 1.12-1.20), had NP v. MD/DO provider (1.11, 1.06-1.16) or PA v. MD/DO provider (1.06, 1.01-1.11) were more likely to receive antibiotics. Patients who were Hispanic (0.87, 0.82-0.94), or Asian (0.85, 0.75-0.96) were less likely to receive antibiotics. Additionally, patients who had Medicare (0.78, 0.74-0.82), Medicaid (0.73, 0.69-0.77) or Exchange (0.90, 0.82-0.98) or lived in a U.S. Census Block group with larger number of households without vehicles (0.66, 0.52-0.85) were less likely to receive antibiotics, whereas those in an area with more owner occupied housing were more likely to receive antibiotics (1.39, 1.25-1.53).

Conclusion: Our study identified antibiotic prescribing disparities for adults with acute bronchitis at the level of the patient, prescriber, and the patient residential area. Interventions targeting antibiotic prescribing in this population should consider the role these factors have in prescribing decisions.
The Effect of a Novel Glucocorticoid Receptor Antagonist (CORT113176) on Glucocorticoid and Insulin Receptor Sensitive Hepatic Gene (mRNA) Expression in a Neonatal Rat Model of Human Prematurity

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Background: Preterm birth is a global health problem the sequelae of which are not well understood. Hypoxia, a common stressor with prematurity, can affect blood glucose via stress-induced increases in glucocorticoids (GC). GCs are also administered to preterm infants to improve oxygenation; however, this is controversial. CORT113176 (Corcept Therapeutics) is a novel, selective glucocorticoid receptor (GR) antagonist that does not bind to the progesterone receptor. We have demonstrated that CORT113176 (in our rat model of preterm birth) increases baseline corticosterone (due to loss of GC negative feedback) and attenuates hypoxia-induced increases in insulin resistance implicating endogenous corticosterone in postnatal metabolic adaptations to stress.

Purpose: We propose that CORT113176 is useful to evaluate the hepatic effects of endogenous GCs in our rat model of preterm birth by measuring critical GC and insulin receptor sensitive gene mRNAs.

Methods: Postnatal day (PD) 2 rat pups of both sexes (N=5 per treatment/sex) were pretreated with CORT113176 (600 mg/kg IP) or vehicle. After 60 minutes, a group of pups were euthanized with livers collected and preserved in RNA later (baseline). The remaining pups were separated from their dams, exposed to normoxia (control) or hypoxia (8% O2) for 60 minutes, and livers obtained. Total hepatic RNA was extracted, and mRNA expression was analyzed (RT-qPCR) for GC and insulin receptor sensitive genes: GC: Fkbp5, Gilz, Nr3c1 (Gr), Nr3c2 (Mr), Per1, Ttpa. INSULIN: Akt2, G6Pase, Igf1r, Insr, Irs1, Irs2, Pik3cb, Pik3r1, Sreb1p1c.

Results: CORT113176 decreased the expression of all baseline hepatic insulin receptor mRNAs in both sexes, except for G6Pase. Pik3r1 mRNA expression significantly decreased with 60 minutes of normoxic separation (fasting) in males and females compared to baseline and hypoxia separation; this was blocked by CORT113176. In the GC receptor sensitive panel, CORT113176 decreased basal Nr3c1 (Gr) mRNA. Normoxia and hypoxic separation increased Per1 and Gilz mRNA expression; this effect was blocked by CORT113176. Interestingly, Fkbp5 expression, a proposed clinical marker for GR antagonism, was not altered by CORT113176.

Conclusion: The hepatic GC and insulin receptor sensitive gene mRNA panels we developed are sensitive to GR antagonism suggesting they may be a useful addition to Fkbp5. The increase in endogenous corticosterone, acting via GR, is critical in the hepatic response to stress in our neonatal rat model of hypoxia and prematurity.

Evaluation of Immediate Post-Placental Intrauterine Device Insertions: A Quality Improvement Study

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Background: 45% of all pregnancies in the United States are unintended. Immediate post-placental intrauterine device (IUD) placement is a safe, reversible and effective way of preventing unintended pregnancy. However, studies have shown expulsion rates to be higher when IUDs are placed immediately postpartum.

Purpose: Our quality improvement study aimed to identify differences in patient and delivery characteristics, as well as insertion techniques, impacting IUD retention six months postpartum.

Methods: We retrospectively reviewed all patients within one urban and predominately state-insured hospital who received a post-placental IUD following a vaginal or cesarean delivery between February 2019 - February 2020. All data was collected and recorded using REDCap. IUD retention six months postpartum was determined through follow-up visits and patient phone calls. Basic descriptive and inferential statistics were used to compare patients with or without IUD expulsion.

Results: Overall, 101 women had an IUD placed following a vaginal or cesarean delivery. Only 65 (64.4%) had follow-up visit information available. Of those, 11 (10.9%) had IUDs expelled. Mean age of patients was 28 years and mean gestational age at time of delivery was 37 weeks. Patients were predominately African American (66.2%). Patients with expulsions did not differ by most patient and delivery characteristics, with the majority of expulsions occurring after vaginal delivery (72.7%). Patients with expulsions were of lower gestational age (35.9 vs. 38.2 weeks no expulsion; p=0.04) and did not differ by insertion techniques. Of the IUDs that were expelled, 36.4% were inserted by PGY1 residents. While expulsion rates decreased with increased years of experience, they were not statistically different (p=0.80). Overall, the most common insertion method was manual; 51.9% of retained IUDs and 54.6% of expelled IUDs were manually inserted.

Conclusion: For those with follow-up information available, immediate post-placental IUD expulsions were rare. Ultimately, as over one-third of our patient population was lost to follow-up, post-placental IUD placement is likely beneficial as it removes the barrier of needing a follow-up visit to obtain postpartum contraception.
Aortic Valve Repair in Pediatric Patients: Is There Any Development in the Material for Aortic Cusp Extension Valvuloplasty?

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Background: Aortic cusp extension is a technique for aortic valve repairs in pediatric patients, subsequently, the choice of the material used in this procedure may influence the time before re-operation is required.

Purpose: We aimed to assess post-operative and long-term outcomes of patients receiving either pericardial or synthetic repairs.

Methods: We conducted a single center, retrospective study of pediatric patients undergoing aortic cusp extension valvuloplasty (N=38) with either autologous pericardium (n=30) or biomaterial (CorMatrix) (n=8) between April 2009 and July 2016. Short and long-term postoperative outcomes were compared between the two groups. Freedom from re-operation was compared using Kaplan Meier analysis. Degree of aortic stenosis (AS) and aortic regurgitation (AR) were recorded at baseline, post-operatively, and at outpatient follow-up.

Results: Baseline demographics, degree of AS and AR, and length of hospital stay were comparable between groups. At five years after repair, freedom from re-operation was significantly lower in the biomaterial group (12.5%) compared to the autologous pericardium group (62.5%) (P = 0.01). For the entire cohort, there was a statistically significant decrease in the peak trans-valvar gradient between pre- and post-operative assessments with no significant change at outpatient follow-up. In the pericardium group, 28 (93%) had moderate to severe AR at baseline which improved to 11 (37%) post-operatively and increased to 21 (70%) at time of follow-up. In the biomaterial group, 8 (100%) had moderate to severe AR which improved to 3 (38%) post-operatively and increased to 7 (88%) at time of follow-up.

Conclusion: In terms of durability, the traditional autologous pericardium may outperform the new material (CorMatrix) for aortic valve repair using the cusp extension method.

Effects of Brief Mental Performance Training on Emergency Medicine Residents’ Stress Response During a Simulated Resuscitation: A Prospective Randomized Trial

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Lovell E, MD, Department of Emergency Medicine, Advocate Christ Medical Center, Advocate Aurora Health
Dodd K, MD, Department of Emergency Medicine, Advocate Christ Medical Center, Advocate Aurora Health
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Purpose: The aim of this study was to assess the effects of the implementation of mental skills training on perceived and actual stress in EM residents during simulated resuscitation scenarios.

Methods: In this prospective, educational intervention trial, PGY-2 EM residents in seven Chicago-area programs were randomly assigned to either receive stress inoculation training or not. One month prior to assessment, the intervention group received didactic training on the “Breath, Talk, See, Focus” mental performance tool. A standardized, case-based simulation session was used for evaluation. Subjective stress response was measured using the state trait anxiety inventory (STAI-6). Objective stress response was measured through heart rate (HR) and heart rate variability (HRV) monitoring. Subjects’ perceptions of the training were measured via survey.

Results: Sixty-one of 87 eligible residents participated (intervention: 25; control: 36). The mean change in pre- and post-case STAI-6 scores were not significantly different between groups (-1.7 vs 0.4, p=0.38). There were no significant differences in mean HRV between groups (-3.8 vs -3.8 ms, p=0.58). There were no significant differences in responses between groups on the Pre-Intervention Survey. On the Post-Intervention Survey, however, in response to the question, “How relevant is the topic of stress inoculation to the resident physician?,” 91% of the intervention group responded “very relevant” compared to 26% of the control group (p <0.01). In response to the question “How important is it to include education about stress inoculation topics in residency training?” 75% of the intervention group responded “very important” compared to 28% of the control group (p <0.01). There was no difference in subjective or objective stress measures of EM resident stress response after a brief didactic mental skills training session, although residents did value the training. More extensive or longitudinal stress inoculation curricula may provide benefit.
Comparison of Treprostinil and Phosphodiesterase Type 5 Inhibitor for the Treatment of Systemic Sclerosis: A Retrospective Study

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Background: Systemic sclerosis is a rare connective tissue disease affecting approximately 100,000 people in the United States (U.S.). Onset is typically between 30-60 years with gradual progression over 11-22 years. Systemic sclerosis is characterized by diffuse fibrosis of the skin and internal organs, vascular insufficiency, and autoimmune dysregulation. Nearly half of systemic sclerosis patients develop digital ulcers, which are profoundly painful, slow to heal and may progress to osteomyelitis or even amputation. Despite the high unmet need, only one systemic sclerosis drug has been FDA-approved for the treatment of systemic sclerosis-associated interstitial lung disease. Thus, there is an immediate need to identify and test therapeutics for the treatment of digital ulcers in systemic sclerosis.

Purpose: To compare the efficacy of treprostinil and phosphodiesterase type 5 (PDE5) inhibitor for the treatment of cutaneous systemic sclerosis.

Methods: A retrospective chart review of adult patients with a clinical diagnosis of scleroderma or systemic sclerosis within Advocate Aurora Health (AAH) was performed. Patients received either treprostinil, PDE5 inhibitor or non-active treatment (No Tx), beyond antibiotic and pain medication, for digital ulcers between January 2011 to March 2020. Treatment efficacy was determined by the rate of digital healing and amputations in each group. One-way ANOVA were used for comparison of the groups. For all statistical tests an alpha of 0.05 was used and all statistical analysis was done using GraphPad Prism and SAS version 9.4. This study was approved by the AAH Institutional Review Board.

Results: Digital ulcers were observed in 12/31 (38%) patients from the treprostinil-treated group, 7/14 (50%) PDE5-treated patients 8/13 (62%) No Tx patients. Treprostinil was successfully used to reduce ulcer burden and avoid amputation in 100% of systemic sclerosis patients (12/12). All digital ulcers in treprostinil-treated systemic sclerosis patients fully resolved, and no new lesions were observed during treatment. Treatment was well tolerated with no major complications. In the PDE5-inhibitor cohort, digital ulcers healed in only 14% (1/7) of patients, and 0% (0/8) of patients improved in the No Tx group (P = <0.001).

Conclusion: The findings support the potential efficacy of treprostinil as a therapy for the treatment of digital ulcers in systemic sclerosis.

Focal Esophageal Hypercontractility is the Commonest Manometric Signature in Symptomatic Patients Presenting to Dysphagia Clinic

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Background: Esophageal Motility disorders are currently classified on the basis of Chicago classification 3.0 which includes the major motility disorders Achalasia, Esophagogastric Junction Outflow Obstruction (EGJOO), Jackhammer Esophagus (JE), and Distal Esophageal Spasm (DES) and minor disorders such as Ineffective Esophageal Motility (IEM) and Fragmented Peristalsis (FP). Normal esophageal pressures are estimated to be between 30-180mmHg. The Distal Contractile Integral (DCI) is a collective measure of the smooth muscle contractility of the esophagus. A DCI between 450-8000 mmHg-s-cm is considered normal. However, many symptomatic patients fail within normal parameters resulting in no defined esophageal disorder under the current system.

Purpose: Evaluate the most common causes of dysphagia.

Methods: Retrospective chart review of all patients in our motility department for esophageal manometry from Apr 2018 to Mar 2020. Studies were classified based on Chicago classification. Smart mouse analysis of distal 2/3 of esophagus was done using Manoview 3.3 software to look for maximum contractile pressures on all individual swallows. 278 patients were evaluated. Distal esophageal pressures over 200mmHg in peristaltic waveform with no other known disorder based on Chicago classification were classified as Focal Hypercontractility (FH). Chi square analysis was used for statistical analysis.

Results: 194 (70%) of the patients were female. FH was the most common manometric signature present in 44 (15.8%) of the patients followed by EGJOO which was seen in 33 (11.9%). JE in 15 (5.4%) of the patients, Achalasia in 17 (6.1%), and DES in 2 (0.7%).13 (4.7%) patients had >1 signature. The most common presenting symptom was dysphagia followed by GERD and atypical chest pain. FH is the most frequent abnormal manometric signature in symptomatic patients and was significantly higher when compared to frequency of Achalasia, JE, and DES (P< 0.05) and was also more frequent than EGJOO (P=0.15).

Conclusion: Despite not being a part of Chicago classification 3.0 nomenclature, FH is the commonest abnormal manometric signature noted in symptomatic patients evaluated with manometry at our center. Focal contractions may reach exceedingly high numbers (250-400mmHg) without meeting abnormality criteria under the current system. Failure to address this anomaly will result in continued classification of these patients as normal. We strongly recommend clinical correlation in patients with this signature until this limitation is addressed.
Evaluation of Opioid Disposal Process for Aurora at Home Hospice Patients

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Methods: This was a retrospective medical records review study of home hospice patients who needed medication managed at date of death within 07/01/2019-12/31/2019. The knowledge of Aurora’s medication disposal policy among home hospice nurses, as well as several ancillary measures, was also evaluated via online survey. Basic descriptive statistics were used to describe the patients and survey responses.

Results: A total of 160 patients met inclusion criteria. We found that 108 (67.9%) patients/families received education on admission, 11 (6.9%) families received education on opioid disposal at the time of death, and 152 (95.6%) of families had an opioid disposal discussion at the death certification visit. Of the 16 nursing survey respondents, only 3 (18.8%) consistently provided all of the necessary education to new patients. However, when education is provided, 14 (87.5%) respondents did provide all the appropriate instructions regarding dosing, administration, side effects, and storage. On death calls/visits, 13 (81.2%) reported consistently providing the appropriate education regarding opioid disposal.

Conclusion: Our results suggest that nursing staff do provide the appropriate education regarding the use and administration of opioids, as well as appropriate disposal practices, but do not do so consistently. The project highlighted the importance of ongoing nursing education regarding safe opioid use, disposal, and awareness of drug diversions. Additionally, tools like pain contracts, drug screens, and drug take back programs will provide more resources to ensure compliance with safe opioid disposal.

Prognostic Implications of Vitamin D in Patients With a Hematologic Malignancy at a Large Health System in Wisconsin

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Methods: Patients with HM from 1/2012 to 12/2019 were evaluated from the electronic health record of Aurora Health Care. IRB approval was obtained. Statistics included descriptive (demographics) and categorical variables analyzed using a chi-squared test. Continuous variables were analyzed using T-tests.

Results: 4,485 patients with HM across 17 oncology clinics were evaluated. The mean age was 68.3 [range:18-99], and patients were predominantly white (89%). Patients receiving chemotherapy, immunotherapy, and radiation therapy were more likely to be tested (p>0.01). The most common HM was chronic lymphocytic leukemia (21%), followed by diffuse large B-cell lymphoma (18%). A total of 645 (14%) patients had a vitamin D test done within a 3-month window either before or after diagnosis, and 172/645 (27%) had VDD. Multiple myeloma patients (25%) were the most likely to be tested for VDD, whereas individuals with primary myelofibrosis (7%) were least likely. VDD was associated with an increased time to initial treatment for all combined HM.

Conclusion: Despite a reported prognostic value, vitamin D levels were infrequently assessed at the diagnosis of HM. The role of VDD and treatment clinical outcomes will be evaluated by stratifying HM tumor types and therapies.
Expansion of a Medication Refill Protocol During COVID-19

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Background: COVID-19 has led to significant challenges in clinic workflows. Prior to COVID-19, our group had created and established a standardized workflow to minimize delays in medication refills. The pandemic has tested the adaptability of clinic workflows worldwide, but robust systems can reduce disruptions and continue to provide continuity of care.

Purpose: To enhance and expand a multidisciplinary medication refill protocol and evaluate the effects of the COVID-19 pandemic on its efficiency.

Methods: We expanded a previously established medication refill protocol designed for nurse-driven management of most prescription refills and compared results between two clinics in Milwaukee. Time between opening and closure of an EMR refill request encounter was measured and compared between the Family Practice Clinic at Aurora St. Luke’s (FPC) and the Family Care Clinic at Aurora Sinai (FCC), for periods pre-pandemic (06/01/2019 - 03/31/2020) vs pandemic (04/01/2020 to 12/31/2020). Time for medication refill completion was also compared between providers (FM faculty, residents, and nurses). Mood median test was used to compare the median time for a medication refill completion. Levene’s test was used to test for equal variance surrounding the median of each group.

Results: Cohorts included both clinics pre-pandemic (n=14623), both clinics during the pandemic (n=14251), FPC (n=18587), and FCC (n=10287); with a combined total 28874 refill encounters. We found a statistically significant reduction in median time to refill, and variance, between the two time periods, 557 minutes in the pre-pandemic phase to 419 minutes during the pandemic (P<0.001). Overall, we also found significant differences in median time to refill, and variance, between FPC (561 minutes) and FCC (325 minutes) with P<0.001. When comparing times between subgroups of ordering users in both clinics combined (residents, [n=5928], faculty [n=6656], and clinic nurses [n=16290]), we found statistically significant differences in time to refill, and variance, between all three, with residents’ median time 694 minutes, faculty 559 minutes, and nurses 426 minutes (P=0.02).

Conclusion: This project reinforces the importance of a standardized multidisciplinary medication refill protocol to increase consistency and decrease medication refill time, and has shown success when expanded to a sister academic family medicine clinic during a system-wide stressor such as the COVID-19 pandemic.

Impact of Concise Interprofessional Meetings on Team Collaboration and Diabetic Foot Ulcer Healing Rates

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Background: Formal interprofessional teamwork has previously been shown to reduce foot ulcer healing times in patients with diabetes. However, interprofessional education (IPE) and interprofessional team meetings require a large amount of up-front education and team-training with frequent interactions/meetings and may not be practical in real world clinical settings.

Purpose: The goal of this study was to study the effects of concise IPE and monthly team meetings on team collaboration and diabetic foot ulcer healing rates within a well-established and high-functioning advanced center for wound healing (Advocate Condell Medical Center, Libertyville, IL).

Methods: Team collaboration was measured amongst a team of wound care nurses, allopathic and podiatric physicians before and after interprofessional interventions (IPE and monthly meetings) using the Index for Interdisciplinary Collaboration and a qualitative assessment of seven open-ended questions. Diabetic foot ulcer healing rates within the wound care center were compared before and after implementation of IPE and concise team meetings.

Results: In the post IP meetings group (N=31), 70% of DFU patients had complete wound closure at 16 weeks compared to 62% complete wound closure at 16 weeks in the control (non-IP meetings) group (N=40) (p=0.562). However, both the qualitative and quantitative assessments showed an increase in team collaboration after concise IPE and monthly team meetings were implemented.

Conclusion: Although the providers perceived that IP intervention improved DFU outcomes, there was no change in DFU healing rates. Despite some identified barriers, this study shows that concise interprofessional meetings is an inexpensive and time-saving way to improve collaboration at an advanced center for wound care, but may have little effect on healing rates within a well-organized and high-functioning wound care center.
Diagnostic Accuracy of Magnetic Resonance Imaging (MRI) and Dynamic Ultrasound for the Diagnosis of Plantar Plate Injuries: A Systematic Review and Meta-Analysis

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Background: Previous literature has suggested both MRI and ultrasound can be used to diagnose plantar plate tears of the lesser metatarsophalangeal joints. There is however a significant cost difference between these two modalities, sparking interest for which should be the preferred method for diagnosis.

Purpose: The purpose of this study was to examine the diagnostic accuracy of MRI and dynamic, musculoskeletal ultrasound in diagnosing plantar plate injuries using a systematic review and meta-analysis.

Methods: MEDLINE, CINAHL, and Clinicaltrials.gov were searched thru May 2020. We included studies evaluating the diagnostic accuracy of MRI or ultrasound for detecting plantar plate tears, using intraoperative confirmation as the gold standard comparison. Sensitivity and specificity were obtained and pooled from included studies. Summary receiver operating curves were formed for each diagnostic test to compare accuracy. Study quality was assessed using the QUADAS-2 scoring system.

Results: Ten studies met our inclusion criteria, representing 227 plantar plates for MRI and 238 plantar plates for ultrasound. MRI displayed a pooled sensitivity of 89% (95% CI 0.84, 0.93) and specificity of 83% (95% CI 0.64, 0.94). Ultrasound displayed a sensitivity and specificity of 95% (95% CI 0.91, 0.98) and 52% (95% CI 0.37, 0.68), respectively.

Conclusion: MRI was superior to ultrasound in diagnosing plantar plate injuries which may justify its higher price tag; however, ultrasound was more sensitive than MRI, suggesting a negative (point-of-care) ultrasound would likely rule out a plantar plate injury in the presence of an equivocal physical exam. Determining the grade of the injury is best served with MRI which can provide added insight into the integrity of the joint’s supporting structures (e.g. collateral ligaments).

Postoperative Opioid Prescribing Practice Among US Podiatrists After Foot and Ankle Surgery

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Background: Approximately 3,900 Americans die every month from opioid overdoses. The total economic burden of the opioid epidemic is estimated to be over $78 billion dollars annually. While the prescribing patterns of many provider groups is better understood, there is relatively little data on the opioid prescribing patterns of podiatrists after foot and ankle surgery.

Purpose: The primary purpose of this study was to better understand the opioid prescribing habits of US podiatrists after foot and ankle surgery. A secondary aim was to identify if select characteristics of podiatric foot and ankle surgeons were associated with postoperative opioid prescribing practices.

Methods: We administered an open, voluntary, anonymous, online questionnaire distributed on the internet via Qualtrics, an online survey platform. The questionnaire consisted of six foot and ankle surgery scenarios followed by a demographics section. We invited podiatric foot and ankle surgeons practicing in the US to complete the questionnaire via email from the American Podiatric Medical Association’s membership list. Respondents selected the postoperative opioid(s) that they would prescribe at the time of surgery, as well as the dose, frequency, and number of “pills” (dosage units). We developed multiple linear regression models to identify associations between prescriber characteristics and two measures of opioid quantity: dosage units and MME.

Results: Eight hundred and sixty podiatric foot and ankle surgeons completed the survey. The median number of dosage units never exceeded 30 regardless of the foot and ankle surgery scenario. Greater number of years in practice correlated with a reduction in opioid dosage units prescribed at the time of surgery.

Conclusion: Postoperative opioid prescribing practice variation exists among US podiatrists. In comparison to what has previously been reported in the orthopedic literature, podiatric foot and ankle surgeons may prescribe ~25% fewer opioids at the time of surgery than orthopedic foot and ankle surgeons. Further research is warranted to determine if additional education may be needed for less experienced podiatry providers.
Universal COVID-19 Testing in Labor & Delivery Patients at Aurora BayCare Medical Center: Preliminary Results

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Background: Pregnant women and their fetuses have been significantly impacted with increased risk of complications by emerging infections. Little is known regarding the impact of the novel coronavirus SARS-CoV-2 (COVID-19) infection on delivery outcomes.

Purpose: To evaluate rates of asymptomatic COVID-19 infection among laboring patients in Northeast Wisconsin and any impact on delivery outcomes.

Methods: A retrospective, public health surveillance project was conducted as part of a universal COVID-19 testing policy at Aurora BayCare Medical Center with laboring patients from April 14, 2020 – July 31, 2020. Chart reviews were conducted to collect demographic data, COVID-19 results (mother and infant), and delivery outcomes (APGAR score, delivery method, gestational age, and arterial blood gas). Descriptive and frequency statistics were used to summarize the characteristics of the study population.

Results: Out of the 487 singleton deliveries included, 9 mothers tested positive, 477 mothers tested negative, and 1 mother refused to be tested. The overall COVID-19 positive rate in Northeast Wisconsin was 1.8% (n = 9). The asymptomatic COVID-19 positive rate was 1.6% (n = 8). Two mothers (0.4%) were symptomatic; however, only 1 tested positive yielding a symptomatic COVID-19 positive rate of 0.2% (n = 1). None of the newborns in this sample tested positive for COVID-19. Notably, although only 9.4% of our sample were Hispanic women, 88.9% (n = 8) of the COVID positive cases were among Hispanic women.

Conclusion: Racial and ethnic disparities in COVID cases have been observed, and these preliminary findings may help to support and guide local outreach efforts in Northeast Wisconsin. Additional data is needed to monitor the impact of COVID-19 infection on pregnant women and their newborns.

Encouraging Opioid Abstinence Through Contingency Management: A Pilot Study

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Background: Contingency management (CM) is an intervention that uses planned contingencies to change behavior. Typically, CM targets consequences to reward or punish behavior. CM has been tested across many behaviors, including substance use. Although CM has shown effectiveness for substance use populations, questions remain about the most efficient versus effective intervention designs. CM mobile applications have been developed to increase efficiency. However, effectiveness of automated CM mobile apps is not yet established.

Purpose: The purpose of the study overall is to test effectiveness of CM delivery via mobile app. This pilot tested proposed study methods and assessed whether opioid abstinence levels differed between treatment groups.

Methods: Patients were eligible if recently enrolled in PHP or IOP programs for an opioid use disorder at Aurora Health Care. Participants were randomly assigned to one of three groups. The Inputs group received differential reinforcement of alternative responses, including taking oral buprenorphine and attending substance use treatment. The Outcomes group received differential reinforcement of other behavior- completing opioid-negative saliva tests. The Combined group received both Inputs and Outcomes reinforcement. Activities were prompted and rewarded through the DynamiCare app. All groups were provided an average of 13 tasks per month. The primary outcome was opioid-negative status on drug tests at 4-week intervals. Secondary outcomes included the number of successful tasks and substance use program completion rate.

Results: Drug screens were obtained at 59% of the 4, 8, and 12-week interval markers. The rates of opioid-negative drug tests completed for weeks 4, 8, and 12 were 80%, 80%, and 57% for Inputs; 83%, 100%, and 100% for Outcomes; and 100%, 75%, and 60% for Combined, respectively. Inputs participants averaged 13.6 successful behaviors, Outcomes averaged 20.8 and Combined averaged 11.8. Completion rates for substance use treatment were 70% for Inputs, 75% for Outcomes, and 75% for Combined.

Conclusion: The pilot study showed success in enrolling patients and collecting outcomes data. However, opportunities for improvement were identified. Increased engagement in outcomes testing will require larger incentives. Also, due to low app engagement by a subset of participants across groups, practice opportunities should be added in the first week of enrollment. Providing participants earlier access to rewards may increase potential for maintaining opioid abstinence.
Assessing Gradients in Hypertrophic Cardiomyopathy: Please Stand Up!

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Background: Assessing Gradients in Hypertrophic Cardiomyopathy: Please Stand Up!

Purpose: Left ventricular outflow tract obstruction (LVOT) in patients with hypertrophic cardiomyopathy (HCM) is provokable with changing preload, afterload, or contractility. Conventionally, patients are asked to perform the Valsalva maneuver to elicit LVOT gradients during transthoracic echocardiography (TTE), yet many patients perform this incorrectly or incompletely, which can lead to underestimation of gradients. The hemodynamic effect of standing from a seated position is reproducible and has not been well described in HCM patients undergoing TTE.

Methods: We performed TTE on patients with HCM and measured LVOT obstruction using 2-D and color Doppler TTE in supine and standing positions. Clinical and demographic variables were collected through medical records.

Results: During routine TTE in 49 patients, LVOT gradients were obtained in four positions: resting, Valsalva, standing, and with Valsalva. The mean gradient at Rest = 18.3 (0, 30) mmHg, Valsalva = 52.5 (20, 76) mmHg, Standing = 41.6 (0, 60) mmHg and Standing Valsalva = 53.9 (20, 80) mmHg. The highest gradients were Standing in 12 patients, Standing Valsalva in 21 patients, and Valsalva in 16 patients. The median left ventricular ejection fraction was 70% and the mean global longitudinal strain was ~17%. The median wall thickness was 20 mm and the most common HCM variant was basal septal 28 (57%).

Conclusion: Standing while performing Valsalva created the largest LVOT obstruction when compared to Valsalva alone. Furthermore, the difference in gradients between standing alone vs Valsalva were negligible. These findings challenge traditional protocols for eliciting gradients in those with HCM that incorporate only Valsalva. Standing from a seated position is a natural and physiologic movement that is easily reproducible and can be performed by nearly all HCM patients; this may provide a more reproducible alternative to the Valsalva maneuver.

Hospitalized Patient Perspectives on Oral Care

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Background: Toothbrushing twice times a day removes bacteria from the mouth and prevents pneumonia in hospitalized patients. Nurses often report oral that care is essential but often missed. Many quality improvement projects aimed at preventing pneumonia in hospitalized patients often prescribe oral care four times per day. Little is known about the patient perspective and effective strategies to engage them to improve their care.

Purpose: This study is designed to use a theory-based approach to gather information from hospitalized med/surg patients on their perspectives of toothbrushing, risk of pneumonia (threat), and nurse-based supportive practices (cues to action).

Methods: This descriptive study was conducted on four diverse medical surgical units at a 273 bed suburban community medical center in Illinois. The Health Belief Model was used to guide the design of a simple brief (13-item) survey to gather information about toothbrushing (type/frequency), individual beliefs about benefits, barriers, self-efficacy during hospitalization, perceived risk for pneumonia, and cues to action. The target population was adults (18+years) who were hospitalized over 24 hours on the study units. Patients were excluded if they were non-English speaking, end of life, or had acute/chronic confusion. After IRB approval, the paper survey was distributed to hospitalized patients with an information letter designed for self-administration and confidential return. Survey results were uploaded into Excel and analyzed using SAS.

Results: The survey was returned by 456 patients, average age 66.8+17 years (range 18-99), 53% female, and primarily white (90%; Black African Americans 6%, Hispanic 8%). Toothbrushing was most often done with brush/paste at a frequency of 1 (22%), 2 (58%), 3 (15%) times a day; Rarely over 3. Most (76%) reported brushing was very important with varied estimates of risk for pneumonia. Brushing has many benefits and few barriers. Patients reported limited cues to action and that simple items were helpful.

Conclusion: As hospitals implement strategies to prevent hospital acquired pneumonia, evidence about patient perspectives about oral care must be taken into account. This theory-based approach to gathering patient input, provided important insights into what patients commonly do at home and what they perceive to be important. These findings can be used by nurses to guide their efforts to engage patients to ensure that this essential practice is not missed.
Does Digital Information Alter Decision Making in Bariatric Surgery?

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Background: Bariatric surgery demonstrates increasing evidence to be the most effective treatment of type 2 diabetes. In contrast to most other surgical procedures, choices about surgical weight loss are largely based on media buzz as well as arbitrary internet resources such as social media and chat rooms.

Purpose: To determine the influence of digitally available sources and word of mouth on patient decisions regarding bariatric procedures. For our diabetic patients we looked at the influence of a validated risk calculator on their choice of procedure. Our secondary aim is to assess our patients’ referral sources and their influence on patients’ predetermined procedure choice.

Methods: All patients filled a screening questionnaire during their first visit. This survey assessed (1) referral source, (2) predetermined decisions about surgeries and (3) how those decisions were made. A validated individualized metabolic surgery score was then presented to our diabetic patients. This calculator recommends the type of metabolic surgery that will have the highest rate of long-term diabetes remission given their individualized score. We then recorded whether the recommendation changed their decision of the procedure.

Results: We saw 227 patients, of those 52 were diabetic. These patients came to us due to word of mouth (15%), primary care physicians (30%) and internet searches (54%). Overall, 173 patients had a predetermined decision and 54 patients felt that the physician should make that decision for them. After the initial consultation, of those with predetermined procedures, 27 patients changed their mind when better informed. Of the diabetic patients, 35 patients had their choice match the calculator recommendation. The remaining ones were advised to alter their choice based on the calculation with detailed explanation of the rational supported by evidence and only 53% agreed with the evidence-based recommendation.

Conclusion: With the abundance of internet information most patients come with predetermined decisions regarding their surgical care. Many stick to that decision after better quality information is presented. Furthermore, in those with serious illness like diabetes, many patients continue with their choice contrary to evidence based information.

In-Hospital Mortality and Outcomes in Hospitalized Patients With Myocardial Injury and COVID-19 Infection

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Background: Outcomes of myocardial injury in hospitalized US COVID-19 patients lacks large sample data. Here we describe the degree of myocardial injury and associated outcomes in a large COVID-19 inpatient cohort.

Purpose: To evaluate the mortality related to Myocardial injury in COVID-19 infected patients.

Methods: Patients with COVID-19 admitted to any of 19 Midwest network hospitals between Feb. 27, 2020 and Oct. 3, 2020 with cardiac troponin-I (cTnI) measured at admission were included. Demographics, medical histories, laboratory results, and outcomes were captured from electronic health records.

Results: The median age was 65 years, with 44.8 % females. cTnI was measured in 3640 patients (82.3% of COVID-19 inpatients). Any cTnI elevation was found in 40.9% of patients. Cardiovascular disease (CVD), including coronary/peripheral artery disease, atrial fib/flutter, hypertension, diabetes, stroke and heart failure, was more prevalent in patients with higher cTnI as was an elevated CRP, d-dimer and thrombocytopenia. A total of 409 (9.2%) patients died during hospitalization. After adjusting for relevant clinical factors, mild myocardial injury (cTnI>0.03 to 0.09 ng/ml; n=388; 10.7 %) was associated with death (HR: 3.74; 95% CI: 2.79 to 5.29; p<0.001) and greater amounts (cTnI>0.09 ng/dl; n=1101; 30.5%) were associated with even higher risk (HR: 4.69; 95% CI: 3.69 to 5.96; p<0.001).

Conclusion: Myocardial injury is prevalent among patients hospitalized with COVID-19 and seen largely in patients with CVD. Troponin elevation among patients hospitalized with COVID-19 is associated with higher risk of mortality.
Determinants of Opioid Abstinence and Retention Time in a Rural Family Practice Buprenorphine Treatment Program for Opioid use Disorder

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Background: Buprenorphine treatment in the outpatient setting is an important tool for management of opioid use disorder, a leading cause of death in the US and especially rural areas, but evidence for predictors of success in outpatient treatment is limited.

Purpose: The aim of this study is to describe how patient and treatment program characteristics are associated with clinical outcomes, including abstinence from opioids and retention in treatment, in a rural family medicine residency-based treatment program.

Methods: Data collection: All patients receiving buprenorphine treatment for opioid use disorder at the Aurora Lakeland Family Medicine clinic between January 2018 and January 2021 were included. Electronic medical record data was abstracted, including date of first and last buprenorphine prescription; whether patient had exited the program; presence of opioids or other substances on any urine sample; gender, age, and psychiatric comorbidities; prior use of prescription opioids, heroin, and IV drugs; buprenorphine dose, use of behavioral health services; and whether patient received primary care at the same clinic. Data analysis: All statistical analysis was performed using Stata. Descriptive statistics and Kaplan-Meier curves were performed. Log-rank tests were used to select covariates for multivariate Cox regression models of association with time to exiting the program accounting for right-censoring. Probability of leaving the program within the first year of treatment was modeled using multivariate logistic regression models on the subset of subjects who entered the program one year or more before the end of the data collection period. Logistic models also estimated association with maintaining complete abstinence from opioids during treatment.

Results: The study sample included 269 subjects. One was excluded from the analysis due to primarily receiving the injectable form of buprenorphine. The sample was 48% women, with mean age 38.3. Preliminary analyses conducted on a subsample of 192 subjects showed 60% were still in treatment at the close of the study period, and 61% were able to achieve total abstinence from opioids while in treatment.

Conclusion: Consistent with other studies, just under two thirds of patients were able to abstain from opioids while on buprenorphine treatment. Further analysis is planned to further elucidate which patient characteristics and treatment choices predict opioid abstinence and retention in treatment.

Cardiac, Renal and Liver Function in Neonates With Hypoxic Ischemic Encephalopathy Treated With Therapeutic Hypothermia

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Background: Therapeutic Hypothermia (TH) reduces the brain injury and the negative multi-organ impact of perinatal asphyxia (PA) in neonates. TH is an established treatment for PA, but there is a lack of research data to explain how TH modulates cardiac, renal and hepatic dysfunction. Moreover, it is unclear if these functional changes can predict neonatal outcomes.

Purpose: To evaluate cardiac, renal and liver function in neonates treated with TH and to determine whether various biochemical/functional parameters are significant predictors of mortality.

Methods: A retrospective electronic medical record review of 47 neonates, treated with TH because of PA in a Level IV NICU. All study procedures were approved by the local IRB. The subjects were divided into groups dependent upon their: 1) gestational age at birth: Late Preterm (PT) and Term, 2) Size-at-Birth: small (SGA), and appropriate for gestational age (AGA) and 3) Outcome: Alive and Deceased (n=7). Data collected for analyses include cardiac, renal and hepatic function parameters; concomitant medications/treatments, and perinatal factors. One-way ANOVA and Pearson correlation analyses were used to compare variables between the independent groups. Fisher exact test was used for categorical variables.

Results: There was no significant difference in echocardiogram’s cardiac function parameters (EF, SFx, or LVIDd) between the alive and deceased groups (p>0.05). No significant correlation was found between EF, LVIDd, or SFx and any of measured cardiac (Troponin I and CK-MB), renal (BUN, Cr, BUN/Cr, GFR), or hepatic (ALT, AST, AlkPhos, LA) (p>0.05) biomarkers. Mean GFR and urine output were significantly lower and serum creatinine was significantly higher in the deceased group than the alive group at 24, 48, 72, and 96 (+4) hours after birth (p<0.05, and p<0.005). Mean serum BUN was not significantly different at any time point between the alive and deceased groups (p>0.05). Mean serum ALT, AST, and Lactic Acid were significantly higher in the deceased group than the alive group at 24 hours of life. (p<0.05). No significant differences were found in the cardiac, renal, and liver function parameters between the Gestational age or Size-at-Birth groups (p>0.05).

Conclusion: Cardiac, renal, and liver function parameters did not significantly differ based on gestational age or by weight for gestational age in neonates treated with TH. Markers of renal and hepatic function may be predictive of survival in neonates with PA being treated with therapeutic hypothermia.
**Evaluation of PTT vs Anti-Xa Levels in Heparinized LVAD Patients**

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**Background:** Various studies have shown a discordance between aPTT and Anti-Xa levels in heparinized patients with Left Ventricular Assisted Devices (LVAD). This discordance could lead to unwanted clinical outcomes if heparin therapy is not properly assessed in these high-risk patients. Patients with LVADs require precise monitoring to reduce the risk of both thrombus and hemorrhage. Aurora St Luke’s Medical Center (ASLMC) currently utilizes aPTT to routinely monitor heparinized patients. The goal of this retrospective review is to determine if aPTT and Anti-Xa levels correlate and represent accurate heparin serum concentrations.

**Purpose:** To assess the correlation of aPTT levels and Anti-Xa levels in heparinized patients with a Left Ventricular Assisted Device.

**Methods:** A retrospective observational assessment of patients with LVADs that required intravenous heparin of which were monitored with aPTT and Anti-Xa levels simultaneously. Serial paired levels of Anti-Xa and PTT were analyzed. Primary outcome was to assess the correlation between aPTT and Anti-Xa levels based off hospital therapeutic heparin metrics. Categorical variables were described using frequency and percentages and continuous variables were described using means and standard deviations or medians and interquartile ranges. A simple Kappa Estimate was used to calculate agreement between Anti-Xa and PTT group levels. The project was submitted to the institutional review board (IRB) for review to which it was determined that it did not constitute Human Subject Research and did not require IRB oversight.

**Results:** Twenty-two patients with 191 serial paired Anti-Xa and PTT levels were included for analysis. The mean age at implant was 54.5 +/- 13.3, 17 (77.3%) were male, and 19 (81.8%) of implants were destination therapy. Of the 191 levels, 42 (22%) were indicated as sub-therapeutic by both PTT (<45) and Anti-Xa (<0.3). There were 82 (43%) indicated as therapeutic by PTT (45-70) but sub-therapeutic by Anti-Xa. Only 37 (19%) were indicated as therapeutic by both PTT and Anti-Xa. Finally, 2 (1%) were indicated as supra-therapeutic by both PTT and Anti-Xa (Table 1) (Kappa Estimate=0.1, 95% CI=(0.01-0.18)).

**Conclusion:** Therapeutic groupings indicated by PTT levels were in slight agreement when compared with Anti-Xa. The most common disagreement group was where PTT indicated a therapeutic range and Anti-Xa indicated sub-therapeutic. In our institution, this tended to overestimate the concentrations of Heparin in the body.

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**Detrimental Oxygen: Oxygen Supplementation in STEMI Patients**

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**Background:** There is evidence that supplemental oxygen administration in an acute myocardial infarction is associated with worse outcomes and larger infarct size.

**Purpose:** The aim of this quality improvement project is to reduce the number of STEMI patients in the ER receiving supplemental oxygen who have normoxia. Currently patients are place on oxygen supplementation regardless of their oxygen saturations. By educating the ER staff about harmful effects of oxygen in STEMI patients.

**Methods:** We retrospectively reviewed our acute ST elevation myocardial infarction (STEMI) population from February 1, 2020 to November 25, 2020 to assess how many of these patients were inappropriately placed on supplemental oxygen. We used a cut-off value of SpO2 greater than 90% as a threshold for inappropriate supplementation, in accordance with the published literature. We then provided education to all first point-of-care staff members on the appropriate use of supplemental oxygen and measured for changes in behavior. Our aim is to reduce inappropriate supplemental oxygen use by 50% in three months.

**Results:** There were a total of 126 patients from February 1, 2020 to November 25, 2020, 79% of them were placed on supplemental oxygen despite having an oxygen saturation greater than 90%.

**Conclusion:** We identified a clear potential for harm with excessive use of supplemental oxygen for acute STEMI patients. Our goal is to obtain the follow-up data at three-month intervals to monitor for improvement, with plans to provide re-education if our goal of a 50% reduction in inappropriate supplemental oxygen use is not achieved.
Cardiac Manifestations of Carbon Monoxide Poisoning

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**Background:** Carbon monoxide (CO) poisoning is one of the most critical health concerns worldwide, due to its high morbidity and mortality. CO is a colorless, odorless and tasteless gas that comes from incomplete combustion of carbon containing fuel. It binds to hemoglobin and impairs oxygen delivery to tissues causing tissue hypoxia. Cardiovascular (CV) and central nervous system (CNS) have the highest oxygen demand therefore are more susceptible to injury. This study looks at the cardiovascular manifestations of CO poisoning.

**Purpose:** The aim of the research is to investigate the effects of CO poisoning on the cardiovascular system.

**Methods:** We reviewed the cardiovascular manifestations of 350 consecutive patients admitted for treatment of CO poisoning between 2011 and 2018 at Advocate Lutheran General Hospital (ALGH), a regional center equipped with hyperbaric oxygen chamber (HBO).

**Results:** There were 350 patients admitted for CO poisoning from 2011 to 2018, 72% of the patients received HBO treatment due to severity of their symptoms. The mean age was 47.3 years with 60% men, 89% of the admission were accidental exposure and 10% intentional. In terms of CV risk factors, 18% were active smokers, 25% had hypertension (HTN), 16% with hyperlipidemia (HLD), diabetes (DM) was present in 11% with 7% having all three risk factors (HTN, HLD and DM). Cardiac biomarkers were elevated in 40% of the patients, with 6% having ischemic EKG changes. 23% had wall motion abnormalities on echocardiogram. In terms of CNS manifestations, 26% presented with loss of consciousness, 20% with GCS <14 and 15% were intubated. In hospital mortality was 1%.

**Conclusion:** Myocardial injury is common and widely seen with CO poisoning as seen by elevated cardiac biomarkers in 40% of the tested population. CO exposure reduces oxygen carrying capacity of the blood and also induces marked oxidative stress and inflammatory response. Direct hypoxic effects and subsequent oxidative stress leads to varying degree of myocardium damage. Patient with CO poisoning should undergo evaluation with an EKG and serial biomarkers. If an abnormality is detected, patient should undergo an echocardiogram. Further evaluation with angiography may be warranted in patients with left ventricular dysfunction and underlying coronary artery disease especially in patients with risk factors.

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The Role of Extracorporeal Pulse Activation Therapy on Pain Reduction with Peroneus Longus Tendinitis

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**Background:** Extracorporeal Pulse Activation Treatment (EPAT) is evidence-based, FDA-approved technology for use on musculoskeletal conditions. It is widely known for its healing effect with studies showing significant clinical and function outcomes for patients that have persistent pain and have failed conservative treatment. However, literature is limited in foot and ankle pathology, primarily focusing on the Achilles tendon and plantar fascia.

**Purpose:** The purpose of the study is to test the efficacy of EPAT as an adjunct modality in patients diagnosed with peroneus longus tendinitis with primary endpoint of pain relief.

**Methods:** A retrospective chart review was conducted for patients diagnosed with peroneus longus tendinitis confirmed with ultrasound or MRI that received EPAT from one single outpatient facility from November 2016 through August 2020.

**Results:** Thirteen patients (15 feet) with a median age of 58 (38 – 65) years were included in this study. All patients received biomechanical treatment adjunctively. The median follow-up period was 30.25 (12.5 - 37.5) months. 11 patients (84%) received biomechanical treatment prior to undergoing EPAT. All patients experienced pain reduction after initial treatment at median time of 1 (1 – 1.5) week. Pain relief was achieved in 12 patients (92%) after a median time of 10.25 (2.65 – 13.25) weeks.

**Conclusion:** Based on the data, EPAT shows promising results in pain relief when used adjunctively with biomechanical treatment. No studies have been conducted with EPAT specifically treating peroneus longus tendinitis. Utilization of EPAT may reduce the need for immobilization leading to iatrogenic muscle hypotrophy and functional decline. It may facilitate faster return to activities and decrease the need for rehabilitation. Further randomized, controlled studies would be beneficial to evaluate superiority of adjunctive EPAT on pain relief when compared to those that did not receive the treatment.
**Design and 3D-Printing of MRI-Compatible Cradle for Imaging Mouse Tumors**

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**Background:** The ability of 3D MRI compatible devices provide opportunities to tailor design features to particular imaging needs. Printing costs can be lower when compared to devices purchased off-the-shelf. In this study we have designed an MRI compatible cradle to fit our need for repeatable serial images of mice within a mouse specific low field MRI.

**Purpose:** 3D printing in preclinical research serves as a valuable tool for small laboratories with limited equipment budgets. It lends itself to production of specialty items with complex geometries that cannot be created using traditional fabrication techniques. Additionally, advances in printer resolution and development of specialized print media make 3D printing the ideal tool to design, develop, and rapidly iterate production of specialized devices to meet specific research needs. Such is the case here, where we have designed, 3D printed, and implemented a cradle compatible with magnetic resonance imaging (MRI) that meets strict tolerances and accommodates interchangeable coils within a mouse-specific low-field MRI unit.

**Methods:** Several designs were reviewed which ultimately generated an open style stereotaxic cradle to fit within specific bore tolerances and allowed maximum flexibility with interchangeable RF coils. Computer Aided Design (CAD) drawings were generated in Solidworks design software based on the device requirements. A 3DSystems Projet 3500 HDMax printer using MultiJet Printing (MJP) Technology was used to print the cradle which was made of M3-X (ABS-like) at a 16µm print resolution with S-300 support material. Testing with multiple phantoms was done to affirm that material choice did not create unwanted image artifact and to optimize imaging parameters. Once phantom testing was satisfied, mouse imaging began.

**Results:** Imaging using the 3D printed cradle provided higher quality results, accommodated multiple coil configurations, and reduced the time for imaging experimental mice. Additionally, reproducible images and lower cost compared to off-the-shelf devices proved to be advantageous for our budget friendly laboratory.

**Conclusion:** The design of a 3D printed stereotaxic cradle was an option for our budget friendly laboratory which functioned well. It satisfied our requirements for containing the animal in a safe manner, shortening set up time and therefore scan time, and allowed us to use multiple RF coils without altering the position of the animal, preserving position and fit within a 3cm bore size in our low field MRI.

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**Evaluation of Rocuronium Dosing in Rapid Sequence Intubation Based on Ideal Body Weight vs. Non-Ideal Body Weight in Obese Patients: A Prospective, Observational Study**

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**Background:** During rapid sequence intubation providing adequate paralysis while reducing potential undersedation can be difficult in an obese patient population. Pharmacokinetic parameters play an important role in dosing of rocuronium as it has low lipophilicity. Theoretically, dosing should be based on ideal body weight as accumulation does not occur in adipose tissue. In obese patients, no guideline recommended dosing strategies exist for the use of rocuronium for RSI in the emergency department (ED). A paucity of data has compared the use of rocuronium in obese patients based on different body weights. However, these studies took place in a surgical setting and not in the ED, therefore demonstrating the need for more data in an ED setting.

**Purpose:** Due to the paucity of data surrounding appropriate dosing weight for rocuronium in obese patients, dosing remains dependent on practitioner preference based on total body weight, ideal body weight, or adjusted body weight. This study aims to compare the intubation conditions, duration of paralysis, and incidence of suboptimal sedation after intubation in obese patients requiring RSI in the emergency department.

**Methods:** This is a single-center, prospective, observational study. Subjects ≥18 years old with a total body weight ≥30% of ideal body weight or a BMI ≥30 kg/m2 that present to the emergency department requiring RSI with the use of rocuronium are eligible for enrollment. Rocuronium is dosed according to physician/pharmacist preference per the current ED practice. For the calculation of rocuronium dose, based on the preferred weight, the pharmacist either utilizes height to calculate ideal body weight, and when available, actual weight measurement is obtained using either standard ED process or by reviewing prior documentation in the chart. After intubation, the physician completes a brief survey to assess intubation conditions utilizing a validated 9-point survey scoring system. The pharmacist notes height and weight used for the calculation of the dose, dose of rocuronium, time of medication administration, time of intubation, need for any repeat dose of paralytic, and time of muscle function recovery. Endpoints assessed include outcome of optimal intubation conditions, duration of paralysis, and the incidence of suboptimal sedation defined as the percent of patients experiencing hypertension or tachycardia post intubation.

**Results:** Results to be presented at AAH Scientific Day.

**Conclusion:** Conclusion to be presented at AAH Scientific Day.
Emergency Department Pharmacist led Methicillin Resistant Staphylococcus Aureus (MRSA) Polymerase Chain Reaction (PCR) Assay for Vancomycin in Pneumonia

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Background: Antimicrobial regimen for methicillin-resistant Staphylococcus aureus (MRSA) coverage with antibiotics such as vancomycin is recommended for patients with suspected community, hospital, or ventilator acquired pneumonia with risk factors for MRSA in the Emergency Department (ED). The nasal MRSA Polymerase Chain Reaction (PCR) assay has shown high negative predictive value (NPV) for MRSA pneumonia in multiple studies. However, no published studies have utilized MRSA PCR assay to avoid vancomycin in the ED setting.

Purpose: To evaluate incorporation of fluoride varnish application in well child visits ages 6 months - 6 years at 2 Family Medicine Residency Clinics (FPC and FCC).

Methods: A dental varnish application protocol was created for 6 months - 6 year well child visits and implemented in July - Sept. 2019. Exclusion criteria included no teeth or varnish application ≤6 months ago. All providers were required to complete a free online training from the STFM Smiles for Life module 6. Pre/post-surveys were conducted to identify provider’s opinions including importance, sustainability, and barriers of the protocol. Data from 7/1/19 - 1/15/20 (period 1) and 1/16/20 - 12/31/20 (period 2; representing present COVID pandemic) was compared for both clinics regarding rates of preventative visits with varnish applied. A Z test for Equality of Two Proportions was used to compare rates as appropriate. Pre/post-survey answers were analyzed using 2-sample T-tests.

Results: Of the 1,984 well child visits, 369 (19%) were coded as including varnish application (99188). During period 1, 25% of visits at FPC and 16% of visits at FCC included a varnish application. There was no significant difference in application rates between periods (22% visits at FPC and 15% at FCC). During the Covid-19 pandemic, varnish applications decreased from 18.6 to 8.1 per month at FPC (p<0.01) but increased from 12.5 to 15.2 per month at FCC (p=0.18). Our pre/post-surveys identified the same barriers to application (not enough training/time, unsure where to find supplies). Except for percentage of eligible patients seen for well child exams including varnish (63% v. 35% p<0.01), no other survey responses were significantly different.

Conclusion: Dental fluoride varnish application can be successfully implemented into academic primary care clinics to reach children most at risk, but not without challenges. Future surveys can be used to streamline protocols for sustainability. Optimized processes may be adapted by others to decrease health disparities.

Evaluation of Fluoride Varnish Implementation for Well Child Visits in a Family Practice Residency Clinic

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Background: Dental decay is the most common chronic disease in children, and is more prevalent among African Americans, Hispanics, and children living in poverty. Dental fluoride varnish, a protective coating painted on teeth to help prevent cavities, requires no special equipment and can be applied in <2 minutes. Per the United States Preventative Services Task Force and American Academy of Pediatrics, dental varnish application should be considered part of well child exams.

Purpose: To evaluate incorporation of fluoride varnish applications in well child visits ages 6 months - 6 years at 2 Family Medicine Residency Clinics (FPC and FCC).

Methods: A dental varnish application protocol was created for 6 month - 6 year well child visits and implemented in July – Sept. 2019. Exclusion criteria included no teeth or varnish application ≤6 months ago. All providers were required to complete a free online training from the STFM Smiles for Life module 6. Pre/post-surveys were conducted to identify provider’s opinions including importance, sustainability, and barriers of the protocol. Data from 7/1/19 - 1/15/20 (period 1) and 1/16/20 - 12/31/20 (period 2; representing present COVID pandemic) was compared for both clinics regarding rates of preventative visits with varnish applied. A Z test for Equality of Two Proportions was used to compare rates as appropriate. Pre/post-survey answers were analyzed using 2-sample T-tests.

Results: Of the 1,984 well child visits, 369 (19%) were coded as including varnish application (99188). During period 1, 25% of visits at FPC and 16% of visits at FCC included a varnish application. There was no significant difference in application rates between periods (22% visits at FPC and 15% at FCC). During the Covid-19 pandemic, varnish applications decreased from 18.6 to 8.1 per month at FPC (p<0.01) but increased from 12.5 to 15.2 per month at FCC (p=0.18). Our pre/post-surveys identified the same barriers to application (not enough training/time, unsure where to find supplies). Except for percentage of eligible patients seen for well child exams including varnish (63% v. 35% p<0.01), no other survey responses were significantly different.

Conclusion: Dental fluoride varnish application can be successfully implemented into academic primary care clinics to reach children most at risk, but not without challenges. Future surveys can be used to streamline protocols for sustainability. Optimized processes may be adapted by others to decrease health disparities.
Rocuronium Versus Succinylcholine in the Traumatically Injured Brain: A Prospective, Pilot Study

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Background: Acute traumatic brain injury (TBI) often requires rapid sequence intubation (RSI) to protect patients’ airways. RSI begins with pharmacologic induction followed by paralysis with agents such as rocuronium or succinylcholine. These medications benefit from a rapid onset and a relatively short duration. Previous retrospective literature demonstrated a mortality benefit favoring rocuronium over succinylcholine.

Purpose: The purpose of this ongoing trial is to assess mortality among other outcomes following RSI with rocuronium compared to succinylcholine for patients presenting to the emergency department (ED) suffering acute TBI.

Methods: This ongoing study identified patients for inclusion as of September 1, 2018. The study population consists of patients presenting to the ED with acute TBI who undergo RSI with either succinylcholine or rocuronium. Demographics recorded include age, sex, race, severity of TBI, and initial Glasgow Coma Scale (GCS). Patients are excluded if they are under the age of 18, have a surgical airway placed, pregnant at time of enrollment, cardiac arrest occurred prior to intubation, or intubation was attempted prior to arrival. The primary clinical outcome evaluated was incidence of in-hospital mortality. Secondary outcomes measured both hospital and intensive care unit (ICU) length of stay (LOS). A sample size of 200 was calculated to detect a 20% difference in mortality.

Results: Of 77 patients evaluated in the study, 60 were included for evaluation and 17 were excluded. Within the inclusion population, 42 patients were administered succinylcholine prior to intubation and 18 patients were administered rocuronium. Baseline demographics were comparable between both groups. Anticoagulant and antiplatelet use was reported in both groups (5 vs 2 p= 0.9) and (3 vs 3 p= 0.35). Prior to intubation, average GCS between the succinylcholine and rocuronium arms (6.5 vs 5.7, p=0.42) did not show a significant difference. No statistical difference was detected in the incidence of in-hospital mortality (33.3% vs 27.8%, p=0.67), in-hospital LOS (13 vs 9.5 days, p=0.43), or ICU LOS (7.4 vs 5.7 days, p= 0.39) between the two treatment groups.

Conclusion: The interim results from this ongoing study are inconclusive. These results prompt further investigation with additional patients enrolled.

Palliative Care Symptoms Assessment Tool (PCSA) and Palliative Care Referral Criteria Index (PCRCI) Major Criteria Were Equally Effective at Increasing Palliative Care Referrals

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Background: There is growing evidence that early access to palliative care specialists can have a positive impact on quality of life through symptom management, reducing hospital admission and length of stay, improving overall patient care by addressing goals of care and health care directives, and even prolonging survival of patients with cancer. However, a main barrier to providing this care early and on-time is the difficulty in identifying patients who could benefit from it.

Purpose: We aim to compare the effectiveness of the Palliative Care Clinic Symptoms Assessment Tool (PCSA) and the Palliative Care Referral Criteria Index (PCRCI)—both Major and Minor Criteria, in appropriately identifying and creating an effective method for referrals to palliative care services within the Vince Lombardi Cancer Clinic (VLCC) at Aurora Sinai Medical Center (ASM).

Methods: Patients undergoing transfusion at the VLCC at ASM for an oncology related diagnosis either filled out a PCSA or criteria for both the Major and Minor Criteria of the PCRCI was identified via chart reviewed. Patients were referred to palliative care services based on a calculated score for the PCSA. Referral by Major Criteria occurred if at least one of its criteria were met, and the same with the Minor Criteria. Non-parametric methods were utilized for within and between group differences. A p-value of 0.05 was considered statistically significant.

Results: Overall, 27 patients were included in the study sample (38% female), with an average age of 59±12. The PCSA and the Major Criteria referred a similar percentage of patients (89% vs 85%), p=0.69. By contrast, the Minor Criteria referred significantly less patients than the PCSA (48% vs 89%), p=0.001. An association between the screening tools was determined by the percentage of clients that were referred by both the PCSA and Major Criteria (n=22(82%), p=0.05) or both the PCSA and Minor Criteria (n=13(48%), p=0.22). Total PCSA scores between those referred vs not referred within PCSA, Major Criteria, and Minor Criteria were as follows: Mdn=50, IQR=[24-79] vs. [6[0-8]], p=0.01; 61[42,84] vs. 21[9,57], p=0.02; 42[17,83] vs. 39[3,74],p=0.38.

Conclusion: The PCSA and the major criteria were equally effective at referring patients while the Minor Criteria performed poorly. Future research should focus on whether the Major Criteria would still be as effective with the exclusion of the severe symptoms criteria, as severe symptoms are determined by the PCSA.
**KALMED: Ketamine for Acute Agitation Management in the Emergency Department**

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**Background:** Acute agitation is common in the emergency department (ED). It is crucial to efficiently relieve agitation in these patients for the safety of the patients and the healthcare team. Numerous studies conducted in the pre-hospital setting and in the ED have found ketamine to be an effective agent with more rapid onset of action compared with benzodiazepines or antipsychotics for initial control of acute agitation. To date, there are no data comparing reduced-dose (~2 mg/kg) versus standard dose (4-5 mg/kg) ketamine IM (intramuscular) for acute agitation.

**Purpose:** The objective of this study was to assess the effectiveness and safety of ketamine IM < 2.5 mg/kg versus > 2.5 mg/kg for acute agitation.

**Methods:** This is a single-center, retrospective, two-arm cohort. Patients that received IM ketamine for acute agitation in the ED were included in this study. Exclusion criteria included patients < 18 years old or administration of a concomitant sedative agent during ketamine administration. The primary outcome was resolution of agitation at 15 minutes (+/- 10 minutes) after ketamine administration. Resolution of agitation was defined as documentation from a healthcare provider, lack of administration of another sedative agent within 30 minutes from ketamine administration, or the ability to complete necessary procedures. The secondary outcomes included use of IM or intravenous rescue medications within 30 minutes after ketamine administration, adverse events, and time to medical clearance.

**Results:** Research in progress

**Conclusion:** Research in progress

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**Access to Targeted Online Educational Resources Pre and in Midst of a Pandemic**

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**Background:** In 2020 medical education shifted to virtual settings driven by pandemic related precautions. New venues for education were created. Long-standing virtual forums, such as a monthly 1-hour most difficult case conference (MDCC) series for geriatric fellows across the country, continued without disruption transitioning from audio only to include video. As an existing national forum, the Advocate Aurora Health (AAH) sponsored MDCC is uniquely positioned to evaluate if access rates for educator recommended virtual resources changed pre versus mid pandemic. Understanding rate change during times of stress is essential for educators to knowledgeably adapt instruction.

**Purpose:** To determine if access rates changed for educator identified virtual resources referenced during a pandemic.

**Methods:** Geriatric Fast Facts (GFFs) is a collaboration between AAH and the Medical College of Wisconsin (MCW) providing a virtual resource for teachers/learners containing peer-reviewed, evidence-based summaries on topics essential to older adult care via a searchable website [www.geriatricfastfacts.com]. A GFF specific to each MDCC monthly case was provided via a link to conference participants. GFF Google Analytics data was used to determine if site traffic for the MDCC targeted GFF differed by pre-mid pandemic. The average daily access rate 12 days prior to each MDCC session was calculated as a control and compared to the access rates on the MDCC day. Site traffic data is typically stable day-to-day and there is no site registration.

**Results:** On average, MDCC attendance increased by 45% from pre (13 sessions held 5.26.19–2.19.20) to mid pandemic (13 sessions held 4.15.20–11.18.20). Access rates to MDCC targeted GFFs remained constant pre-mid pandemic given MDCC participation increase. MDCC targeted GFF site visits averaged 6.06 pre and 10.09 mid pandemic – a 44% increase (average increase 4.9 per MDCC session). Individuals stayed on the GFF web site visiting 16.54 other pages pre and 25.19 mid pandemic – a 34% increase (average increase 8.7 per MDCC session).

**Conclusion:** MDCC linked GFF access and other page visits remained constant during the pandemic. Educators can be confident that their efforts to identify relevant, synoptic web-resources are still accessed even in challenging times.
Providing AC2Tionable Feedback Improves Resident & Fellow Satisfaction

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Presented by Trish LaFratta, MBA

Background: Feedback is an essential component of the learning process and is a required program accreditation. Yet it is often among the lowest rated items on education/teaching evaluations, is stressful for learners/teachers alike, and is not actionable. To be actionable, feedback must include current performance (omission/commission, deficient/error), the desired goal performance (the gap), and a stepwise approach to bridging that performance gap with strategies and resources. Unfortunately, one or more of these elements are often omitted rendering most feedback unactionable.

Purpose: To educate learners and teachers to seek/provide actionable feedback and determine if residents’/fellow’s feedback ratings improve.

Methods: Over a 2-year period, faculty and trainees in Accreditation Council on Graduate Medical Education (ACGME) approved residency/fellowship programs in our sponsoring institution (SI) were invited to attend a 45-minute actionable feedback session. Session was typically incorporated into an established training program venue. The core elements of actionable feedback were highlighted – from both a faculty and learner perspective using AC2T model: “A” = Ask for feedback /Answer focused on specific performance gap; “C” = Clarify if any actionable feedback elements were omitted; “C” = Consider what steps you will take/Coach to support learning and growth; T =say Thanks as feedback is a dynamic relationship. Sessions included feedback vignettes framed around specialty-specific milestones to provide practice opportunities. Participant pairs were given 90 seconds to complete the feedback interaction followed by a debriefing. ACGME administered survey results over 4 years were examined: 2 years prior to AC2T and 2 years of AC2T implementation.

Results: In each of the 2 years prior to AC2T implementation our ACGME mean rating on the item “satisfied with feedback” was significantly below the national mean by 0.4 (5 Point Scale: Extremely Satisfied to Not at All Satisfied). Response rate > 98%; 2017= 139/141; 2018=163/167). After AC2T education in year 1, feedback item ratings improved to 0.20 below national mean (response rate 99% 168/170) and in year 2 ratings reached the national mean (response rate 85% during pandemic 152/179).

Conclusion: Focusing learner and faculty development on key elements of actionable feedback is associated with dramatic improvement in feedback ratings.

Personal Protective Equipment Compliance: A Quality Improvement Initiative

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Background: Provider and patient safety is dependent on accurate donning and doffing of Personal Protective Equipment (PPE). Studies prior to the coronavirus disease 2019 (COVID-19) pandemic have reported poor adherence to PPE use with higher risk of contamination during donning. Pre-pandemic audits at pediatric general ward and intensive care unit of Advocate Children’s Hospital, Park Ridge, IL showed varying compliance each month (88-100%) with donning. Doffing historically was never monitored. The COVID-19 pandemic has heightened the importance of donning and doffing while making the process more complex due to need for additional equipment and reuse of supplies.

Purpose: Identify and ameliorate modifiable, individual and system factors through process standardization and education to achieve 100% compliance with PPE use.

Methods: The local institutional review board approved this multidisciplinary quality improvement initiative. We used an anonymous online (REDCap) survey and bedside audits to assess baseline compliance and opportunities for intervention.

Results: Eighty-six providers (27-physicians/advance practice providers, 38-nurses, 20-respiratory therapist, and 1-ancillary services) returned the survey. Electronic communication from leadership (63%) and an online COVID-19 toolkit (56%) were reported to be major sources of information, while 13% had participated in in-situ simulation. Only 20% reported to be very confident of their own donning/doffing skills while 29% were only somewhat confident. About 30% of team members self-reported errors/contamination during donning or doffing and reasons were identified as: lack of knowledge of the current processes due to frequent changes in recommendations (74%), lack of supplies consolidated in one location (89%), distraction from phone calls/conversation (88%), patient deterioration (66%), and PPE fatigue (33%). Baseline audit revealed use of appropriate PPE by most providers, but the process was often completed out of order or incorrectly.

Conclusion: We identified a need for additional education and readily available supplies. Videos showing proper donning and doffing technique, in-person validation of said technique, and just-in-time review for team members are educational interventions implemented. Custom-designed, dedicated PPE carts are placed at the bedside for short-term storage and easy access to equipment. A post-intervention survey and audit will be completed to assess the effectiveness of these interventions and identify future opportunities.
Leveraging Human Genetic Variation to Uncover the Molecular Basis of T cell Selection and Autoimmunity

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Background: To respond to a myriad of ever-changing pathogens, the thymus generates T cells each equipped with a unique receptor at their surface to recognize any virus, bacterium, or parasite. To build this comprehensive repertoire, gene segments encoding T cell receptors undergo random rearrangement, yielding specificities against the body’s own constituents. To safeguard against harmful auto-reactive T cells, recognition of ‘self’ triggers cell death for developing T cells in the thymus. Failure in this process leads to the escape of self-reactive T cells that ultimately results in autoimmune diseases. To ‘mirror’ all of self in the thymus, the thymic epithelium possesses the remarkable capacity to express virtually any gene, including genes whose expression is normally restricted to highly specialized tissues, e.g. insulin. Despite its clinical importance, the precise mechanism driving this tissue-restricted gene (TRG) expression remains unknown.

Purpose: We leverage the natural genetic variation in human populations to uncover the molecular basis of tissue-restricted gene expression in the thymus and its contribution to autoimmunity.

Methods: We will first identify the genetic loci that impact tissue-restricted gene (TRG) expression via quantitative trait loci (QTL) analysis. These loci correspond to ‘regulatory’ regions that directly promote gene expression, or regions encoding activating factors essential for TRG expression. To further characterize these regions and pinpoint molecular players, we will measure their activity and investigate any disruption of factor binding motifs at these loci. Finally, we will determine the contribution of the discovered genetic determinants to autoimmune traits by assessing their overlap (‘colocalization’) with known risk variants.

Results: To this end, we are assembling an unprecedented cohort of human thymi. We developed a protocol to isolate thymic epithelial cells from donor samples that maximizes cell viability and recovery. We are profiling their genetic sequence, tissue-restricted gene (TRG) expression (via RNA-seq) and regulatory landscape (via ATAC-seq).

Conclusion: These findings will serve as a foundation for the design of new diagnostics and therapeutics for autoimmune diseases.

Evaluating the Pediatric Transitional Care Management Visit at Aurora Sinai Family Care Center

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Background: Centers for Medicare and Medicaid Services (CMS) offer payment to outpatient primary care facilities to provide Transitional Care Management (TCM) visits. The visit serves as a handoff of patients from the acute inpatient setting to the outpatient ambulatory environment, allowing succinct follow-up on medical management. However, creating a thorough workflow and protocol to establish TCM visits can be challenging, especially when patients are mostly discharged from hospital facilities not a part of one’s health care system.

Purpose: To assess the current pediatric TCM workflow at an academic primary care clinic, as well as missed opportunities for pediatric hospital discharge follow-up and appropriate TCM reimbursement.

Methods: The current pediatric TCM workflow was obtained via informal interviews with care coordinating staff members of Aurora Family Care Center (FCC). A retrospective chart review was performed for clinic patients aged 3 days-18 years old who were hospitalized from January-December 2019, and who were discharged from any community hospital to outpatient follow-up at Aurora FCC. It was determined whether TCM visits were performed following their hospital discharge. Basic descriptive statistics and Mann-Whitney Tests for continuous analyses were used as appropriate. For outpatient visits, those not meeting TCM criteria for billing, loss of reimbursement was calculated per patient’s medical complexity at the time of their hospital discharge.

Results: Of the 46 patients who met inclusion criteria, 60.9% were male, of mean age 7.3 years and had a mean hospital stay of 4.7 days. The two most common discharge diagnoses were respiratory (24%) and surgical (24%). Overall, 22% (N=10) of pediatric patients received a follow-up visit after discharge. However, only 50% (N=5) of the hospital discharge visits met criteria for TCM billing. There were no statistically significant differences in whether a TCM visit was performed based on length of stay (2.5 vs. 3 median days; P=0.82). However, there was a statistically significant difference based on age (0.2 vs. 7.4 years; P=0.01). Reimbursement for those who met TCM criteria was $963.44. The total estimated potential TCM reimbursement for patients not meeting criteria and who did not have a hospital follow-up was $7805.19.

Conclusion: Team based TCM services are designed to allow appropriate medical follow-up for recently discharged patients. Our primary care clinics have room to implement a more standardized and effective pediatric TCM process.
Drug Coated Balloon vs Drug Eluding Stent: A Long-term Comparison

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Background: Peripheral artery disease (PAD) affects more than 200 million people worldwide and carries significant morbidity and mortality. Endovascular treatment of critical femoral-popliteal PAD has advanced in recent years. Drug eluting stents (DES) and drug coated balloons (DCB) have demonstrated improved primary patency compared to balloon angioplasty or bare metal stenting. The current literature lacks any long-term direct comparison between the two modalities.

Purpose: To compare long term patency of DCB and DES in the treatment of femoral popliteal peripheral artery disease.

Methods: A retrospective analysis was completed on patients who underwent femoral-popliteal interventions from June 2014 to June 2018 in a single high-volume center with either DCB or DES. Patient medical data and lesion characteristics were retrieved using Vascular Quality Initiative database. Outcomes were analyzed through December 2019. Primary endpoint of time to clinical event driven target lesion reintervention (TLR) and secondary endpoint of all-cause mortality were examined.

Results: Four hundred and eighty-three patients with a total of 563 interventions met the inclusion criteria in the designated time frame. Three hundred fifty-nine DCB and 204 DES were performed. Of those who underwent DCB, 132 required bailout stenting at the time of procedure, majority for residual stenosis. For the endpoint of TLR: DES had a higher reintervention rate 19.6% DES vs 16.2% DCB, which was not statistically significant. In the beginning years of the study there was significant higher use of DES with a paradigm shift in the final three years to DCB use. All patients requiring TLR were examined; mean time for TLR in DES group was 1277 days (SD 546), while DCB mean time for maintaining patency was 904 days (SD 330.1). For patients requiring target lesion reintervention, DES remained patent significantly longer than those with DCB (373 days longer on average) (p value: < 0.001). For all-cause mortality there was no significant difference at 50 months between DCB and DES (p value: 0.06).

Conclusion: In patients who required target lesion reintervention, DES had a significantly longer length of time to reintervention (average of 373 days), although no difference in mortality was observed.

Assessing Comfortability and Knowledge of LGBTQ Health in Family Medicine Residency Program

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Background: The LGBTQ community experiences health disparities, including higher mental health concerns and lower likelihood to receive recommended preventative care. A contributing factor to these disparities is a lack of physician comfort and education on LGBTQ health.

Purpose: The purpose of this study was to assess primary care residents and attendings’ medical knowledge and comfort of LGBTQ health issues before and after formal education.

Methods: A pre-test survey was emailed to residents and faculty at the Aurora Family Medicine residency program. Questions included: self-reported knowledge and comfort of taking care of LGBTQ patients, terminology, CDC and USPSTF screening guidelines, and gender-affirming treatment options. After completion of the pre-test, two 15-minute lectures were provided during resident-faculty meetings. After completion of the second lecture, a post-test survey was emailed to residents and faculty.

Results: Pre-test (n=34) and post-test (n=20) responses were compared using Chi-Square tests and Fisher’s Exact test for categorical variables, and T-tests for continuous variables. While respondents reported improvement in knowledge (pre-test 43.4%, post-test 53.1%) and comfort (pre-test 52.0%, post-test 62.0%) after the lecture series, results were not statistically significant (p=0.161; p=0.191). There were no statistically significant differences between pre-test and post-test scores on LGBTQ health questions.

Conclusion: While self-reported knowledge and comfort scores improved after receiving lectures on LGBTQ health, results were not statistically significant. Interpretation of the data was limited due to fewer respondents on the post-test, as well as having different respondents when comparing pre-test and post-test identifiers. It is also unclear what percentage of residents and attendings were able to attend either or both lecture series and whether more or longer educational sessions would have increased medical knowledge and comfort further. Addressing barriers to physician attendance and completion of surveys could improve the study.
Enhancing Tools to aid in Antimicrobial Stewardship Services in a Multi-State Health System
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**Background:** Infectious disease (ID) pharmacists at Advocate Aurora Health are a part of an antimicrobial stewardship (AMS) program where clinicians monitor antibiotic usage and resistance patterns to facilitate appropriate use. Currently, a third-party clinical surveillance program outside of the electronic health record (EHR) is used to identify patients who would benefit from surveillance. Because this program does not integrate with the EHR, ID pharmacists must shift between platforms to do a comprehensive workup of the patient. The program is also used for antimicrobial consumption reporting, and more tools are being enabled within the EHR to improve this reporting. Therefore, there is a need to develop a more efficient means of identifying patients and enhance AMS reporting.

**Purpose:** The purpose of this project is to optimize tools to perform antimicrobial- and culture-based surveillance and to report antimicrobial consumption within an electronic health record to improve the efficiency of AMS services.

**Methods:** Infectious disease pharmacists were consulted to discuss current workflows and to align system-wide initiatives with workflow changes. A patient list-based workflow was determined to be the preferred method for identifying and reviewing patients within the EHR, and a workgroup assessed the preliminary EHR build. A one-week time study was conducted to establish a baseline of the number of patients reviewed using the third-party clinical surveillance program. Once implemented, post-implementation data will be collected over one week using an ID-focused documentation tool within the EHR. Simultaneously, reports to quantify appropriate restricted anti-infective medication use will be developed.

**Results:** A pre-implementation time study was conducted from September 14 to September 18, 2021. During this time, 1,644 patients were reviewed, and each ID pharmacist reviewed about 329 patients on average. Per workgroup discussions, a patient list-based workflow to identify patients taking anti-infective medications with restricted use criteria was developed. To facilitate review prioritization, a ranking system was created and integrated into the EHR. Additionally, an AMS-focused navigator and documentation tools were developed and linked to the patient lists. Implementation of this workflow is planned for the end of March, and the post-implementation time study is subsequently planned for early April.

**Conclusion:** Post-implementation delayed. Data will be available and analyzed prior to poster session.

Gabapentin for Prophylaxis of Alcohol Withdrawal
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**Background:** Limited information is available on the use of pharmacological agents for alcohol withdrawal prophylaxis. Current literature for benzodiazepines has been reported, however the role of gabapentin as a prophylactic agent has yet to be determined.

**Purpose:** The objective of this study was to evaluate the efficacy of gabapentin to prevent disease progression in patients at high risk of developing severe alcohol withdrawal.

**Methods:** This retrospective cohort study was approved by the Institutional Review Board and used electronic medical records (EMR) to identify patients who had Clinical Institute Withdrawal Assessment (CIWA) scores monitored during inpatient stay. Patients were included if their initial CIWA scores were <8 upon admission, indicating that they were not experiencing active withdrawal symptoms. Patients who either experienced acute alcohol withdrawal symptoms on admission as defined by a CIWA score >8 or were admitted for primary treatment of alcohol withdrawal or dependence were excluded. The intervention group consisted of patients who received gabapentin prior to a reported CIWA score >8, while the control group consisted of those who did not. The following baseline characteristics were collected: age, sex, weight, serum creatinine, liver function tests, and history of alcohol withdrawal seizures or delirium tremens. The primary objective of this study was to compare the number of asymptomatic patients who progressed to severe alcohol withdrawal (defined as two CIWA scores >15 within an 8-hour time period) when given gabapentin prophylaxis to those who were not given gabapentin prophylaxis. Secondary endpoints included medication use and duration (benzodiazepines, antipsychotics, phenobarbital, propofol, and alpha-2 agonists), CIWA scores, need for intensive care unit (ICU) admission incidence of mechanical ventilation, ICU and hospital length of stay, rates of complications, and select adverse effects.

**Results:** Data collection is currently in progress.

**Conclusion:** In progress
Demographics, Treatment and Survival for Patients Diagnosed With Pancreatic Cancer 2010-2016

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Background: The incidence and deaths caused by pancreatic cancer has increased over recent years, despite improvements in mortality rate in other cancer types. Pancreatic cancer is a predominantly asymptomatic cancer, very difficult to detect, with diagnosis late in the disease. It is among the most lethal cancers.

Purpose: The purpose of this study was to describe the demographics among those who were diagnosed with pancreatic cancer, evaluate incidence and mortality and overall survival(OS) and percent survival after 1, 2 and 5-years for patients diagnosed with pancreatic cancer.

Methods: Data from National Cancer Database from 2010 through 2016 was used for this study. We identified of 384,753 patients diagnosed with pancreatic cancer. In this study population, patients with missing mortality (dead, alive) were excluded from the study sample. Descriptive statistics and Cox regression were used to analyze the data.

Results: Overall there were 49% female, 79% non-Hispanic white (NHB), 12% non-Hispanic black (NHB), 5% Hispanic and the remaining 3% were from 'Other' race category (Asians and Pacific Islanders). Cox proportional hazard regression analysis showed that female (0.95, 0.94-0.96), Hispanic (0.96, 0.95-0.97), non-Hispanic black (0.94, 0.93-0.95) and patients from other race category (0.88,0.87-0.89), compared to non-Hispanic white, patients in lower medium (0.96,0.95-0.97), medium (0.94,0.93-0.95) and higher income category (0.88,0.87-0.89) compared to low income category, living in metro (0.99,0.98-1.00) areas versus in urban areas and residing in East (0.96, 0.95-0.96) and West (0.99, 0.98-1.00) region versus in central region, patients with government (0.90,0.88-0.92), and private (0.84, 0.82-0.59) insurance versus no insurance had lower hazard of mortality. Similarly, patients who had treatment such as surgery (0.29, 0.29-0.30), radiation (0.85, 0.84-0.86), chemotherapy (0.69, 0.69-0.70), immunotherapy (0.76, 0.72-0.81), hormonal therapy (0.50, 0.47-0.54) had lower hazards for mortality. The patients with higher Charlson-Dayo score (1 versus 0, 1.13, 1.12-1.14; 2 vs 0, 1.27,1.25-1.29; 3 or more versus, 0 (1.48, 1.14-1.52). Also, one-year increment in age increased risk of dying by one to two percent (1.01, 1.01-1.02).

Conclusion: Transitions of PAH medications appears safe and efficacious when following our institutional guideline protocols. Patients may require acute adjustments to transition protocol based on side effects, prostaglandin insufficiency, and patient reason for transition.

Abametapir Drug Review

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Background: Head lice, or Pediculus humanus capitis, is a common yet difficult to treat ectoparasite. It has traditionally been treated with over-the-counter (OTC) synergized pyrethrin or pyrethroids (permethrin), however, widespread resistance has led to the need for novel pediculicides, such as abametapir 0.74% (Xeglyze).

Purpose: The purpose of this article is to review the pharmacology, safety, efficacy, and clinical importance of abametapir.

Methods: A systematic review of the Medline and Embase databases was conducted for the terms "abametapir", "Xeglyze", or "Ha44". All relevant articles prior to December 2020 were included.

Results: Abametapir works through chelating heavy metal ions and inhibiting metalloproteinases critical to louse ova development, hatching, and adult survival. A phase II trial using an ex-vivo approach validated the direct ovicidal activity of abametapir, inhibiting 100% of treated louse eggs from hatching, compared to 64% in the vehicle-treated group. With comparison to untreated controls, the absolute hatch rate reduction was 92.2% in abametapir-treated and 42.3% in vehicle-treated louse eggs (P < 0.001). Two identical phase III clinical trials conducted in 704 patients with head lice infestations showed subjects treated with a single 10-minute application of abametapir had a significantly greater proportion of treatment success, or being lice free through 14 days, compared to vehicle-treated subjects, with 81.1% success versus 50.9% (P = 0.001) and 81.8% versus 47.2% (P < 0.001). Abametapir was well tolerated with mild scalp erythema, rash, skin burning sensation, and contact dermatitis being the most commonly experienced adverse effects.

Conclusion: Abametapir 0.74% is a newly Food and Drug Administration (FDA)-approved single application treatment for head lice in patients aged 6 months and older. Its direct ovicidal and lousicidal activity is effective in treating head lice infestations with one application. In the face of growing resistance to current pediculicides, abametapir offers a safe and effective new treatment.
Impact of COVID-19 Lockdown on STEMI Volume and Door-to-Balloon Time

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Background: Measures taken to mitigate the spread of coronavirus disease 2019 (COVID-19) have been correlated to a decline in the number of patients seeking medical care for emergency cardiovascular illness.

Purpose: Here we evaluate the impact of a state-wide lockdown on ST-elevation myocardial infarction (STEMI) care.

Methods: All consecutive adult patients admitted with an acute STEMI diagnosis and percutaneous intervention (PCI) performed between Jan. 17, 2020, and Jul. 14, 2020, were included in this study. Patient demographics, medical history, and procedure details were collected retrospectively from electronic medical records. Data were segregated according to date into pre-lockdown, lockdown (Mar. 17 to May 13), and post-lockdown groups.

Results: There were 225 patients in the study cohort. The median age was 62 (IQR: 53-71) years. Patients were predominantly male (n=154, 68%), white (n=208, 92%), hypertensive (n=139, 61%) and dyslipidemic (n=135, 60%). The average weekly rate of STEMI PCIs performed pre-lockdown decreased by 40% during the lockdown from 10.9 to 6.5 PCIs per week (p<0.05). Door-to-balloon (D2B) times increased from 42 (IQR: 28-68) min pre-lockdown to 53 (IQR: 40-72) min during the lockdown (p=0.01). No significant differences were observed in in-hospital mortality or cardiac troponin measurements within 24 h of procedure between the three groups.

Conclusion: Adverse effects of COVID-19-related lockdowns on acute STEMI care include a decrease in PCI volumes and prolonged D2B times.

Retrospective Review of Alteplase Dosing for Pulmonary Embolism

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Background: Pulmonary embolism (PE) is the third leading cause of cardiovascular mortality and causes over 100,000 deaths in the United States per year. Thrombolytic therapy is recommended for massive PE but remains controversial in submassive PE. Furthermore, a guideline-directed alteplase dose has not been established. Various alteplase dosing regimens have been noted within our health system.

Purpose: The objective of this multicenter, retrospective review was to evaluate the efficacy and safety of various alteplase dosing strategies used to treat massive and submassive PE.

Methods: Data was collected via an electronic health record report based on ICD-10 coded primary or secondary diagnosis of PE and retrospective patient chart review. Patients were included if they received systemic or catheter-directed alteplase for PE across 14 hospitals between March 1, 2017 and July 31, 2020. Patients who received alteplase for an indication other than PE (stroke, chest tube administration, line or port access, or catheter-directed thrombolysis for deep vein thrombosis) were excluded. PE was confirmed with radiographic evidence and classified as massive, defined as PE-associated hemodynamic instability, or high-risk submassive, defined as pulmonary embolism severity index [PESI] classification III-V with elevated troponin and RV dysfunction or a BOVA score of 5-7. The dosing strategies evaluated included alteplase 100 mg, alteplase 50 mg, or the mean alteplase dose administered during catheter-directed thrombolysis (cumulative from bolus and continuous infusion). The primary outcome was 30-day mortality. Key secondary outcomes include 90-day mortality, recurrent PE within 30 days, hospital readmission within 30 days, and any bleeding event during hospitalization, defined as a completed blood transfusion or ICD-10 diagnosis code for hemorrhagic stroke.

Results: Data collection and analysis for the primary outcome, 30-day mortality, and secondary outcomes, including 90-day mortality, recurrent PE within 30 days, hospital readmission within 30 days, and any bleeding event during hospitalization, is ongoing.

Conclusion: Definitive conclusions cannot be made until analysis of treatment regimens are completed. Data will be analyzed prior to presentation.
Parangliomas of the Larynx: An Evidence Based Review

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**Background:** Parangliomas, also called glomus tumors, are a common tumor of neuroendocrine cells that occur in various locations throughout the head and neck such as the carotid, cervical, and jugular areas. However, parangliomas of the larynx are rare in literature and therefore data is scarce on how they present, how they should be treated and their complications. These tumors have been commonly misidentified as other neuroendocrine tumors but increased use of immunohistological markers has made it easier to distinguish parangliomas from other neuroendocrine tumors such as atypical carcinoid, atypical carcinoid and medullary thyroid cancer.

**Purpose:** Given the sparsity of literature related to the characterization of parangliomas of the larynx, our objective was to perform an evidence-based systematic review of the literature evaluating the initial presentation, physical findings, approach to management, and complications associated with the management of these primary parangliomas of the larynx.

**Methods:** A Systematic Review was conducted on literature describing primary parangliomas of the larynx. PubMed/MEDLINE, Cochrane Library, Ovid, and Scopus databases were evaluated. Studies were assessed for quality of evidence and risk of bias using the GRADE and MINORS criteria. Case reports were omitted.

**Results:** Seven hundred eight studies were identified, only twenty-six met inclusion criteria. The data is currently being analyzed but preliminary results show that there were 60 cases of laryngeal parangliomas in the literature. GRADE criteria indicated studies of low to unclear quality with a mean MINORS score of 10.8. The average age of diagnosis was 66. The tumors were more common in females. Most of these tumors arose from the superior paranganglia (%). The most common presenting symptoms was hoarseness, dysphagia, globus, and dysphonia. The most common treatment was surgical excision. The data is still being analyzed.

**Conclusion:** Parangliomas of the larynx are quite uncommon. In the little literature that is out there, some may have been misidentified due to the lack of immunohistological staining. In this review, we discussed the presentation, physical findings, approach to management and complications associated with the management of these tumors. We need to characterize the behavior of these tumors so we can properly diagnose and treat the tumors.

Addition of Gabapentin to Opioids Does Not Improve Pain in Patients With Chronic Neck and Low Back Pain

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**Background:** Since gabapentinoids are rarely prescribed alone, but rather as adjuvants to other classes of analgesics, it is paramount to establish their interactions with other analgesic medications, particularly opioids.

**Purpose:** We compared the reduction in pain and opioid consumption in patients with chronic spinal pain on concomitant gabapentinoids and opioids with patients using opioids only.

**Methods:** This was a retrospective chart review of patients with chronic neck or low back pain who were on opioids with at least 24-month follow-up. We have included 167 patients with chronic spinal pain lasting at least 6 months. Patients on gabapentin or pregabalin were included in the gabapentinoid group, while the other patients were included in the non-gabapentinoid group. Primary outcome was assessment of pain scores measured via a numeric rating scale (NRS), and secondary outcomes were response to the treatment (>2 point reduction on NRS) and daily opioid use measured in morphine milliequivalents.

**Results:** Pain scores were reduced in the first 6 months and plateaued after that in both groups. At the end of 24 months, the average pain score was 6.71 in the gabapentinoid group, while the average pain score was 7.18 in the non-gabapentinoid group. There was no statistical significance between the groups (p=0.28). There was no difference in response to treatment in gabapentinoid group (33.3%) when compared to non-gabapentinoid group (32.7%). We also failed to find any significant difference in daily opioid usage between the two groups.

**Conclusion:** Gabapentinoids may not lead to reduction in pain or opioid consumption in patients with chronic spinal pain. A careful approach must be adopted while prescribing gabapentinoids in the chronic spinal pain patient population.
Time to Positivity and Antibiotic Duration in Febrile Neonates at Advocate Children’s Hospital

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Background: Due to lack of national recommendations, there are a wide variety of practices in management of febrile neonates. This leads to extended antibiotic courses and hospitalization. Initial recommendations described in the 1980s recommended at least 48 hours of empiric antibiotic treatment based on time to positivity in manually observed blood culture systems. Despite improvements in automated continuous-monitoring blood culture systems, there have been no changes to the length of stay in febrile neonates.

Purpose: We conducted a retrospective chart review over a one-year span of febrile neonates (0-90 days of life) admitted to Advocate Children’s hospital. We specifically examined the time to positivity of blood cultures and respective antibiotic duration.

Methods: Of the one hundred sixteen patients, 54 patients were excluded based on predefined criteria and 62 patient charts were reviewed. All patients had a blood culture obtained prior initiation of first dose of antibiotics.

Results: A total of 8 (12.5%) positive blood cultures were identified with a time to positivity less than 36 hours: 7 blood cultures (87.5%) were positive within 24 hours and one culture (Staphylococcus hominis) resulted at 33 hours. The mean time to positivity was 20 hours with a range of 15 - 33 hours. Of the 62 patients, urine cultures (59) and CSF cultures sent (57) were also obtained with 8 positive urine cultures (13.6%) and 2 positive CSF cultures (3.5%). Of the urine cultures, one patient had a positive blood culture with the same organism and the remainder 7 patients had negative blood cultures. The 2 positive CSF cultures both grew GBS and both had corresponding positive blood cultures with the same organism. The average length of stay was 142 hours (range 22-700 hours). The LOS average was 48 hours for febrile neonates with negative blood and urine cultures and no other diagnosis requiring admission (range 22-75 hours). All 62 patients received empiric antibiotics. For patients with negative blood and urine cultures, the average antibiotic coverage duration was 65 hours (range of 25-417 hours). When removing patients with other indications for antibiotics (necrotizing enterocolitis and pneumonia) the average duration of antibiotics was 53 hours (range of 25-128 hours).

Conclusion: We can conclude that there is some area for improvement in our institution in regard to standardizing antibiotic therapy in well appearing febrile infants. The data supports decreasing empiric antibiotic therapy duration to 36 hours.

Association of Fresh Waterways and Legionella Pneumophila Infection in Eastern Wisconsin: A Case-Control Study

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Background: Legionella pneumophila is an environmentally acquired, intracellular bacterium which causes Legionnaires’ disease. Known to infect humans through contaminated cooling towers and other built sources, there is recent preliminary evidence of associations with fresh waterways. A positive Legionella urine antigen (LgAg) test is diagnostic of L. pneumophila infection.

Purpose: Our study aimed to identify associations of Legionella infection and fresh waterways in Eastern Wisconsin.

Methods: This case-control study was a secondary analysis of home address data from patients who underwent LgAg testing at a single Eastern Wisconsin health system between January 2013 and December 2017. We investigated ZIP codes in which there were 3 or more positive cases with 50 or more tests completed, as well as adjacent ZIP codes in which there were 2 or more positive cases and 50 or more tests completed. For every positive case within these identified ZIP codes, three random negative LgAg controls were also selected (1:3 ratio). Addresses were geocoded and mapped using ARC-GIS; nearest waterway and distance to home (ft.) was identified. Nearest waterway and distance to home was verified/corrected by use of Google Maps. Waterway type was classified per WI DNR. Verified distance to nearest waterway was analyzed using Chi-squared and 2-sample t-tests.

Results: Overall, 80 cases and 240 controls from 22 ZIP codes were included. Mean distance to nearest waterway did not differ between cases and controls (2958 +/- 2049 ft. vs. 2856 +/- 2018 ft.; p=0.701). Additionally, cases were no more likely than controls to be within 1320 ft. (1/4 mile) of waterway (31% v. 28%, p=0.571). When only the subset of four non-532xx (non-Milwaukee) ZIP codes were analyzed (total N=48 addresses), cases were significantly closer to nearest waterway than controls (1165 +/- 905 vs. 2113 +/- 1710 ft.; p=0.019). In addition, comparing the number of observed vs. expected cases, the non-532xx ZIP code group cases were disproportionately within 1320 ft. of waterway (8 v. 3.45, p=0.004). There were no associations identified with type of waterway.

Conclusion: Additional studies are needed to determine if proximity to fresh waterways is consistently associated with Legionella infections. Moreover, studies on the relative importance of fresh versus built environmental water sources in the acquisition of legionellosis in non-urban areas is warranted.
Detection of Cardiac Disease Using Artificial Intelligence With 12-Lead ECG Data

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Background: Cardiac diseases such as hypertrophic cardiomyopathy and aortic stenosis affect the heart’s main blood pumping chambers and can result in adverse outcomes such as sudden cardiac death. The echocardiogram is the gold standard to diagnose these diseases. Equipment and expertise to perform this procedure can be costly in some healthcare systems. 12-lead electrocardiograms (ECG) are lower-cost tools to establish baseline cardiac function. These diseases present similarly on ECGs and distinguishing them is a clinical challenge.

Purpose: This study uses artificial intelligence to confirm similar disease presentation, to detect disease presence, and to identify features most indicative to detect disease.

Methods: 16,781 ECGs were processed from 1,461 adult patients diagnosed with one disease after undergoing a previous echocardiogram. A multiclass study design was used to detect disease presence. 912 features were extracted from raw ECG signals in the MUSE database. Training data consisted of 75% of the observations (n = 1096), and testing data consisted of the remaining 25% of the observations (n = 365). Feature selection with the SelectKBest method reduced 912 features to a subset of 50 important features. Principal Component Analysis (PCA) was used to visualize how each disease presented from the others. Multilayer perceptron (MLP) and linear discriminant analysis (LDA) models classified diseases, and were compared in terms of accuracy, positive predictive value, and area under the curve (AUC).

Results: PCA showed one overlapping cluster of six diseases, indicating data patterns for each disease are not well-separated: confirming the challenge of separating scans. MLP most accurately detected Fabry’s disease (83.60%); LDA most accurately detected amyloidosis (75.42%). From the 50 important features, feature values and lead numbers characterized the diseases. S-wave features characterized amyloidosis, HCM, and AVS (21, 17, 17 occurrences); T-wave features characterized Fabry’s disease (14 occurrences); R-wave features characterized LVH and sarcoidosis (13 occurrences). Lead V6 characterized amyloidosis, AVS, HCM, and sarcoidosis (8, 11, 9, 8 occurrences); Lead I characterized LVH (8 occurrences); Lead III characterized Fabry’s disease (13 occurrences).

Conclusion: The choice of classification model depends on the chosen disease and AI is a useful tool in clinical practice in conjunction with physicians’ trained expertise.

New Cutoffs for the Biochemical Diagnosis of Adrenal Insufficiency After ACTH Stimulation Using Specific Cortisol Assays

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Background: The cosynotropin (synthetic ACTH[1-24]; Cortrosyn®) stimulation test is the standard approach to screen patients for adrenal insufficiency, a life threatening disorder. The historical cutoff for the cortisol response to intravenous cosynotropin is ≥18 µg/dL (500 nmol/L) at 30 or 60 min after injection. This cutoff is based on older serum cortisol assays some of which are still in use. Newer, more specific monoclonal antibody immunoassays or liquid chromatography-tandem mass spectrometry (LC-MS/MS) may have lower thresholds for a normal response.

Purpose: To calculate serum cortisol cutoff values for cosynotropin stimulation testing using three newer, more specific cortisol assays.

Methods: Retrospective analysis of cosynotropin stimulation tests was performed in ambulatory and hospitalized patients suspected of adrenal insufficiency. Serum samples were assayed for cortisol in parallel using the Roche Elecsys I and Elecsys II immunoassays, and when plasma volume was sufficient, by the Beckman Access immunoassay and LC-MS/MS.

Results: 110 patients were evaluated. Using 18 µg/dL as the cutoff after ACTH stimulation, 16%, 29%, 22%, and 32% of patients had a biochemical diagnosis of adrenal insufficiency using the Elecsys I, Elecsys II, Access Cortisol, and LC-MS/MS assays, respectively. Deming regressions of serum cortisol were used to calculate new cortisol cutoffs based on the Elecsys I cutoff of 18 µg/dL. New post-cosynotropin cutoffs were 14.6 µg/dL for Elecsys II, 14.8 µg/dL for Access Cortisol, and 14.5 µg/dL for LC-MS/MS. Very low baseline serum cortisol (<2 µg/dL) was predictive of a subnormal cortisol response to cosynotropin.

Conclusion: To reduce false positive cortisol stimulation testing, we recommend a new serum cortisol cutoff of 14-15 µg/dL depending on the assay used (instead of the historical value of 18 µg/dL with older, less specific polyclonal antibody assays). Baseline serum cortisol, unless extremely low, does not obviate the need for cosynotropin stimulation testing. When evaluating patients for adrenal insufficiency, clinicians should be aware of the cosynotropin-stimulated cutoffs for the cortisol assay used in their clinical laboratory. Furthermore, clinical laboratories should provide the appropriate cortrosyn-stimulated serum cortisol cutoff for their assay when reporting results.
Pulmonary Valve Sparing Repair of Tetralogy of Fallot: Considerations and Factors That May Influence Surgical Techniques

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Background: The optimal surgical technique for complete repair of Tetralogy of Fallot (TOF) remains controversial. Historically, transannular patch reconstruction of the right ventricular outflow tract was more frequently performed. More recently, there is a tendency toward preservation of the pulmonary valve function in order to protect right ventricular function. However, there are the unanswered questions of how much residual pulmonary stenosis (PS) is too much to leave behind, and how much pulmonary regurgitation (PR) is acceptable when the indication of valve sparing procedure is stretched.

Purpose: The aim of this study is to review the long-term outcomes of our expanded indication of valve sparing procedure for TOF.

Methods: We carried out a single center retrospective chart review of 87 patients who underwent TOF surgical repair from January 2009 to January 2019. Patients who underwent a valve sparing repair (n= 71, 82%) were included for analysis. Our study team reviewed hemodynamic data, intraoperative reports and echocardiography results to compare those who underwent a pulmonary valve replacement (PVR) vs patient with no PV reintervention (no PVR) after the valve sparing repair at long term follow up.

Results: The median age of patients at TOF repair was 4 months old with a mean pulmonary valve size of -2.0 ranging from 1.32 to -5.34 in Z score. Nearly 78% of our study population had a bicuspid pulmonary valve at the time of repair. Freedom from PVR at 1, 3, 5 and 10 years were 93.4%, 88.1%, 84.6% and 67.5%, respectively. For patients who had residual PS at the time of initial TOF repair, there was limited change of the pressure gradient over time (increased by 15.6 ± 18.4mmHg or decreased by 14.9 ± 10.7mmHg). Residual PS at the time of initial TOF repair was significantly higher in the PVR group compared with no PVR (PVR 38.8 ± 15.9 vs no PVR 23.6 ± 17.7: p = 0.02). In the PVR group, 87.5% patients had the right ventricular pressure greater than half of the systemic pressure at the time of initial complete repair. The degree and change of PR over time were comparable between PVR group and the no PVR group (p>0.05).

Conclusion: TOF valve sparing procedure can be performed in about 80% of patients using various technique with sufficient long-term results. Since the change of residual PS over time is limited, the intraoperative decision to convert to transannular patch repair is critical. The long-term sequela of residual PV regurgitation remains difficult to predict.

COVID-19 and Heart Failure: Outcomes From a Large Healthcare Network

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Background: Heart failure (HF) confers increased susceptibility to coronavirus disease-19 (COVID-19). We aimed to elucidate the risk factors and outcomes of hospitalized COVID-19 patients with a prior diagnosis of HF.

Purpose: To illustrate the relationship between heart failure patients and covid-19 mortality and morbidity.

Methods: We analyzed 4,425 COVID-19 patients hospitalized in any of 19 of our Midwest network hospitals between Feb. 27, 2020 and Oct. 3, 2020. Clinical characteristics and outcomes (length of hospitalization, ICU admissions, ventilation requirements and in-hospital mortality) were captured from electronic health records. Patients were stratified according to prior diagnosis of HF into HF and control groups.

Results: The HF group had 988 patients (median age 74 years, 52% male). Troponin >0.09 ng/mL and age >65 years were found to be independent predictors of in-hospital mortality after adjusting for hypertension, diabetes, coronary and peripheral artery disease, cancer, stroke, myocardial infarction and NTProBNP for the HF group (OR: 2.48, 95% CI: 1.53 - 4.04, p<0.001 and OR: 2.21, 95% CI: 1.25 - 3.92, p<0.01; respectively). Patients with HF also had longer hospitalizations (8 days, IQR: 5-12 vs. 6 days, IQR: 3-10; p<0.001), more ICU admissions (n=330, 33.4% vs. n=871, 25.3%; p<0.001) and higher in-hospital mortality (n=168, 17.0% vs. n=241, 7.0%; p<0.001).

Conclusion: History of HF was associated with higher risk of in hospital mortality. Troponin elevations >0.09 ng/dL and age >65 years were found to be independent predictors of mortality after adjusting for relevant risk factors.
Zika Virus Demonstrates Oncolytic Activity in a Patient Derived Glioblastoma Xenograft Model in Mice

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Background: Glioblastoma (GBM) is a malignant primary brain cancer. The poor median survival rate for patients with GBM of 15 months has not budged for the past 15 years, when the current standard treatment was first approved. There is no standard of care chemotherapy for recurrent GBM. We hypothesized that Zika virus (ZIKV) can be purposed as an oncolytic virus for GBM. In order to test this hypothesis, we have used patient-derived xenograft (PDX) mouse model and investigated the oncolytic potential of ZIKV.

Purpose: Preliminary in vitro data from our lab confirms that ZIKV has tropism for commercial and patient derived GBM cell lines through the AXL receptor, and the subsequent productive infection is cytotoxic. Given this information, we wanted to determine if ZIKV can work as an oncolytic virus against GBM in mouse models.

Methods: All procedures were approved by IACUC. We used 6-8 week old Fox N1 Nude homozygous female mice. There were four experimental arms: two patient derived cell lines, each with a ZIKV treated and a control group. The number of animals per experimental arm was 12. Animals received subcutaneous flank injections of patient derived GBM 8049 or 8049 AXLKO Cells (2x10⁶) in 100 µl matrigel under isoflurane anesthesia. Animals were observed daily, and weights and tumor measures were done three times per week. When tumor size reached 150mm³, mice received intra-tumoral injection of 2.5x10⁶ ZIKV particles; control group received intra-tumoral saline. At euthanasia, tissues were harvested for IHC and qRT-PCR to determine ZIKV distribution.

Results: After 2-4 weeks of viral particle administration, striking results were observed. ZIKV induced complete tumor remission in 22 of 24 animals (8049: 11/12; 8049 AXLKO: 11/12). There was no tumor remission in 8049 and 8049 AXLKO control animals. Overall survival of 8049 and 8049 AXLKO tumor bearing mice was significantly improved (P= 0.001) by ZIKV treatment: median survival of ZIKV treated animals (8049: 124 days; 8049 AXLKO: 125 days) compared to control animals (8049: 42 days; 8049 AXLKO: 46 days). Among ZIKV treated mice, there were two recurrences: one in the 8049 tumor (24 days after significant tumor remission) and one 8049 AXLKO tumor (7 days after significant tumor remission). We found a significant amount of virus particles in ZIKV infected tumors using qRT-PCR. Histologic analysis confirmed necrotic tumor foci and ZIKV positives tumor cells in treated animals.

Conclusion: ZIKV could be a potential oncolytic agent for GBM therapy.
Treatment Outcomes and Program Transition Rates Across Substance Use Treatment Programs

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Background: Patients with substance use disorder (SUD) represent a diverse group of individuals with unique histories, demographics, substance use patterns, and treatment-related behaviors. As a result, several levels of treatment programs exist, including inpatient, residential, partial hospitalization (PHP), intensive outpatient (IOP), and outpatient. Program level is based on current clinical needs, and best practice is to successfully complete a program and transition to the next in a step-down manner. In contrast, patients who discharge against medical advice, have lower lengths of stay, or fail to transition are thought to have worse outcomes. However, actual patient behaviors and their outcomes within and across substance use treatment programs is not well understood.

Purpose: To describe the outcomes and transition rates of patients across substance use treatment programs.

Methods: Medical records were used to collect data from SUD treatment programs at a midwestern psychiatric hospital between 1/1/17-12/31/19. Data included treatment history, reason for discharge, admissions, latency to program transitions, and location. Basic descriptive and comparative statistics were conducted.

Results: Programs differed in rates of discharge against medical advice (AMA). PHP had the highest rate of discharge AMA, whereas residential treatment had the lowest. In most programs, patients who discharged AMA had similar rates of successful program transitions compared to those who completed the program. Inpatients had higher rates of 6-month readmissions than any other treatment program. Whereas lower acuity treatment programs (residential, PHP, IOP) had decreased inpatient readmissions following program discharge, inpatients had higher inpatient admission rates post-discharge compared to before admission. Consistent with this, programs had unique transition patterns, where inpatients were most likely to readmit as inpatients, residential patients were most likely to step down to PHP, PHP patients step down to IOP, and IOP discharges transitioned across several programs. However, a large subset of patients did not successfully transition to any program. Insurance type was a factor in transitioning to residential treatment.

Conclusion: Treatment-related behaviors and outcomes of patients were unique across programs, potentially reflecting differences in treatment intensities and patient acuities. Results highlight opportunities for reducing readmissions and increasing successful transitions.

Anticoagulation for COVID Associated Coagulopathy: The Experience of a Singular Community Hospital

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Background: Thrombotic events despite prophylactic anticoagulation are a well-recognized complication in patients diagnosed with severe COVID-19. The appropriate dosages and indications for anticoagulation remains controversial.

Purpose: This study aims to describe the general outcomes of critically ill COVID-19 patients receiving therapeutic anticoagulation guided by our expert-driven protocol.

Methods: This retrospective cohort study includes patients admitted to the intensive care unit between March 3 - April 12, 2020 at Advocate Christ Medical Center. Patients taking oral anticoagulants prior to arrival and those started on therapeutic anticoagulation to prevent extracorporeal membrane oxygenation (ECMO) circuit thromboses were excluded. The initiation and dosing of anticoagulation was at the discretion of the treating clinicians. Informal, institutional indications for initiation of therapeutic anticoagulation were: d-dimer > 6x ULN, SIC > 4, and clinical evidence of thrombosis. Demographic, laboratory, and clinical outcomes data were collected. Thrombotic and bleeding events were adjudicated by two trained clinicians or pharmacists. Results are descriptive.

Results: Of 145 subjects identified, 67 (46%) received therapeutic anticoagulation. The median [IQR] age being 61 [56-71] years, BMI 32.8 [29 - 36.7] kg/m2, 42 [62%] male, 44 [66%] non-white. The most common comorbidities were hypertension 50 (75%) and obesity 46 (69%). The initial therapeutic anticoagulation method was unfractionated heparin (UFH) infusion in 63 (94%) and subcutaneous enoxaparin in 4 (6%). The most common indication was a d-dimer > 6x ULN in 58 (87%), while 4 (6%) were started on anticoagulation for thrombotic events alone. The median [IQR] time to initiation was 5 (1.5-8) days; 43 (64%) required invasive mechanical ventilation at the time of initial therapeutic anticoagulation. At follow-up, 44 (65%) were discharged alive, and 23 (34%) had expired. Four (6%) were diagnosed with 5 new thrombotic complications; 3 (4.5%) deep vein thromboses, 1 (1.5%) pulmonary embolism with hemodynamic compromise and 1 (1.5%) ischemic CVA. Two (3%) patients experienced clinically overt gastrointestinal bleeding accompanied by a decrease in hemoglobin of at least 2 g/dL. No other fatal or major bleeding complications reported. Minor bleeding events were identified in 12 (18%).

Conclusion: In this study, critically ill adults on therapeutic anticoagulation had a low incidence of new thrombotic complications and low incidence of major bleeding.
Effects of Therapeutic Anticoagulation for SARS-CoV-2 Coagulopathy on Markers of Inflammation and Mortality

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**Background:** Practitioners have used therapeutic anticoagulation to prevent the thrombotic complications of the severe acute respiratory coronavirus 2 (SARS-CoV-2) virus responsible for the coronavirus disease 2019 pandemic. The effect of such an approach on serum inflammatory markers, and factors associated with survival while on therapeutic anticoagulation, are not known.

**Purpose:** This study evaluated the effect of therapeutic anticoagulation on CRP, LDH ferritin and D-Dimer and also analyzed the association of several factors with mortality.

**Methods:** This retrospective cohort study used data collected from patients diagnosed with SARS-CoV-2 and receiving therapeutic anticoagulation in the Intensive Care Unit of a tertiary care center between March 3, 2020 and April 12, 2020. Indications for initiation of therapeutic anticoagulation included d-dimer > 6x upper limit of normal (ULN), Sepsis-induced coagulopathy (SIC) score ≥ 4, or evidence of thrombotic disease. Data included initial serum markers and repeat values taken at discrete intervals, along with clinical features and mortality. Comparisons were made using two-sided Mann-Whitney U test. Multivariate analyses for predicting death were calculated using Cox proportional hazards models.

**Results:** Of 145 subjects, 67 (46%) received therapeutic anticoagulation; 58 (87%) for COVID-19 coagulopathy and 12 (18%) for thrombotic events. Initial median [IQR] serum values were as follows: CRP 14 mg/dL (9-21), d-dimer 8.1 mg/L (4.3-18.6), ferritin 1,614 ng/mL (723-2,526) and LDH 445 units/L (356-629). Five days after initiation of anticoagulation all patients had a decrease in all measured serum values: CRP 6.8 (2.5-9), LDH 385 (297-472), D-Dimer 4.1 (2.3-7.9) and Ferritin 975 (646-1,483; P < 0.05 for all). At the time of follow-up, 23 (34%) patients had been discharged alive, 20 (30%) patients had expired, and 24 (36%) patients remained in-hospital. Mortality was directly associated with age (HR 9.05; 95%CI 1.71-46) and post-anticoagulation d-dimer level (HR 9.78; 95%CI 1.81-52.9; P < 0.01 for both), and inversely associated with obesity (HR 0.27, 95%CI 0.80-0.93; P < 0.05 for all).

**Conclusion:** In this patient population, therapeutic anticoagulation was associated with a decrease in inflammatory markers, suggesting efficacy of treatment. Anticoagulation may have a particularly important role in obese patients, as obesity was associated with higher survival in patients placed on anticoagulation. This study provides important data for larger, prospective trials.

Advancing Advance Directives in Internal Medicine Residency Clinic

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**Background:** Eighty-nine percent of patients prefer advance directive (AD) conversations be initiated in the outpatient setting, ideally with their primary care doctor. Only 47% of patients greater than 65 in the resident clinic have completed advance directives documentation on file.

**Purpose:** Our goal was to increase AD completion numbers for patients > 65 years old in an Internal Medicine Residency Clinic by 12%.

**Methods:** We developed a new standardized workflow for all clinic patients > 65 years old to ensure they were receiving appropriate goals of care counseling. During the pandemic, the workflow was adapted to include virtual AD completion utilizing a new organizationally approved on-line platform and incentivizing clinic teams for AD-specific appointments. The new workflows were implemented at one of two Internal Medicine residency clinics, with the other used as a control site. Residents completed a series of educational lectures and simulations exercises on how to engage in advance care planning discussions in the outpatient setting. Metrics included health care system provided percent AD completion rates with overall clinical quality improvement (QI) scores and Clinical Learning Environment Quick Surveys (CLEQS) used as balancing measures.

**Results:** Between Jan 2020 and Dec 2020, our clinic AD completion improved 1% at the intervention site. Post virtual AD implementation, AD intervention site completion rate increased another 1% in January 2021. This marks an overall 4% AD intervention site improvement compared to the control site whose AD completion rate decreased by 2% during same period. There were no unexpected changes in our overall QI scores and an improvement in teamwork, as measured by CLEQS, pre-post project implementation.

**Conclusion:** Planning for future health care needs has multiple benefits for older adults, their loved ones, and the entire health care system. Improving provider comfort with and destigmatizing advance planning conversations is an essential step in promoting the completion of AD documentation. As seen with our Jan 2021 data, better coordination with clinic social work staff through clear workflows and availability and utilization of online AD completion platforms is critical in progressing towards goal achievement. Moving forward, continuing to integrate new virtual AD technology into clinical operations and provider training appears to facilitate AD document completion in a more timely and efficient manner.
The Utility of Endoscopy as a Bleeding Risk Assessment Tool Prior to Left Heart Catheterization

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Background: Endoscopy is often requested prior to left heart catheterization however the incidence and utility of endoscopic evaluation prior to heart catheterization has not been reported.

Purpose: The goal of our quality study is to examine current practices of endoscopic evaluation prior to left heart catheterization and its impact on gastrointestinal bleeding for patients’ post-heart catheterization as compared to those who did not have endoscopic evaluation pre-heart catheterization.

Methods: Patients who underwent left heart catheterization (LHC) and endoscopic evaluation as identified by CPT coding within 30 days prior to LHC were identified between 01/01/2012 and 12/31/2019. Chart review of patients post-LHC were followed up to a year for any further endoscopic evaluation(s). Patient characteristics, PPI use, indication and average time to endoscopy were reported using descriptive statistics in patients who had previously undergone pre-LHC endoscopic evaluation.

Results: 29,991 patients had LHC of which 274 patients had 333 endoscopic evaluations within 30 days prior to LHC. 181(54%) completed esophagogastroduodenoscopies, 134 (40%) completed colonoscopies, 10 (3%) completed sigmoidoscopies, 8 (2.4%) completed small bowel procedures (either push enteroscopy, capsule endoscopy or double balloon enteroscopy). 18% of patients who underwent endoscopic evaluation prior to LHC also had endoscopy up to one year (366 days maximum) post-LHC. Patients who underwent endoscopy 30 days-pre and 1 year-post LHC had the following indications post-LHC: anemia (N=8, 17%), rectal bleeding (N=6, 12.5%), screening colonoscopies (N=9, 18.8%), melena or hematemesis (N=4, 8.3%), history of cirrhosis/variceal screening (N=7, 14.6%) abdominal pain (N=7, 14.6%), nausea/vomiting (N=3, 6.3%), IBD related screening or diarrhea (N=6, 12.5%), abnormal CT (N=2, 4.2%), and history of PUD (N=4, 8.3%). There was no difference in bleeding incidence in regards to cirrhosis, advanced age (>65), smoking history, low platelet count, or coagulopathy. The average time to endoscopy post-LHC regardless of pre-LHC endoscopy was 174 days (minimum 1 day, max 366 days). In patients who had undergone endoscopy within 30 days prior to LHC and up to 1 year after LHC with history of GIB the average time to post-cath endoscopy was 153.9 days versus 155.2 days in those who had not undergone pre-cath endoscopy (p=0.86).

Conclusion: There was no difference in timing to endoscopy post-LHC between patients who had undergone pre-LHC endoscopic evaluation versus those who did not. We also found that patient traits with known affiliation to bleeding risk did not have different bleeding risks if they had undergone endoscopic evaluation prior to LHC. Endoscopic evaluation prior to LHC does not seem to affect the need for endoscopic evaluation post-LHC however larger studies are needed to validate these findings.

Opioid Prescribing Practices Following Otologic and Neurotologic Surgery

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Background: Surgeons accounted for nearly 37% of opioid prescriptions dispensed in the U.S. between 2007 and 2012. The prescribing of opioids for postoperative pain is routine, but there is little consensus on the appropriate amount to prescribe. Recent publications have found the number of pills prescribed by otolaryngologists following ear, nose, and throat procedures varies widely and patients typically do not consume the entirety of their prescription. Given the variability in reported prescribing practices and the limited data available specific to otologic and neurotologic procedures, there is a need to further examine opioid prescribing practices.

Purpose: This study aims to provide insight into opioid prescribing practices following otologic and neurotologic procedures at Aurora Health Care.

Methods: Medical records of patients that underwent an otologic or neurotologic procedure at Aurora Health Care between October 1, 2018 and August 24, 2020 were examined for inclusion. Records were included if patients were discharged from the hospital the same day as their procedure, were not chronic opioid users prior to surgery, and were not admitted to the hospital within 2 weeks of surgery.

Results: A total of 223 patient records met eligibility criteria. All but five patients received a postoperative opioid prescription. Nearly 90% of prescriptions were written for 30 tablets of 5-325 mg hydrocodone-acetaminophen. Refills were requested by 16% of patients. Patients were more likely to request a refill if their procedure included a mastoidectomy. The patient cohort that requested refills was younger, reported more pain during PACU recovery, and received significantly more intravenous fentanyl during the perioperative period compared to the patient cohort that did not request a refill. Patients that received a postoperative corticosteroid prescription were less likely to request a refill. There was no effect of surgery duration or patient BMI on whether a patient requested a refill of opioid pain medication.

Conclusion: Current prescribing practices provide nearly 90% of otologic surgery patients the same quantity of opioids to manage postoperative pain. Our findings suggest opioid use following surgery may be influenced by surgery type, amount of fentanyl given, pain during PACU recovery, and patient age. A prospective study of patients undergoing otologic and neurotologic procedures will be conducted to better understand how otologic surgery patients use opioid pain medication to manage postoperative pain.
Impact of Inpatient Level of Care on Colonoscopy Preparation Quality

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Background: Colonoscopy is the predominant method to detect mucosal abnormalities in the colon, rectum and terminal ileum, therefore an adequate bowel preparation is essential. Inadequate bowel preparation is a common problem, worse in the inpatient setting when compared to the outpatient population for several reasons. Identified variables associated with inadequate preparation include a high ASA score, polypharmacy, tricyclic antidepressants, opioids, diabetes, chronic constipation, neurologic diseases, intra-abdominal and pelvic surgery. The effect of level of care while having inpatient colonoscopies has not been studied as a variable impacting the quality of bowel preparation.

Purpose: Our objective was to examine the quality of the bowel preparation and the level of care determined by a patient’s disposition in the General Medical Floor (GMF), Telemetry or Critical Care (ICU).

Methods: Adult patients undergoing diagnostic colonoscopy while admitted in the hospital from January 2015 to June 2020 were included in this retrospective observational study. Outcomes were assessed using chi-square tests for independence, Student’s T-tests, and unadjusted and adjusted logistic regression.

Results: The analysis included 552 patients. Most colonoscopies were performed in Telemetry patients with 46.7 %, followed by General Medical Floor (GMF) at 43.8% and Intensive care unit (ICU) at 9.6 %. Quality of bowel prep was found to differ by care level (P=0.01) and overall, the quality of bowel prep was good or excellent in 72.3% of patients. Cecal intubation was achieved in 90.8% of cases. The median LOS prior to colonoscopy was 2 days (Interquartile range=2). The quality of bowel preparation was worse in patients from ICU. In our study, critical care patients were more than two times more likely to have inadequate bowel prep in comparison to GMF and telemetry after adjusting for race/ethnicity, age, and gender (aOR=2.34, 95%CI=1.23,4.47; aOR=2.37, 95%CI=1.28, 4.41, respectively).

Conclusion: At our institution, patients in the Critical care unit were more likely to have inadequate inpatient bowel preparation in comparison to GMF and Telemetry patients.

National Cancer Database Analysis of Outcomes in Patients Diagnosed With Glioblastoma

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Background: Glioblastoma is one of the aggressive types of cancer that can occur in the brain or in spinal cord. There has been progress in understanding in recent years, however the prognosis is still very poor. Treatment of glioblastoma requires a multidisciplinary approach based on understanding the pathophysiology of the disease, which can eventually lead to a better prognosis for patients.

Purpose: The purpose of the study was to describe the demographics for the patients diagnosed with glioblastoma and evaluate association of patient’s characteristics, socio-economic status, and treatment with overall survival (OS) and with percent survival after 1, 2 and 5-years of diagnosis.

Methods: We analyzed the National Cancer Database (NCDB), which provides broad and detailed information on demographic characteristics, treatment modalities, and survival outcome for patient diagnosed with glioblastoma. Descriptive statistics, Kaplan-Meier curve, and Cox proportional hazard regression were used to analyze the data. For all statistical analyses SAS9.4 SAS Institute, Cary, NC was used.

Results: A total of 124, 282 patients were identified with diagnosis of glioblastoma from 2004 through 2016. The study population included patients with histology codes (ICD-O3) 9440, 9441, and 9442 and tumor sites for CNS and brain (C71.0 - C71.9 and C72.0-C72.3). The data with missing vital status (dead, alive) was excluded from the analysis. There were 57.4% male, 87% non-Hispanic white (NHW), 5.5% non-Hispanic black (NHB), 5% Hispanic and rest were from ‘other’ race category. Adjusted hazard ratio for mortality was significantly higher for male (1.06) and for NHW 1.3 compared to Hispanics, 1.2 compared to black and 1.3 compared to ‘Others’. Similarly, hazard ratios were higher for low income group (1.03), uninsured (1.06), and for patients with higher comorbidity scores (1.2-1.4). The patients with treatment such as surgery (0.57), radiation (0.69), immunotherapy (0.83) or chemotherapy (0.64) had lower hazard ratio for mortality. Every 10-year increase in age was also found to cause 1.27 times increase in mortality. One-year, two-year, three-year and five-year survival percentages were only 42%, 19%, 11% and 6% of the patients diagnosed with glioblastoma.

Conclusion: Female, Hispanic and Asian and pacific islanders and younger patients had better survival. Also, patients who underwent treatments such as surgery, chemotherapy, immunotherapy, hormonal therapy and radiation has better survival probability.
Risk Factors for Developing Unpleasant Paresthesia After Implantation of Permanent Spinal Cord Stimulators

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Background: Spinal Cord Stimulators (SCS) have become a promising option to treat chronic pain syndromes, nevertheless, there are challenges that might compromise the effectiveness and lead to higher healthcare costs, and unpleasant paresthesia/dysesthesia is one of them.

Purpose: The aim of our study was to determine the incidence of unpleasant paresthesia after implantation of permanent SCS and find the risk factors for its development.

Methods: After approval from the Advocate Healthcare IRB, a retrospective analysis was conducted of prospectively collected data of patients that had permanent percutaneous SCS implanted. We included patients age >18 years with chronic intractable non-malignant pain of the trunk and/or limbs that had SCS implanted for at least 2 years. We used SPSS 22.0 software (IBM Corp, Armonk, NY) to perform statistical analysis.

Results: We had a total of 104 patients that had at least 24-months follow-up after implantation of permanent SCS. The mean age of patients was 56.99, and an average BMI of 29.7 (Table 1). Mean pain score measured via NRS before implantation was 8.05, which was reduced to 5.6 after 24 months (Table 1). Excluding the need for routine reprogramming, 45% of the complication events presented within the first 12 months of follow-up (p=0.022). The most common complication in our study sample was the development of unpleasant paresthesia/dysesthesia, which was reported by 27% of participants. There was no association between paresthesia and age, gender, or BMI. We found a statistically significant correlation between current tobacco use and cases of uncomfortable paresthesia and/or dysesthesia in patients that received the permanent SCS (p=0.001), and 38.46% of the cases required or requested explantation of the device (p=0.028). During the follow-up period, active tobacco users and former tobacco users had a lower than average mean NRS reduction of 2.74±2.3 and 2.90±3.9, respectively, when compared to a 3.33±2.67 mean NRS reduction in never tobacco users; however, no statistical significance was observed between the groups (F (<1) p=0.60).

Conclusion: Unpleasant paresthesia seems to be more common than originally thought with an unclear cause. According to our study findings, long-standing tobacco users being treated with SCS are more prone to develop unpleasant paresthesia/dysesthesia when compared with non-tobacco and former tobacco users.
Oral Presentation Session III

Association of Select Preventative Outpatient Services and Hospitalization in People With Diabetes

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Background: There is still uncertainty in the US regarding the value and need for many outpatient preventative services.

Purpose: The purpose of this study was to assess the utilization rates and trends of preventative outpatient visits to providers in a population of people with diabetes, and evaluate which preventative services may offer protection against poor outcomes (i.e. all-cause hospitalization).

Methods: The National Health and Nutrition Examination Survey (NHANES) was used to examine the relationship between select outpatient services and risk of all-cause hospitalization in people with diabetes. NHANES data is publicly available. We included data from 2011 to 2016, and assessed five outpatient services commonly recommended to prevent future complications in patients with diabetes: (1) routine examination from a physician (2) assessment of hemoglobin A1C (3) eye exam with pupil dilation (4) foot exam and (5) assessment from a diabetes specialist. Logistic regression models were performed to assess the independent association of outpatient services used in the past 1 year, and hospitalization within that same year.

Results: The prevalence of diabetes within the NHANES population was 10.5% (n = 3,054). Hospitalization was significantly more common among diabetics who were older, had lower income levels (i.e. under $20,000) and those who considered themselves in 'fair' or 'poor health'. After adjustment for important covariates, patients who received a preventative foot exam within the last year (i.e., 1-4 times per year) were 33% less likely to be hospitalized within that year (OR 0.67, 95%CI 0.46, 0.96). Those visiting a diabetes specialist were 44% less likely to be hospitalized that year (OR 0.56, 95%CI 0.39, 0.82) if the visit was preventative in nature (i.e. occurred more than one year before the hospitalization event). No other outpatient services displayed an independent association with hospitalization.

Conclusion: Outpatient services were consistently being used annually by the diabetic population studied. Receiving a preventative foot exam and visiting a diabetes specialist were associated with protection against hospitalization, resulting in a 33% and 44% decreased risk, respectively.

Utilization of Pharmacologic Prophylaxis for Prevention of Hemorrhage During Second Trimester Dilation and Evacuation

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Background: Although evidence for use is limited, clinicians often give pharmacologic medications during dilation and evacuation (D&E) to prevent operative hemorrhage.

Purpose: To determine whether the use of prophylactic antihemorrhagic medication reduces operative hemorrhage and estimated blood loss (EBL) following D&E.

Methods: We retrospectively reviewed all pregnant women 14-28 weeks gestation who had a D&E for maternal or fetal indications within our large, community-based healthcare system, 1/2012-12/2019. Women with a molar pregnancy, known coagulopathies/hemophilias, or known allergies to vasoconstrictors/uterotonics were further excluded. Hemorrhage was defined as EBL ≥500mL. Prophylactic antihemorrhagic medication use was defined as receiving vasoconstrictors/uterotonics at the start of or midway through D&E procedure prior to identification of hemorrhage or need for other interventions (pharmacotherapy, transfusion, tamponade balloon, hysterectomy). Women who received any prophylactic medication during the procedure were compared to those who did not receive any. Basic descriptive and inferential statistics were used to compare differences between groups and outcomes.

Results: Overall, 148 women met inclusion criteria; 1 underwent two D&E procedures. Women were predominately nulliparous (95.9%) with a mean gestation age of 16.4 weeks at time of D&E procedure. Reasons for D&E included fetal demise (52.0%), fetal indication (41.9%), and maternal indication (6.1%). Prophylactic medications were used in 72.3% (n=107) of all D&E procedures, with 54.2% (n=58) of patients receiving only one medication. Women did not significantly differ by demographic and pregnancy related characteristics between groups. Those who received prophylactic medications were significantly less likely to hemorrhage (22.4% vs. 51.2% no medications; p≤0.01) and to require intraoperative interventions (10.3% vs. 39.0% no medications; p≤0.01). Mean EBL was also significantly lower (356.2 mL vs. 551.3 mL no medications; p=0.02). Those who received prophylactic uterotonics only (N=69) also had reduced incidence of hemorrhage and mean EBL in comparison to those with no medications (p's<0.01). Overall, only three patients required transfusion, and there were no maternal deaths or patients with delayed hemorrhage (≥ 24 hours).

Conclusion: Our study found that prophylactic antihemorrhagic medication use during second trimester D&E decreases operative hemorrhage and EBL, further supporting use of these medications during D&E procedures.
Clinical Characteristics and Outcome of Children Hospitalized With SARS-CoV-2 Related Illness: A Single-Center Descriptive Cohort Study

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**Background:** Pattern of presentation and hospital course of children affected with SARS-COV-2 infection is distinct than adults.

**Purpose:** Objectives of this descriptive study are to describe characteristics and outcomes of children affected by SARS-CoV2 related illness presenting to two campuses of the midwestern community-based Children’s Hospital.

**Methods:** Data of symptomatic hospitalized children with laboratory confirmed SARS-CoV-2 infection or epidemiologically related multisystem inflammatory syndrome in children (MIS-C) based on CDC definition, reported to the Society of Critical Care Medicine's VIRUS COVID-19 registry from two campuses of Advocate Children’s Hospital between March 1st 2020 to March 1st 2021 was retrospectively analyzed. Primary outcome measure is in-hospital mortality and secondary outcome measures are hospital length of stay, need for admission to the intensive care unit and organ support. Data is reported as percentage, number or median (IQR) and analyzed with Fisher exact, Chi square or Mann-Whitney U test as appropriate.

**Results:** Total 76 children were admitted during the study period [Age: Median 5.5 years (2.23-11.69); Male: 59%, black: 13%, Hispanic: 47%) and 26 met CDC definition of MIS-C. SARS-CoV-2 PCR was positive in 68, while IgG antibody was positive in 24. Seventy-four patients were discharged home, one patient on chronic non-invasive home ventilation died, and outcome was not reported in 1. Fifty were reported to be alive at day 28, while rest were lost to follow up. Median duration of hospitalization was 5.34 (2.05-9.2). Forty-one children needed intensive care [4.7 days (2.05-10.10)]. Modalities of organ support included: invasive mechanical ventilation [n=15, 3.4 days (1.6-10.10)], non-invasive ventilation (9), and high flow nasal canula (20), nitric oxide (7), and ECMO (2). Compared to those with acute COVID-19, children presenting with MIS-C were older [9.31 (5.49-12.38) vs 3.63 (1.76-8.66), p=0.005], more likely to be Hispanic (p<0.001), less likely to have co-morbidities (p=0.04), and more likely to need intensive care (p=0.002).

**Conclusion:** Children demonstrate two distinct phenotypic presentation related to SARS-CoV-2 infection, a typical COVID-19 type presentation and a distinct multisystem inflammatory syndrome. Early identification of risk factors is essential for appropriate intensive care utilization and management decisions.
Trends in Delirium Rate Across 14 Hospitals During the COVID-19 Pandemic: A Comparative Study

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Background: The WHO announced Coronavirus disease (COVID-19) pandemic in March 2020. Due to the pandemic, strategies to prevent delirium in the hospital were limited due to restrictions in staff and visitor policies. In addition, delirium has been common due to the COVID-19 infection itself. Thus, we suspected that the delirium rate may increase during the pandemic.

Purpose: This study aimed to investigate the trends in the delirium rate over past 2 years and compare the trend in delirium rate prior to and during the COVID-19 pandemic in hospitalized older adults.

Methods: Data was obtained retrospectively from the Acute Care for Elders Tracker snapshot, an electronic health record tool to identify the presence of delirium within 48hrs of hospitalization for patients ≥ 65 years of age. Delirium was defined as delirium symptoms documented by staff nurses across 14 hospitals. Study time frame was 05/2018-06/2020. Delirium was calculated using a weighted median delirium rate. Time periods of interests were 3/2019-6/2019 (pre-COVID) and 3/2020-6/2020 (during-COVID). A weighted rate was calculated for each month by combining data from all hospitals for the total number of inpatients ≥ 65 years of age. The overall trend in the delirium rate was assessed with simple linear regression models and an ANCOVA. A Chi-squared Test for Independence and a Wilcoxon Signed-Rank Test were utilized to test for differences in the overall delirium rate between two time periods.

Results: Overall, the median delirium rate was 6.8% in 70,562 encounters of 42,878 patients; the mean age was 78 years; the mean length of stay was 6.5 days. The median delirium rate increased by 2.1% from 6.6% to 8.6%, for pre-COVID vs. during-COVID, respectively (Z=-3.044, p<0.001). There were no statistically significant differences between actual weighted delirium rates and projected weighted delirium rates (p=0.18). However, the weighted delirium rate, for both the actual and projected trend lines, demonstrated significant changes over time (p<0.001).

Conclusion: The trend in the delirium rate increased over the study time period regardless of the COVID-19 pandemic. Considering that the study period included the initial 4 months of the pandemic, further analysis with a longer time frame is crucial to understand the consequences of the pandemic on the delirium rate.