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*Brody School of Medicine*  
*6th Annual*

**DISTINCTION DAY**

Abstract Book

# *Acknowledgments*

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## Improving Safety During Transitions of Care Through the Use of Electronic Referral Loops to Receive and Reconcile Health Information

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**Background:** Clinical information reconciliation occurs when patients transition between medical settings, and transitions of care are known to be high-risk periods for miscommunication that could result in patient harm. Medicare's Promoting Interoperability Program and the Merit-based Incentive Payment System require organizations to report 90 continuous days of data on how often medical providers within the organization reconcile differences between the internal medical record with information received from outside electronic health records (EHRs) regarding patient problems, medications, and allergies during hospitalizations in a calendar year. This quality improvement project sought to increase rates of complete reconciliation of patient problems, medications, and allergies to 80% of hospitalizations for 90 consecutive days at all eight hospitals in an academic medical system by December 31, 2021.

**Methods:** Baseline characteristics were determined using monthly reconciliation performance from October 2019 to October 2020. A preexisting pharmacist-led group of certified pharmacy technicians (CPTs) completed medication and allergy reconciliation for all admissions at the academic medical center, except the perinatal unit, and for admitted patients located in emergency departments in community hospitals remotely. The intervention period occurred from November 2020 to December 2021 and consisted of 26 Plan-Do-Study-Act cycles, two cycles incorporated EHR workflow enhancements while 24 cycles were devoted to training physicians and mid-level providers to reconcile. Subsequent performance was reported to leadership of each clinical division via monthly emails. After the intervention period, performance was monitored from January 2022 to June 2022 to observe the sustainability of the initiative. Statistical process control charts were used to identify special cause variation in system-level performance.

**Results:** All eight hospitals successfully recorded 90 consecutive days of complete reconciliation above 80% in 2021, and seven of eight hospitals maintained this goal in the sustainability period. Average baseline reconciliation was 22.1%. System-level performance satisfied criteria for baseline shift after PDSA 17, when the average performance was recalculated as 52.4%. Criteria for a second baseline shift were satisfied during the sustainability period, when the average performance was recalculated at 79.9%. Overall performance remained within the recalculated control limits throughout the sustainability period.

**Conclusion:** An intervention that included enhancing EHR workflows, training medical providers, and communicating division performance was successful in increasing and sustaining complete reconciliation of clinical information in a multi-hospital medical system.

## Alphabet Rounds in the SICU

Mona Amin<sup>1</sup>, Kenji Leonard MD<sup>2</sup>, Michelle Brownstein MD<sup>2</sup>, Lindsey House RN<sup>2</sup>

<sup>1</sup>ECU Brody School of Medicine, <sup>2</sup> ECU Health Department of Trauma Surgery

**Background:** Critically ill patients in the ICU face challenges such as pain, delirium, immobility, and isolation, leading to poor outcomes or prolonged ICU stay. The Society of Critical Care Medicine (SCCM) developed the ABCDEF bundle, a set of evidence-based practices to optimize ICU care. The bundle has six components: pain management, spontaneous awakening and breathing trials, choice of analgesia and sedation, delirium assessment and prevention, early mobility, and family engagement. However, not all ICU teams follow this bundle due to lack of training or time constraints. Our aim was to implement a standardized daily progress note template that incorporates and reflects the best practices of the ABCDEF bundle for the Surgical Intensive Care Unit (SICU) at ECU Health and to achieve 90% usage compliance of the template within six months.

**Methods:** We used the model for improvement and PDSA cycles to test and refine our change idea: creating and implementing a standardized daily progress note template with the ABCDEF bundle. We used SCCM resources and team input to develop the template and conducted seven PDSA cycles to test and modify the template based on feedback. Our future plan includes sharing the note template with the floor which will allow us to track usage compliance and eventually measure patient outcomes such as length of stay, ventilator days, mortality, and delirium.

**Results:** We tested and refined our daily progress note template using seven PDSA cycles from 2/18/22 to 9/29/22. The first three cycles involved creating and modifying the template based on SCCM resources and team input. The electronic version of the template was built by 9/25/22. The next four cycles involved adjusting the template based on feedback and data from implementing the template as a medical student note for morning rounds. Once the template is incorporated for use by residents and other team members, we will develop run charts that track usage compliance and patient outcomes.

**Conclusion:** We created and used a daily progress note template with the ABCDEF bundles for the SICU at ECU Health utilizing the model for improvement and PDSA cycles. This project is still in progress, and we hope to demonstrate how consistent documentation can enhance overall ICU care.



## Good Wishes Aren't Enough: Disparity in Surgical Outcomes Despite Institutional Mission

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**Background/Purpose:** The NSQIP Pediatric Surgical Risk Calculator (PSRC) utilizes 17 patient predictors in conjunction with the planned procedure to estimate the patient-specific likelihood of post-operative complications within 30 days. The NSQIP-P database demonstrated worse surgical outcomes in apparently healthy black patients as compared to white peers, with 3.43 times odds of death postoperatively. Causality is likely multifactorial, but poorly understood. Our institutional Mission includes improving the health status of our rural, underserved, and relatively high population of minority patients, as well as the training of minority physicians. We assessed pediatric surgical patients using the PSRC to validate it in our population, compare predicted to actual outcomes, identify causes of differences, and compare our outcomes with national reporting.

**Methods:** Records from 2015-2018 in a single hospital were queried for NSQIP-P inclusion criteria (N= 2,650). PSRC variables, CPT codes, and 30-day postoperative complications were collected and entered into the PSRC. Outcome predictions were stratified by race and compared with actual outcomes. Odds ratios with 95% confidence intervals are provided as measures of strength and association, used to compare post-operative outcomes and receiver operator characteristics (ROC) analysis was used to estimate the accuracy of actual versus expected outcomes as estimated by area under the ROC curve (AUC).

**Results:** For patients of all health categories, black children had 2.98 times the odds of dying within 30 days postoperatively (95% CI: 1.1, 8.08) as compared to white peers. Additionally, black children had 1.76 times the odds of experiencing any complication (95% CI: 1.3, 2.39) as compared to white peers. Preoperative variables account for 65% of black and 78% of white peer complications. The odds of mortality in our combined healthy and seriously ill population was less than reported for only the healthiest nationally (2.98 vs 3.48).

**Conclusion:** Black children remained at greater risk of post-operative complications and mortality. This disparity was largely, but not entirely explained by pre-operative comorbidity. Dedicated institutional mission may improve outcomes in minority children.

## **Enteral Feeding in Critically Ill Patients on Mechanical Ventilation in Prone Positioning: A Quality Endeavor**

**Anna Lisa Ciarrocca, MS4, LINC Scholar, ECU Brody School of Medicine; Jennifer Stahl, MD, Division of Pulmonary and Critical Care and Department of Emergency Medicine; Rachel Gergely, MS, RDN, LDN, Department of Clinical Nutrition Services; Robert Curtis, MD Division of Pulmonary and Critical Care and Department of Emergency Medicine**

**Background:** Early enteral nutrition in critically ill patients is associated with improved patient outcomes. There has been growing evidence for tolerance of enteral nutrition in prone positioned mechanically ventilated patients. Research and quality improvement efforts within this domain are needed as the COVID-19 pandemic led to an increased number of patients with acute respiratory failure undergoing prone positioning. Prior to the initiation of our project, there was not a formalized protocol at our medical center for the provision of enteral nutrition during prone positioning to patients on mechanical ventilation. We sought to improve nutrition and tolerance of enteral feeding in this patient population with implementation of a treatment protocol within the medical intensive care unit (MICU). We aimed to increase average patient enteral intake in prone positioning from 10% to 50% of recommended goal intake (RGI) from January 2021 to June 2022.

**Methods:** Three PDSA cycles were utilized to develop and implement a treatment protocol for provision of enteral nutrition in patients undergoing prone positioning while on mechanical ventilation in the MICU. 144 patients met inclusion criteria between January 2021 and June 2022. Primary outcome measures were percent of patients receiving enteral nutrition and percent of RGI being met during prone events. Balancing measures include prone events with enteral nutrition held due to increased gastric residual volumes (GRV) and prone events with emesis.

**Results:** Of the 144 patients meeting inclusion criteria, there were 257 separate prone events and 4149 total hours prone. After implementation of the treatment protocol, 74% of patients throughout the entire study period received enteral nutrition while prone. Average percentage of RGI increased throughout the study period reaching our goal of 50% in November 2021 however subsequently declined to an average of 34% throughout January 2022-June 2022. Two percent of prone events had enteral nutrition held due to increased GRV. Five percent of prone events had emesis.

**Conclusion:** Enteral nutrition during prone positioning appears to be well tolerated with only 2% of prone events having enteral nutrition held due to increased GRV and only 5% of prone events having emesis. Although the percentage of patients receiving enteral nutrition and percentage of RGI improved with implementation of our protocol, we did not maintain our aim of sustained average RGI of 50%. Optimization of nutrition is limited by the critical status of patients in the MICU and the medical team's clinical decision to limit enteral nutrition.

## **A QI Project to Decrease Suboptimal Transfers From the Neonatal ICU to the Special Care Nursery**

**Kiane Douglas, MS4, LINC Scholar, Brody School of Medicine, Chinonye Eriobu, MD, ECU Health Medical Center, Ann Sanderson, NNP, ECU Health Medical Center, Dmitry Tumin, PhD, Brody School of Medicine, Uduak Akpan, MD, Brody School of Medicine**

**Background:** Poorly executed transitions of care in health care systems are associated with safety concerns and patient dissatisfaction. We noticed several problems in the transfer process between our Neonatal Intensive Care Unit (NICU) and Special Care Nursery (SCN) and designed this Quality Improvement (QI) project to address them. Our aim was to decrease suboptimal transfers from the NICU to the SCN by 50% over 9 months. We defined suboptimal transfers as discharge of a patient within 72 hours of being transferred from the NICU to the SCN or return of a patient to the NICU within 5 days of transfer.

**Methods:** We formed a multidisciplinary team and collected baseline data. Three PDSA cycles were used to evaluate improvement and develop further interventions. Interventions included sending out surveys at the beginning, in the middle and at the end of the project, designing a checklist, and implementing an algorithm. Statistical process control charts were used to track project measures over time. Outcome measures were the percentage of patients discharged from the hospital within 72 hours of transfer or returned to the NICU within 5 days of transfer and the percentage of parents notified before transfers (Goal: 95%). Process measures included the percentage of patients with a completed transfer checklist and the percentage of staff that report satisfaction with the process (Goal: 30%). The balancing measure was the percentage of providers who report an increase in the burden of the transfer process (Goal: < 50%).

**Results:** Patient demographics and SCN length of stay were similar for both the baseline and post-intervention periods. We did not achieve our goal of decreasing suboptimal transfers within the targeted period, however we observed a significantly increased rate of parent notification before transfers (81% baseline vs. 93% post intervention,  $p < 0.001$ ), and increased staff satisfaction with the transfer process (15% baseline vs. 43% post intervention).

**Conclusions:** Implementing a streamlined process including the use of algorithms to help make next best step decisions can be beneficial. We successfully improved the transfer process from our NICU to the SCN. Incorporating interprofessional providers has helped to implement interventions that will create a process amenable to all providers needing to carry out a transfer. Increased staff satisfaction and the lack of perception of additional burden to the staff from the new process are likely to lead to sustainability of our results.

## **Increasing Utilization of Mental Health Resources by Adolescents Screening Positive for Depression and Anxiety at the ECU Pediatric Diabetes Clinic**

**Emily Downs, MS4, Leader in Innovative Care Scholar, Brody School of Medicine; Jennifer Sutter, MD, Division Chief ECU Pediatric Endocrinology, Co-Pediatric Outpatient Medical Director (Pediatric Subspecialty); Gina Prettyman, Clinical Social Worker (SW), Pediatric Specialty Care Clinic; Kaitlin Hamilton, PA-C, ECU Pediatric Diabetes; Kacie Nelson, RN, Nurse Specialist, ECU Pediatric Diabetes; Courtney Nichols, RN, Nurse Specialist, ECU Pediatric Diabetes**

**Background:** Adolescents with chronic medical conditions are at increased risk for depression and anxiety, which can impact their disease management and quality of life. Screening can identify patients who may benefit from counseling. In 2020, rates of acceptance and utilization of mental health services were suboptimal for adolescents at the ECU Pediatric Diabetes Clinic. By October 2022, we aimed to (1) increase the percentage of adolescents (12-21) who scored moderately to severely positive (score of 10 or greater) on PHQ-9, GAD-7, and/or with self harm concerns without a current mental health provider who are offered and accept mental health resources from 40% to 90% and (2) increase confirmed mental health utilization from 21% to 50%.

**Methods:** PDSA cycles were utilized implementing processes to encourage acceptance of resources, document discussions consistently, and assess barriers to utilization:

1. Streamlined scheduling process for internal referrals to licensed clinical social worker (1/2021)
2. Modified PHQ-9 documentation including follow-up plan with a focus on provider interactions (6/2021)
3. Implemented standardized approach to screening results utilizing social worker for education, documentation, and follow-up (7/2021)
4. Improved coordination of care through primary care provider (11/2021)
5. Created crisis resource flyers by county for families declining social work assistance (5/2022)

**Results:** In the third quarter of 2021 after the first three PDSA cycles took place, 82% of adolescents with significantly positive screens or with self-harm concerns without an established mental health provider were offered and accepted mental health resources and 61% of all patients with positive screens had confirmed utilization. The rates of acceptance subsequently declined to a low of 60% but increased back to 75% in the final quarter after two additional PDSA cycles were employed to address challenges. Utilization ranged from 30% to 53%.

**Conclusion:** Solutions championed by our social worker were key to early improvement in acceptance and utilization rates. Provider drift from protocol, documentation issues, and patient fatigue contributed to a decrease in acceptance rates. Improving coordination of care and providing lower-stakes ways to accept resources were key to long-term success and sustainability. Ultimately, while it is important to screen for depression and anxiety in adolescents with chronic medical conditions, it is equally important for care teams to ensure patients can access mental health care when indicated. We have shown that implementation of a standardized process for offering mental health resources can increase both acceptance and utilization of services, even in a subspecialty practice.

## Quality Improvement: Implementing Screening to Address Social Determinants of Health in a Family Medicine Residency Clinic During COVID

Brandon Garcia<sup>1</sup>, M4, LINC Scholar, Doyle "Skip" Cummings<sup>2</sup>, PharmD, FCP, FCCP; Hannah Dail-Barnett<sup>2</sup>, MPH

<sup>1</sup>Brody School of Medicine, <sup>2</sup>ECU Department of Family Medicine

**Background:** Social determinants of health (SDOH) are nonclinical factors, such as food insecurity, transportation barriers, and housing instability, that influence health outcomes and were exacerbated during the COVID pandemic. While increasing attention is being given to SDOH, strategies for screening for adverse SDOH in busy primary care practices remains poorly defined. We sought to implement a new SDOH screening workflow in a busy outpatient family medicine residency program clinic, with the longer-term goal of connecting patients with local resources.

**Methods:** Clinic staff provided patients, ages 18 years and older, with a voluntary, on-paper, screening instrument (hereafter "screener"). The screener consisted of standardized questions addressing food access, transportation barriers, and housing stability with yes/no answer options. Two Plan, Do, Study, Act (PDSA) cycles (selected days; July 2021-December 2021) examined screener completion rates and identified patient endorsed needs. A third PDSA cycle (April 2022-July 2022) utilized a digital screener to improve documentation in the exam room, focusing only on food insecurity. Statistical analysis was limited to descriptive statistics.

**Results:** PDSA cycles 1 and 2 included 80 adult patients and SDOH needs were identified in 23.8% (N=19) of patients screened, including food insecurity (15/19, 78.9%), transportation (9/19, 47.4%), housing (7/19, 36.8%), and interpersonal violence (3/19, 15.8%). PDSA 3 only focused on food insecurity as it was the most identified SDOH in the prior two cycles (15/80, 18.75%) and could best be addressed if screened positive. PDSA 3 identified food insecurity in 18/102 (17%, N=102) of patients screened.

**Conclusion:** Challenges with pandemic-related staffing shortages hampered implementation and reduced recruitment of patients. An estimated one out of four patients reported adverse SDOH with food insecurity being most common. Nutritionist designed food bags for needy patients were provided to those endorsing food insecurity.

## **Improving EMS Handoffs: Using the “IMIST-AMBO” Mnemonic to provide Standardized Structure & Organization**

**Atif Mahmood<sup>1</sup>, Roberto Portela, MD<sup>2</sup>, Stephen Taylor, MHS<sup>3</sup>**

**LINC Scholar, ECU Brody SOM<sup>1</sup>; ECU Department of Emergency Medicine<sup>2</sup>; Pitt County EMS<sup>2,3</sup>**

**Introduction:** Upon surveying EMS and ED providers with Pitt County EMS and ECU Health Medical Center, it is apparent that little to no training exists for proper delivery of EMS handoffs. As a result, information is commonly lost in the handoff, and many providers have expressed dissatisfaction with the current handoff process. Based on a 2012 study done by Iedema et al. in Australia, EMS handoffs may benefit from a mnemonic acronym such as “IMIST-AMBO.” Our project was designed to evaluate the current EMS handoff process, and to provide standardized training and reference materials for Pitt County EMS providers.

**Aim Statement:** By 2023, all Pitt County EMS providers will receive standardized training in patient handoffs using the “IMIST-AMBO” mnemonic, resulting in an improvement of at least 20% in handoff satisfaction, and more consistent verbalization of important patient information.

**Methods:** Measured satisfaction with current handoffs through online surveys distributed to both Pitt County EMS and ECUHMC ED nursing staff. Directly observed EMS handoffs in the ED to record current handoff content, structure, duration, and number of interruptions. Surveyed EMS and ED supervisors regarding satisfaction and potential benefit with the acronym “IMIST-AMBO,” and made small adjustments to the mnemonic

**Results:** PDSA #1: EMS and ED providers express an average of 66% satisfaction with the current handoff process. 65% of EMS providers and 56% of ED providers agree that handoffs would benefit from improved structure. PDSA #2: Less than 50% of observed handoffs verbalized patient vital signs, and less than 30% reported PMHx, medications, and/or allergies. Clarifying questions were asked during 80% of the handoffs. PDSA #3: 100% of the 8 surveyed EMS and ED supervisors agree that “IMIST-AMBO” would improve the handoff process. 2 of the 8 suggested improved wording within the acronym to encourage reporting “relevant” information. Will collect post-intervention satisfaction and handoff content data after implementation of “IMIST-AMBO” training

**Discussion:** Our project identified a need for improved structure and standardization of EMS handoffs. While many other barriers to effective handoffs exist within our EMS and ED system, providers agree that the “IMIST-AMBO” mnemonic would benefit the current process. Our next steps include piloting a training module, implementing the module with Pitt County EMS, and distributing reference materials to be used while delivering handoffs. Considering the success of “IMIST-AMBO” in foreign EMS agencies, successful implementation within Pitt County EMS may set a framework for other agencies in the US.

**Conclusion:** There is a need for improved structure and standardization of EMS handoffs between Pitt County EMS and the ECUHMC ED, and the use of a mnemonic like “IMIST-AMBO” may improve patient safety by helping providers organize their presentations in an appropriately detailed and concise manner.

## Improving HPV Immunization Rates in Children Ages 9-10

Grant O'Brien BS, Sandy Goff MSN, Tracy Findling BSN, Betsy Heath, Shaundreal Jamison MD, MPH

**Introduction:** Human papillomavirus (HPV) is a common sexually transmitted infection and is the leading cause of cervical, vaginal, vulvar, penile, anal, and oropharyngeal cancers. The HPV vaccine is highly effective, particularly in those without a previous HPV infection. However, fewer than 50% of American teens are fully vaccinated against HPV.

**Aim statement:** The aim of this quality improvement project was to improve the rate of HPV vaccination at well visits of patients aged 9-10 to  $\geq 50\%$  within one year.

**Methods:** A modified version of the "Parent Attitudes about Childhood Vaccines Survey" was administered to parents of children aged  $\geq 9$  to assess vaccine hesitancy. Using the Model for Improvement, a total of 4 iterative plan-do-study-act (PDSA) cycles were implemented focused on 1) education of nursing staff on the HPV vaccine and counseling, 2) developing visual reminders for nursing staff, 3) educating residents on HPV vaccine counseling, and 4) posting visual information for patients and providers. Data was collected through manual chart review of a given week's well visits following implementation of new PDSA cycles. Overall vaccine percentages were obtained using the North Carolina Immunization Registry.

**Results:** During the one-year project period, the number of patients aged 9 or 10 who were offered and received the HPV vaccine at their well child visit increased from 0% to 67%. In 2022, the percentage of 11-year-olds who had initiated the HPV vaccine series was 24.5%, an increase from 19.5% in 2020. Vaccine hesitancy was low with only 10% of parents being concerned with age-appropriateness of the HPV vaccine.

**Discussion:** Failure to offer the vaccine, rather than parents declining the vaccine, was the primary limiting factor of the impact, along with low frequency of well visits for these patients. Altering the state's immunization registry to automatically flag children as "due" for the HPV vaccine starting at age 9 could be the intervention with the most potential for impact statewide.

**Conclusion:** Offering the HPV vaccination at ages 9 and 10 resulted in an increase in HPV vaccine initiation. Continued vaccination at these ages could result in more timely completion of the HPV series in adolescence.

## **Addressing Immunization Gaps: Improving Rates of Immunization Among Adolescents for Routine, Recommended Vaccines**

**Nonye Onokalah (M4, Brody School of Medicine), Mary Catherine Turner (MD, ECU Adult and Pediatric Health Care)**

**Background:** Vaccines have significantly reduced the rates of childhood viral and bacterial infections, saving an estimated 2-3 million lives annually.<sup>1</sup> However, adolescent immunization rates have steadily declined.<sup>2</sup> At the onset of the Covid 19 pandemic from January to March of 2020, the East Carolina University Adult and Pediatric Health Care (ECU APHC) clinic witnessed a fall in weekly vaccination rates by approximately 91%.

**AIM Statement:** The goal of this study was that by December 2022, 75% of all ECU APHC Medicaid patients ages 11-13 would have received all age-appropriate immunizations against HPV, Tdap, and MCV.

**Methods:** Data collection occurred primarily through electronic health record chart review. Implemented changes of the PDSA cycles included contacting patient families, information sheets on vaccine-preventable diseases, and mitigating language barriers through Spanish translations. Progress was measured as percent of patients in the target population who received the three vaccines.

**Results:** In November 2020, 19.5% of patients in the study had received some combination of Tdap, HPV, and MCV vaccinations. This rate rose to 25.7% by December 2020 following letters sent to patient families addressing the need for immunization, and 33.6% by February 2021 following a Spanish translation of the letter. During the third PDSA cycle, modification of North Carolina's Medicaid structure created barriers for obtaining patient data. Individual vaccine completion rates rose as followed from May to September 2022 following mailed outreach letters with vaccine information sheets: Tdap 58.2% - 67.8%, MCV 58.2% - 70%, HPV 10.4% - 22.6% (initiation of the two-part HPV series: 40.9% - 53.9%), and 9.6% - 21.7% for completed series of all three vaccines. Additionally, some patients received additional vaccinations against covid and influenza (8 and 2 patients, respectively) at their updated clinic visits.

**Conclusion:** As adolescent healthcare decisions are ultimately made by parents, improving healthcare access requires communicating with the whole family. Throughout the study, vaccination rates improved through increased outreach efforts, addressing language barriers, and providing foundational education on the rationale behind healthcare recommendations. The findings of this study provide a framework for methods that may improve vaccination rates, which ultimately contribute to overall improved health among the general population.



*Medical Education & Teaching Distinction Track*

## **Incorporating Combined Near-Peer and Peer-to-Peer Teaching into the Pediatric Clerkship to Increase Student Exam Performance and Preparation for Residency**

**Jared Barkes, B.S. B.A.<sup>1</sup>, Denise Elizondo, M.D.<sup>2</sup>, Mary Lenfestey, M.D.<sup>3</sup>, Dmitry Tumin, Ph.D.<sup>3</sup>**

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**Background** Peer-to-peer teaching methods prepare physicians for their future role as educators and benefit participants both academically and professionally (Cate & Durning, n.d.; Crowe, 2001; Gregory et al., 2011; Yu et al., 2011).

**Methods** A reference comprised of 30 core pediatric topics was prepared and distributed to each third-year medical student at the Brody School of Medicine at the beginning of their pediatric clerkship. Each student prepared a brief review of at least one topic of their choosing and presented it to a group of their peers in an educational session led by a third-year pediatric resident. Students were asked to complete an anonymous online survey requesting feedback after completion of the clerkship and the Pediatric NBME Subject Exam. Survey data and average NBME scores for each cohort were compared to the previous years' cohorts to assess for improvement in student performance.

**Results** Survey data indicated a positive sentiment amongst students about the educational afternoons and the facilitation of interprofessional communication and shelf exam preparation; 79.2% of participants agreed or strongly agreed that this program supported communication with residents and 79.1% of students indicated that they felt better prepared for the shelf after completing the sessions. Preliminary results showed NBME examination scores remained stable year over year with the 2023 cohorts performing  $\pm 5\%$  against the average from their respective cohorts over the last 4 years.

**Conclusion** Student-led peer-to-peer teaching sessions, facilitated by residents, are an enjoyable experience and subjectively improve interprofessional communication in the pediatric clerkship. The next steps include evaluating resident performance as teachers before and after involvement with the peer-teaching program and expansion to other third year clerkships. More longitudinal data is necessary to assess the long-term positive impacts on the performance of students and residents involved in the medical curriculum.

## **A Virtual Clinical Pharmacology Module for Medical Students to Review, Prescribe and Order Diabetic Drugs**

**Kari Beasley, MS4, Lisa Domico, PhD**

**Background:** Although specific use of drugs as therapy for certain diseases is included in the clinical pharmacology curriculum for medical students, many newly graduated physicians still feel unprepared to prescribe drugs. New physicians are twice as likely to make prescription errors leading to medical errors than senior physicians. Computer-based training can be useful to increase prescribing competency for resident physicians. An online clinical pharmacology module with a focus on diabetic drugs was created to review content from the previous medical pharmacology course and add content to build skills for residency such as dosing and ordering in the electronic health record. The purpose of this research is to assess the efficacy of the module in both medical education and quality measures of online learning such as navigation, aesthetics, and overall interactive ability.

**Methods:** This research study is an educational prospective cohort study utilizing quantitative study design. Second-, third- and fourth-year medical students will be recruited from one medical school. The virtual module will be delivered in Canvas, an online learning platform. Identical pre- and post-test surveys of five multiple choice clinical vignette style questions will be administered, and a paired-t-test will be performed to determine if there is a significant increase in score after the module to represent knowledge gained. A cross-sectional post-evaluation survey will also be delivered to understand learner experience of the module through Likert scale ratings of quality measures and qualitative comment feedback. Descriptive statistics will be analyzed on the quality measures.

**Results:** We hope to gain an appropriate sample size of at least 50 participants. In the results, we predict to find a significant increase in post-test score from pre-test score for all participants. There will likely be differences in pre-test and post-test scores depending on the level of the participant, second-year, third-year, or fourth year. We hope to understand the quality level of the module with the post-evaluation survey by participant rating of aesthetics, navigation, and interactive ability.

**Conclusion:** From the results, we hope to demonstrate that the module fills a gap in pharmacology training. The module may be added to the required medical curriculum in the future. Furthermore, we hope that the educational module helps to reduce the number of medical prescription errors for newly graduated physicians.

## **Preparing Future Physicians to Identify and Treat Children with Autism Spectrum Disorder: An Educational Intervention**

**Kelly K. Davis, M4, MET Scholar, Brody School of Medicine; Karen Stiles, PhD, ABPP, East Carolina University, Department of Pediatrics**

**Background:** Research has indicated a gap in the knowledge of medical students and residents regarding the characteristics and treatment of children with autism spectrum disorder (ASD), and this leads to physicians feeling unprepared to treat this patient population (Austriaco et al., 2019). This study implemented three online educational modules with the goal of improving the knowledge and comfort level of future physicians regarding ASD.

**Methods:** The educational study included clinical medical students and pediatric residents at the Brody School of Medicine that were randomly assigned to control and treatment groups. Participants completed a pre-intervention survey, KCAHW pretest, access to educational modules (treatment group only), KCAHW posttest, and post-intervention survey. The surveys assessed the participant's comfort level and the KCAHW questionnaire test scores indicated the participant's knowledge. SPSS was utilized to calculate descriptive statistics, repeated-measures ANOVA, and linear regression to assess the effect of the educational intervention on the outcome measures.

**Results:** The majority (64.3%) of participants (n=28) reported that their prior training did not sufficiently prepare them for caring for children with ASD. There was a statistically significant difference in the pretest and posttest mean scores between the control and treatment groups ( $p=0.034$ ) and the self-reported comfort level mean score among participants before and after the intervention between groups ( $p=0.006$ ). The educational intervention led to a 1.456 point increase in the KCAHW questionnaire among the treatment group ( $B= 1.456, p= 0.034$ ), and a 0.997 point increase in the participants' self-reported comfort level after the intervention ( $B= 0.997, p= 0.006$ ).

**Conclusion:** Despite a small sample size, the results indicate that targeted training regarding ASD can improve test scores and comfort level among medical students and pediatric residents. The hope is that improving the knowledge and comfort level of future physicians will lead to better patient care for children with ASD.

## **Examining the Role of Three-dimensional Models in Medical Student Understanding of Embryology Topics**

**Regan Lane, MS4 and Craig Wuthrich, Ph.D.**

**Background:** Embryology is an essential subject in the preclinical medical school curriculum, but this course often presents challenges for medical students due to the transient structures, abundant terminology, and dynamic nature of fetal development. A common challenge students face is visualizing these structures using two-dimensional images from textbooks. We tested the hypothesis that using three-dimensional models helps students better visualize these anatomical and embryological structures. Commercially available models tend to be expensive, however, and few students have access to them. This study investigates the impact of using low-cost, handmade three-dimensional models to teach a population of first year medical students the stages of early embryogenesis.

**Methods:** 42 first-year medical students were enrolled in the study. Participants attended a 30-minute in-person workshop at the Brody School of Medicine where researchers used modeling clay models to review early embryogenesis. Students took a 10-question pre-quiz before the workshop, followed by the same 10-question quiz and a survey after the session. Primary outcomes measured included pre- and post-quiz score averages and survey data, which was measured on a 5-point Likert scale.

**Results:** Pre- and post quiz data showed a significant improvement in quiz score average between the two data sets (pre-quiz score average=44.5%, post-quiz score average=70.2%), an increase in 25.7 percentage points ( $p$ -value <.001). Survey data revealed strongly positive opinions of the teaching methods used, with greater than 95% of students answering “agree” or “strongly agree” to all five survey questions.

**Conclusion:** Students performed better on an assessment after attending a review session using three dimensional models of embryological structures. They reported overall very positive reactions to the teaching method and indicated that they would benefit from access to more models in their embryology course. This study collected data from only one class of students at one institution, but similar results could be expected on a larger scale at other institutions. Shortcomings recognized include the small sample size which was limited by the size of the class at the institution, as well as the short-term basis of the study. Further research is needed to address long-term recall of these topics after intervention using three-dimensional models.

## Converting School Specific Resources into Study-Friendly Formats

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**Background:** Medical students are increasingly using third-party self-study resources during their preclinical years, likely influenced by their link to higher scores on national licensing exams which have been growing in importance over recent years for placement into residency programs. As these students turn towards these newer third-party resources, medical school faculty have lamented the increasing disengagement of their students with the traditional institutional curricula. Anki is a flashcard software with spaced repetition capabilities that has emerged as one of the most popular of these third-party resources. Previous research has documented efforts to understand the role Anki is playing in preclinical medical education, and some medical educators have experimented with creating partial sets of flashcards for their preclinical courses. No prior group has documented an attempt to transform pre-existing study resources into an Anki format.

**Methods:** Our team began with a goal of creating a comprehensive Anki study resource for an entire preclinical medical course. Secondly, we also hoped we could demonstrate the future possibility of using such projects to re-engage medical students in their institution's curriculum.

**Results:** Our collaborative project between medical faculty and a team of preclinical medical students succeeded in converting the entirety of pre-existing PowerPoint review slides from the preclinical medical pathology course into over 8,800 highly organized Anki flashcards.

**Conclusion:** We concluded that cooperative efforts between small groups of medical students and medical school faculty can succeed in transforming traditional institutional resources into more popular formats. Our work offers a potential way to re-engage medical students in their school-specific curriculum.

*Research Distinction Track*

## **Patient Understanding of Enhanced Recovery After Surgery Pathways in an At-risk Population**

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**Background:** Health literacy is a critical determinant of patient outcomes, and understanding patients' comprehension of pre-operative instructions is essential for optimizing the Enhanced Recovery After Surgery (ERAS) pathway. This study aimed to assess surgical patients' experience with and understanding of the ERAS pathway and pre-operative instructions in Eastern North Carolina, a region with low literacy and high poverty rates.

**Methods:** A cross-sectional study was conducted at ECU Health, including patients enrolled in the institutional ERAS program undergoing gynecologic oncologic and colorectal surgery between July 25, 2022, and January 31, 2023. A 10-question survey was administered postoperatively to assess patient understanding of the ERAS pathway, their experiences with the surgical process, and adherence to pre-operative instructions. The survey was intentionally binary, brief, and administered by a medical assistant.

**Results:** Of 101 patients surveyed, 98% found pre-operative instructions easy to follow, 94% reported satisfactory pain control, and 79% owned a smartphone. The majority (96%) felt they received consistent information about surgical preparation from all care providers. A subset of patients (21%) did not own a smartphone, highlighting the digital divide in Eastern North Carolina.

**Conclusion:** The majority of patients in Eastern North Carolina understood and followed the ERAS pathway pre-operative instructions and reported satisfactory pain control. Open communication and addressing patient questions were effective strategies to improve patient understanding, despite low education levels. However, the digital divide remains a concern for patient access to healthcare information. Future research should explore barriers to ERAS pathway comprehension, tailor educational materials to specific patient populations, and investigate alternative communication methods for patients without digital access.



## Outcomes in Cardiac Valvular Surgery in Patients with Substance Use Disorder in a Rural Tertiary Medical Center

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**Background:** The incidence of patients undergoing valvular repair or replacement for substance use disorder-related infective endocarditis (SUD-IE) has increased in recent years due to the opioid epidemic, but surgical outcomes of these patients are not well studied. The purpose of this study was to evaluate differences in outcomes of valvular surgery between patients with and without SUD-IE.

**Methods:** Patients from a large rural tertiary medical center who underwent urgent or emergent isolated valvular repair or replacement from 2000-2021 were included in this study. Data were obtained from the Society of Thoracic Surgeons Adult Cardiac Surgery Database and included patient demographics and surgical outcomes. Patient deaths were confirmed from review of the medical record. Patients were considered to have SUD-IE if they had documented illicit drug use at the time of endocarditis diagnosis. Continuous data were compared using Wilcoxon Rank-Sum test while categorical data were compared using Chi-squared or Fishers Exact Test, and survival analysis was performed using Kaplan-Meier method. Variables were adjusted for age, sex, race, and history of prior valve surgery.

**Results:** There were 265 patients who met inclusion criteria, and 68 (26%) had SUD-IE. The SUD-IE group was younger (median age 41 [IQR 29-50] vs 60 [IQR 51-69]) and had a higher proportion of female (40% [27] vs 33% [65]) and white (75% [51] vs 56% [110]) patients compared with the non-SUD-IE group. There were no significant differences in postoperative complications or in-hospital death. Postoperative and total length-of-stay were longer in the SUD-IE group, but only total length-of-stay was significant (median postoperative length-of-stay 14 days [IQR 7-27] vs 10 days [IQR 7-18], respectively,  $p=0.16$ ; median total LOS 25 days [IQR 15-46] vs 20 days [IQR 14-29], respectively,  $p=0.02$ ). 30-day readmission rates were higher in the SUD-IE group (29% [20] vs 12% [23],  $p<0.01$ ). Reasons for readmission were similar between groups and included congestive heart failure, recurrent infectious complications, and cardiac arrhythmias. Median follow-up was 5.3 years (IQR 3.4-8.7) in SUD-IE group vs 11.4 years (IQR 5.9-16.8) in non-SUD-IE group. 5-year survival (n, SE) in the SUD-IE group is 63.4% (43, 6.7%) and 69.5% (137, 3.4%) in the non-SUD-IE group (HR 1.05 [95% CI 0.64-1.74];  $p=0.84$ ).

**Conclusions:** Patients undergoing valvular surgery for endocarditis have similar postoperative outcomes and long-term survival regardless of SUD-IE status. Our data show that SUD-IE patients have longer LOS and readmission rates and may place a larger burden on health care systems in the short term.

## **Collagen Peptide Inhibits Fibroblast Differentiation: A Potential Anti-Fibrotic Factor**

**Hanifah Hendricks, Kaitlin Whitehead, and Lisandra E. de Castro Brás, PhD**

Upon injury or disease, fibroblasts differentiate into myofibroblasts; these cells, which have a secretory and contractile phenotype, are the main source of fibrosis. Myofibroblasts have been shown to associate with adverse left ventricular (LV) myocardial remodeling leading to progressive loss of cardiac function. Matricryptin p1159, a biologically active collagen-derived peptide, has previously been shown to change fibroblast function and reduce fibrosis in a mouse model of adverse LV remodeling.

Accordingly, we hypothesized that p1159 reduces fibrosis by delaying or inhibiting fibroblast transition into myofibroblast. To test our hypothesis, we first starved semi-confluent Human Cardiac Fibroblasts (HCF) cells in T75 flasks overnight in low serum media (LSM) We then treated each flask with various conditions: LSM (negative control), LSM + Integrin alpha 4 neutralizing antibody (NBP1-26661, Novus Biologicals; Itga4i, 15  $\mu\text{g}/\text{mL}$ ), 100 nM p1159, 500 nM p1159, 100 nM p1159 + Itga4i, and 500 nM p1159 + Itga4i. Cells were treated with the neutralizing antibody for at least 2 hours. After this period, some of those cells had the media changed, were rinsed, and incubated with new LSM + p1159 at the same doses described above. After 48h, cell lysates were collected and RNA was extracted using a Pure Link RNA mini kit and quantified using the NanoDrop2000. Reverse transcription was performed to generate cDNA and quantitative RT-PCR was performed to measure the expression of markers of fibrosis, namely transforming growth factor (TGF $\beta$ ),  $\alpha$ -smooth muscle actin ( $\alpha$ SMA), collagen-I, collagen-III, vimentin (fibroblast marker), and Gapdh (housekeeping gene).

The highest dose of p1159 promoted expression of both collagen-I and  $\alpha$ SMA and this was dependent of Itga4. This suggests that p1159 could potentially change fibroblast functions into a pro-fibrotic phenotype (contrary to our initial hypothesis). Although the matricryptin did not directly promote expression of collagen-III, and vimentin; when Itga4 was blocked, we observed an increase in collagen-III expression at 500nM of p1159, as well as TGF $\beta$  and vimentin at 100 nM p1159.

Itga4 is a known receptor for fibronectin, also an extracellular matrix protein that increases during fibrosis. There are no reports of Itga4 binding to collagen; this suggests that the bioactive cryptic sites that are exposed in matricryptins not only confer different functions to these peptides that differ from those of the parent molecules, but also bind to distinct receptors.

Overall, these data suggest that Itga4 is a receptor for p1159 in fibroblasts. However, it is possible that the peptide also binds to other receptors when Itga4 is not available, and this changes the expression of the pro-fibrotic molecules collagen-III, TGF $\beta$ , and  $\alpha$ SMA. Future experiments need to be focused on p1159 effects on fibroblast phenotype.

## Clinical Factors that Affect Fiducial Tracking in Robotic Stereotactic Ablative Radiotherapy (SABR) for Lung Tumors

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**Background:** Stereotactic ablative radiotherapy (SABR) is a treatment option for patients with lung tumors that employs fiducials to track tumors during the breathing cycle. Currently, there is a paucity of data on how relative fiducial location and patient clinical characteristics impact fiducial tracking and clinical outcomes. This study aims to identify factors that affect errors encountered and number of fiducials tracked with respiratory motion management during SABR.

**Methods:** A retrospective review was performed on patients receiving robotic SABR for lung tumors at our institution from 2016 to 2019. Clinical data including demographics, medical history, treatment data and follow up were collected. Fiducials geometries were obtained with Velocity contouring software and MATLAB. Chi-Square, t-test, and Mann-Whitney-U tests were completed using MedCalc.

**Results:** 73 patients with 77 treatments were identified. Chi-Square analysis revealed chronic obstructive pulmonary disease (COPD) was associated with having three or more fiducials tracked ( $p=0.034$ ). Tumors in lower lobes were associated with higher rates of uncertainty errors ( $p=0.015$ ). The number of fiducials tracked had no impact on local tumor control or overall survival with a median of 36 month follow up. 28 treatments had fiducial centroid data available for geometric analysis. The most common tracking errors were rigid body error (RBE) (57%) and spacing errors (36.4%). Spacing errors had a shorter average minimum inter-fiducial distance versus non-spacing errors (1.0 cm vs 1.7 cm, respectively,  $p = 0.017$ ). RBE treatments had a longer average maximum distance versus non-RBE treatments (4.0 cm vs 3.0 cm,  $p = 0.022$ ).

**Conclusion:** Greater motion in lower lobes can contribute to certain tracking errors that prevent more fiducials from being tracked. Maintaining inter-fiducial distance between experimentally determined guidelines may limit spacing errors and RBE's, the two most common tracking errors. Increased number of patients in a data set may result in stronger correlations between patient and tumor factors and outcomes.

## Determining Trends and Factors associated with Self-Reported Physical Activity among Adolescents in Rural North Carolina

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**Background:** Insufficient physical activity (PA) in the youth can lead to adverse health outcomes, and youth in rural areas have particularly low PA. However, factors contributing to these levels remain unclear. Using data from a middle school-based wellness intervention called Motivating Adolescents with Technology to Choose Health™ (MATCH), we evaluated demographic and environmental factors predicting PA in adolescents across rural North Carolina.

**Methods:** We used cross sectional data from MATCH participants in 40 schools from fall 2018. Self-reported PA was determined from a validated question: “How many days each week are you active for at least 60 minutes?,” with results dichotomized into those achieving 1, 5 and 7 day(s) meeting the threshold. Other variables included sex, race, weight category determined from Body Mass Index percentile, and PACER score (measuring cardiovascular fitness). Three environmental variables, from a previous study, were scored for each school from 1-5 (higher = better environment). These include exercise opportunities in the community and physical education (PE) and PA opportunities at school. Analyses included appropriate measures of descriptive statistics (mean, t test, Chi Square), correlation (Pearson, Spearman), and regression models.

**Results:** Participants included 3,799 7<sup>th</sup> graders, approximately half male, half white, mean age of 12.7 years, and 27.8% obese. Male sex ( $p < .0001$ ), white ( $p < .0001$ ), and healthy weight ( $p < .0001$ ) participants reported more days of PA. Associations between the environmental variables and self-reported PA yielded statistically significant but extremely weak ( $|r| \leq 0.1$ ) relationships; however, school PE and PACER ( $r = .27$ ,  $p < .0001$ ) were correlated. Regression models showed significant independent relationships of self-reported PA and school PE ( $B = .108$ ,  $p = .0011$ ) and race ( $B = -.306$ ,  $p = .0005$ ).  $c_2$  analysis showed significant relationships between school PE score and percentage of students who reported 60 minutes of PA for 5 ( $p < .0001$ ) or 7 ( $p = .0307$ ) days per week (Figure 1). Additionally,  $c_2$  analysis showed that 85% of adolescents did not get 60 minutes of PA per day, as recommended by the CDC.

**Conclusion:** Adolescents in rural NC report low PA, but more is reported by male, white and healthy weight participants. Increasing school PE may improve adolescent PA levels, thus policy changes to increase school PE may be warranted.

## **Influenza Vaccination Status of Patients Admitted to an Inpatient Behavioral Health Unit**

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Influenza is a communicable infection with a high rate of both morbidity and mortality. It was responsible for 55,685 deaths in 2019. The spread and symptomatology associated with the infection can be decreased through preventative care strategies like annual influenza vaccination. Patients with mental illness are less likely to receive preventative care, including vaccinations. During inpatient psychiatric treatment, patients have increased freedom of movement and are required to leave their rooms and interact with other patients. In this setting, communicable disease can easily spread between patients resulting in unit closure as a mitigation effort. Prior studies indicated why this patient population may or may not choose to get vaccinated, reasons included belief in vaccine efficacy, insurance coverage, and provider encouragement. Our study is different in that it examines demographic factors, psychiatric diagnoses, and medical comorbidities as they relate to vaccination status. It is a retrospective chart review of 518 admissions to an inpatient behavioral health unit during the 2018-2019 influenza season. Upon admission 119 patients (23%) had already been vaccinated, 63 were vaccinated during admission (12%) and 337 actively refused vaccination (65%). The following results are based on the 399 patients who were unvaccinated upon admission. White patients were found to have higher vaccination rates than non-white patients (40.4% vs 28.8%). Age was positively correlated with vaccination status, especially those over the age of 55. Those diagnosed with schizophrenia were less likely to be vaccinated compared to other psychiatric diagnoses (22.9% vs 39.6%). Comorbidities autoimmune/cancer, epilepsy were more likely to get vaccinated when compared to those without (50% vs. 33%). Patients with co-morbid epilepsy were less likely to refuse vaccination (39.1% vs 14.1%). These data may help to identify gaps in care so that tailored interventions can be developed to improve health outcomes and health care equity.

## Trends of Lymph Node Outcomes in Partial Cystectomy for Muscle-Invasive Urothelial Carcinoma of the Bladder

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**Introduction:** Local tumor invasion depth has been associated with lymph node metastasis in urothelial carcinoma, and, for muscle-invasive bladder cancer (MIBC), pelvic lymph node dissection (PLND) is a critical step in curative surgery. Gold standard treatment includes radical cystectomy(RC), but partial cystectomy (PC) is an important bladder-preserving modality reserved for patients with certain favorable prognostic indicators. There is poor evidence concerning the utility of PLND in PC and we seek to further define its role by comparing survival outcomes when PLND was cursory or omitted.

**Methods:** A retrospective analysis of 13,652 cT2N0M0 patients who underwent PC or RC between 2004-2016 was performed using the National Cancer Database. Patients undergoing PC were stratified by the presence of PLND as well as by node yield >15. The primary outcome was overall survival, analyzed using the Kaplan-Meier Method and multivariable Cox-proportional hazards regression. Multivariable models were adjusted for confounding clinicopathologic variables.

**Results:** From 2004-2016, PLND in PC increased from 44% to 57% with RC remaining over 90%. Compared to RC, PC was approximately twice as likely to be performed at community centers and approached laparoscopically/robotically ( $p < 0.001$ ). When stratifying PC PLND yield into 1-15 and >15 compared to PC without PLND, the adjusted hazard ratios for overall mortality were 0.78 and 0.54, respectively ( $p < 0.05$ ).

**Conclusions:** PC patients had a significantly lower rate of PLND compared to RC and improved survival when performed versus PC alone. Furthermore, increased node yield was associated with a larger reduction of adjusted mortality hazard. For MIBC patients that are appropriately selected for PC, high-yield PLND should be prioritized given the significantly improved survival outcomes.

## Rate and Predictors of Spontaneous Patent Foramen Ovale Closure After Identification on Prenatal Echocardiogram

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**Background:** The foramen ovale is an opening in the atrial septum that allows oxygen rich blood to pass to the left side of the heart to oxygenate the fetal brain and myocardium. The fossa ovalis often closes at age 6-7 months but remains as a patent foramen ovale (PFO) in roughly 20-25% of cases. We aimed to establish the rate of spontaneous closure of an enlarged fossa in patients at our center, and to correlate the prenatal size and other patient factors with PFO closure.

**Methods:** A retrospective review was conducted at our Pediatric Cardiology Clinic. Patients were included if they had at least one postnatal echocardiogram age 5 months to 3 years between January 2009- July 2020 and without additional complex congenital heart disease and were not premature. Postnatal echocardiograms were examined for closure up to 7 years of age in patients with identified enlarged fossa ovalis on prenatal echocardiogram.

**Results:** Of the 70 patients examined, 62 (88.6%) experienced spontaneous closure. The median age of closure was 8 months. No patients required surgical PFO closure. The percent over the predicted fossa ovalis size was not associated with PFO closure. Prenatal comorbidities, and maternal history were not associated with PFO closure.

**Conclusion:** Spontaneous closure rates of PFO may be higher and occur earlier than indicated by previous literature, with closure that may occur up to 5-7 years of age. No maternal or fetal factors including size of the fossa ovalis were associated with spontaneous closure.

## Longitudinal patterns of beverage intake in treatment-seeking obese children in eastern NC using the validated BEVQ-15

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**Background:** Sugar-sweetened beverage (SSB) consumption remains a major target for interventions to treat severe obesity for children. Understanding how total energy consumption is divided among various calorie-dense beverages within the course of obesity treatment remains unclear.

**Objective:** Using the validated BEVQ15 in children with severe obesity presenting to a pediatric weight management clinic, examine how beverage calories (kcal) changed during the course of treatment and how kcal intake from SSB was associated with relative BMI.

**Design/Methods:** A retrospective chart review included patients aged 2-18 years who completed a first visit in Jan 2017-Dec 2019 and had at least one follow up with beverage intake data. The primary outcome of this study was total beverage kcal consumed from 100% fruit juice and SSBs. Additional analysis included beverage kcal from each specific type of beverage among the following: (1) soda, (2) 100% fruit juice (juice), and (3) other sweetened beverages. The primary independent variable included treatment duration in months. Relative BMI at each visit was expressed as percent of the 95th sex- and age-specific percentile (%of95BMI).

**Results:** The analytic sample included 155 patients and 341 visits. Median age was 11 years with 62 boys, 93 girls and median follow up duration of 3.1 months. At baseline, the median %of95BMI was 135 and median kcal/day intake was 436 from juice and 263 from SSB (Table 1). At the last available follow-up visit with beverage data, %of95BMI increased to 138 and median SSB kcal/day intake decreased to 78 while SSBs and juice combined decreased to 133 (Table 2). Each additional month after baseline was associated with 7 fewer calories per day from SSB and juice combined (95% confidence interval: -11.6, -2) and with 0.5 percentage point increase in %of95BMI (p=0.012). For each additional 100 calories consumed per day from SSB and juice, %of95BMI increased by 1.4 percentage points. (Table 3)

**Conclusion(s):** Data in this study were limited to visits with measures of beverage intake, so BMI changes at subsequent visits may not be represented. Children in this treatment program tended to drink less calories from beverages over time, however this decrease was not accompanied by a decrease in %of95BMI within the study period. SSB other than soda accounted for the majority of beverage kcal intake, therefore potentially providing targeted direction for interventions. The BEVQ15 tool was useful during treatment to quantify and better understand energy intake from beverages in children with obesity.



## **COVID 19 Infection is Associated with Repeat Emergency Department Visits.**

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**Background:** As COVID-19 persists and the number of people with prior infection increases, the long-term sequelae are still being discovered. These long-term effects create the potential for previously infected to seek care in the Emergency Department. The objective this study is to determine if there is an association between COVID-19 infection and subsequent Emergency Department utilization and to describe the reason for return visits.

**Methods:** This observational, case-control study was performed at ECU Health an academic Level 1 trauma center. Charts were randomly selected from 400 patients who received an initial COVID diagnosis in the ED and 400 COVID-19 negative patients matched for age and comorbidity. Visits were recorded for the 18 months after the initial visit. Demographic data and chief complaint was also collected. Comparison of visit return rate was performed via a binary linear regression with p-value of 0.05 indicating significance. Descriptive statistics are reported for categorical and demographic data.

**Results:** COVID-19 and control groups were of similar age (53.4 vs. 54.3 years, respectively). Both groups were predominately black (61.5% vs 70.6%), followed by white (27.2% vs 26.2%). The most common chief complaint for both groups for 1- 3 months after enrollment was cardiovascular ( $p=0.64$ ). At 16-18 months after enrollment COVID patients most often presented with pulmonary complaints while control patients presented with cardiovascular complaints ( $p=0.02$ ).

In total, 203 patients with a positive COVID-19 (50.8%) returned to the ED within an 18-month compared to 148 (37.1%) in the control group ( $p < 0.001$ ). Over the first 3 months, 23.5% of COVID-19 patients returned to the ED, while 13.5% of non-COVID patients returned ( $p < 0.001$ ). At 16-18 months, 12.8% of COVID 19 patients returned to the ED compared to 7.0% of non-COVID patients ( $P=0.002$ )

**Conclusion:** A positive COVID-19 Infection was associated with repeat visits to the ED within 18 months following primary infection. The difference in return rate between COVID and non-COVID patients occurred within the first 6 months. It is possible that COVID-19 is exacerbating underlying medical conditions, requiring more intervention, or an underlying COVID-19 sequelae could be resulting in specific increased complaints amongst infected patients. Further identification of chief complaints at each visit, may help identify if a COVID-19 infection is responsible for a rise in specific complaint following primary infection.

## **Vitamin D Deficiency in Emergency Department Patients With Generalized Complaints**

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Vitamin D Deficiency (VDD) may result in symptoms ranging from fatigue and weakness to depression and cognitive impairment. However, in Emergency Department (ED) patients presenting with non-specific complaints, Vitamin D (VitD) levels are not regularly evaluated. This study sought to determine if VDD is associated with measures of anxiety, depression, and fatigue as well as ED utilization in ED patients with generalized chief complaints.

A cross-sectional observational study was performed in an academic ED of a rural Level 1 trauma center. A convenience sample of ED patients presenting with generalized chief complaints was enrolled. Patients were excluded if they were <18 years, had a physical injury, life threatening condition, or a medical history of mental illness. After obtaining consent, National Institutes of Health Patient Reported Outcomes Measurement Information System (NIH-PROMIS) scale surveys were used to assess for depression, anxiety, and fatigue. Blood was collected and 25-hydroxy vitamin D<sub>3</sub> levels measured using targeted mass spectrometry (VDD defined as VitD <40 ng/ml). The number of ED visits for the same complaint in prior 12 months was obtained from electronic health records. Chi-square analysis (GraphPad Prism v9.2) determined associations between VDD and positive NIH-PROMIS screenings and unpaired t-test compared number of repeat ED visits across groups.

100 patients were enrolled over 12 months. 34% of patients were VDD and accounted for 13% of positive screenings for anxiety, 9% for fatigue and 5% for depression. There was no association between VDD and positive screening on the PROMIS measures ( $p > 0.05$ ). The average number of return visits for VDD patients was  $3.2 \pm 0.77$  vs.  $2.0 \pm 0.32$  for non-VDD patients ( $p = 0.09$ ). 7 patients with the most severe VDD (<20 ng/mL) represented 85% of the return visits by VDD patients while only 23% who did not return to the ED had VitD <20 ng/ml ( $p = 0.15$ ; OR = 3.3; 95% CI = 0.8-12.0). Post-hoc analysis shows this study is powered at 61%. 52 patients in each group are needed to reach significance for an association between VDD and return ED visits.

While no association was found between VDD and measures of fatigue, depression or anxiety in ED patients, future studies with a larger enrolment may focus on the use of severely low (<20 ng/ml) levels of VitD to predict outcomes.

*Service-Learning Distinction Track*

## Educational Handouts as an Approach to Weight Management: Weight Management Clinic

LaQuanda Fredericks, Brittany Smith

**Background:** In North Carolina, 65.6% of adults are overweight and obese with approximately 35.9% and 29.7% of adults being overweight and obese, respectively.<sup>2</sup> Pitt County's overweight and obesity rates are 7.1% higher than North Carolina's average, making this a serious issue that needs to be aggressively targeted as these conditions increase an individual's risk for developing a significant number of acute and chronic medical conditions that could affect every organ system.<sup>3</sup>

In the Weight Management clinic, participants were provided educational handouts that focused on healthy weight education. Content included creating SMART goals, learning the PLATE method, recognizing healthy shopping/eating behaviors, understanding the nutrition facts label, documenting food intake and physical activity. Pre and post surveys were completed to assess for the usefulness of the material as it relates to participants' healthy weight goals.

**Methods:** The subjects of this study were comprised of adults over the age 18, who are patients in the Family Medicine Weight Management Clinic. This study utilized pre and post surveillance via the Likert Scale. The Likert Scale data range was calculated using the Z Test formula for the Likert Scale where each category was assigned the following score: strongly agree=5, agree=4, neutral=3, disagree=2, strongly disagree=1. The Z Test formula was used to determine whether averaged data points for each question fell into the strongly agree, agree, neutral/neither agree nor disagree, disagree or strongly disagree range. Pre and post surveys were compared to assess for the usefulness of the material presented.

**Results:** 35 workbooks were distributed to participants in the weight management clinic. Of those 35, 10 participants completed both pre and post surveys. The remaining 25 participants either completed only pre or post surveys and are not accounted for in the results. Pre and post survey averages were 3.49/5 and 3.74/5, respectively. This meant that on average, participants agreed with the statements presented in the surveys with no differences noted before and after the educational handouts.

**Conclusion:** Further discussion should be conducted to further assess which information participants found the most or least useful. This information can be used to make changes to the educational handouts that will best help participants. Limitations of this study include the sample size of 10 participants.

## **Support of Minority Youth in Eastern North Carolina Through Mentorship and Workshops**

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Youth with mentors are more likely to enroll in college, volunteer in communities and serve in leadership roles on teams and in clubs. Mentoring of youth can have an impact on the trajectory of their lives. We see that with mentorship youth have increased high school graduation rates, healthier relationships and lifestyle choices, enhanced self-esteem, and self-confidence as well as improved interpersonal skills.

Our workshops at Building Hope Community Life Center (BHCLC) are a collaborative effort designed to expose minority youth in Greenville, North Carolina to mentors, and opportunities to gain exposure to fields in healthcare while also promoting health and wellness in adolescents. BHCLC is a faith-based non-profit founded in 2001 for youth and family development serving the community in Greenville. We collaborated with BHCLC due to the large number of minority students who rely on this center as a community resource.

Annually since 2020, we hosted programs at their annual summer camp which allows students an enrichment opportunity during the summer months when they are not in school and facilitate workshops through the academic year. We work with students ages 11 to 16 utilizing open discussions and hands-on learning activities to teach them about various topics. Students also participate in direct and indirect service activities to benefit underserved communities. Our overarching goal is to impact their lives by providing mentorship and access to a network of individuals who have achieved dreams which they may otherwise find difficult to obtain.

## **Implementation and Quality Improvement of a Pre-health Advising Program for Students and Volunteers Within PhysioCamp.**

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**Background:** In the 2021 application cycle for medical schools in the US, there was a 17.8% increase in applicants when compared to 2020.<sup>1</sup> With an increase in number of applicants, there is a dramatic increase in competitiveness, and undergraduate pre-health students often do not fully understand this when applying. As PhysioCamp continued to grow to include undergraduate student volunteers, PhysioCamp Advising was developed to provide these students with access to an advisor who had personally been through the admissions process. The aim of this project is implementation of a pre-health advising program and improvements based on post-session evaluation surveys.

**Methods:** Participants were recruited via email and divided into one of three cohorts depending on the month of their session. Following each session, advisees were emailed a summary of the meeting as well as a Google Forms evaluation survey to identify strengths and weaknesses of the program.

**Results:** Seven out of eight participants filled out the post-session evaluation form. 57.1% were interested in medical school, 14.3% physician assistant school, 14.3% pharmacy school, and 14.3% dental school. There was a 100% satisfaction rate among the participants. Suggestions for improvement included increasing the number of advisors and including advisors from other healthcare professions.

**Conclusion:** Based on the results from the post-session feedback form, plans moving forward should be based on expanding the number of advisors. Additionally, these advisors should have different health care backgrounds to meet with advisees with corresponding interests. Current strategy is to connect advisees with contacts within their professional interest; however, limitations to this can include delays in communication and scheduling issues.

## The Impact of Video-Based Education on Safe Injection Techniques in People who Inject Drugs

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**Background:** Injection drug use is on the rise in the United States, yet research on the impact of safe injection education on preventing injection-related injuries is limited. Injection drug use increases the risk for developing skin and soft tissue infections (SSTI), bacteremia, endocarditis, and sepsis. The principal objective of this study is to ascertain if video education can improve knowledge regarding sterile technique for intravenous drug use and reduce rates of SSTIs in our sample population.

**Methods:** Twenty-three participants of eKiM Syringe Service Program in Greenville, NC were recruited to complete a pretest survey, and watch our video on safety education, followed by a posttest survey testing knowledge retention from the video. There was an additional health behavior section of the survey, which included questions regarding types of drug use, preferred injection sites, history of SSTI, self-treatment techniques, hospitalizations, frequency of Narcan use in the last 30 days, Hepatitis C status, insurance coverage, and healthcare access. Four to six weeks following the first session, participants were asked to retake the knowledge test and answer questions regarding SSTI occurrences.

**Results:** After watching the video, the average posttest score was 90.2% correct, which is an increase of 11.4% from the pretest score (78.8%). While this did not yield a statistically significant change ( $p = 0.639$ ), it should be noted that the clinical outcomes were impressive, with 100% of the follow-up participants ( $n = 8$ ) reporting no infections during the study period. During session two, participants were asked to retake the knowledge test about safe injection, which led to an overall increase of 7.81% ( $p = 0.14$ ) between the pretest score and the follow-up score.

**Conclusion:** Safe injection education is an important tool in empowering people who use drugs to prevent injection-related injuries (i.e., skin and soft tissue infections, bacteremia, endocarditis, hepatitis C, HIV). Additional research on safe injection should be replicated with a larger sample size to assess the effectiveness of education on injury prevention and rates of hospitalizations for people who use injection drugs. As the harm reduction model becomes more accepted in the medical field, educational training for medical personnel should focus on teaching and supporting people who use drugs so the overall threshold for seeking medical attention for infection in this population is lowered and complications and the associated costs are avoided.

## **The Use of Telehealth to Operate the Greenville Community Shelter Clinic During the Covid-19 Pandemic**

**Anna Beth Robertson, Grant O'Brien, Jessica Barbee, MSW, Ryan Moore, MD, Gary Levine, MD, David Collier, MD**

**Background:** At the onset of the Covid-19 Pandemic, the Greenville Community Shelter Clinic (GCSC) was forced to close its doors. GCSC is a student-run clinic by students at the Brody School of Medicine that serves the local population experiencing homelessness. Certain racial and ethnic minority groups were disproportionately affected by the Covid-19 virus.<sup>1</sup> The population experiencing homelessness was one of the most vulnerable without access to technology.

Using donated iPads, we were able to implement fully functional virtual clinics via Microsoft Teams in September of 2020. In the interim, we started a Prescription Refill program to refill necessary medications remotely. We collected survey data on patient satisfaction with our telehealth model. The purpose of this study was to determine how useful telehealth was at our clinic and see if patients would use it again.

**Methods:** Data was collected at each virtual clinic on the number of patients and prescriptions that were refilled. At the end of clinic, a survey was administered that used a 5-point Likert scale. On the scale, (1) was completely disagree and (5) was completely agree to "ease of communication" and "would participate in another telehealth clinic." Data on the Prescription Refill Program was collected using monthly invoices from ECU Pharmacy.

**Results:** Through the prescription refill program, 55 prescriptions were provided to 16 unique patients at no cost, at a value of \$566.08. Eleven telehealth clinics were hosted, serving 26 patients, and providing 70 additional prescriptions. Twenty individuals responded to the surveys. The "ease of communication" question had a mean score of 3.75 and median of 4.5. The "would participate in another telehealth clinic" question had a mean of 4.45 and median of 5.

**Discussion:** There were barriers that we faced to make virtual clinics work for our patients. One of the main barriers was poor internet connection at the shelter. We added a wireless extender, which helped some, and our physician volunteers started coming to clinic in-person, leaving just the students on the telehealth platform. When looking at our survey results, satisfaction with the virtual platform improved significantly after November 2<sup>nd</sup> when we implemented these changes. Telehealth has proven that it is here to stay since the Covid-19 pandemic. It can worsen health disparities in those without access to technology, however we showed that those disparities can be combatted.

**Conclusion:** Telehealth proved to be a useful and effective tool for providing health care when in-person services were not feasible. Majority of our patients responded that they would participate in another virtual clinic.