EAST CAROLINA UNIVERSITY

April 2020

Brody School of Medicine

DISTINCTION DAY

Abstract Book

Acknowledgments

The Brody School of Medicine Distinction Track Programs would like to express sincere gratitude to the following individuals and participating faculty of the following departments for their support of the 2020 distinction track program graduates. Those listed provided mentorship, financial support, research resources, and/or administrative support for the programs. These generous contributions make it possible for BSOM students to learn and make their own contributions to the field of medicine through scholarly pursuits.

Distinction Track Program Leadership

Dr. Timothy Reeder and Dr. Suzanne Lazorick, Health System Transformation and Leadership Distinction Track

Dr. Kori Brewer and Dr. David Collier, Research Distinction Track

Dr. Kelly Harrell and Dr. Luan Lawson, Medical Education and Teaching Distinction Track

Dr. Jennifer Crotty, Dr. Ricky Watson, and Dr. Susan Keen, Service-Learning Distinction Track

Distinction Track Program Administration

Jenna Garris, Distinction Track Program Administrator
Sierra Duncan, Course Coordinator

Acknowledgments

Health System Transformation and Leadership Distinction Track Program Mentors

Dr. Uduak Akpan, Department of Pediatrics
Dr. Weili Chang, Department of Pediatrics
Dr. Amanda Higginson, Department of Pediatrics
Dr. Toni Johnson, Department of Psychiatry and Behavioral Medicine
Dr. Gregory Knapp, Department of Family Medicine
Dr. Roberto Portela, Department of Emergency Medicine
Dr. Michael Ritchie, Department of Internal Medicine
Dr. Jan Wong, Department of Surgery

Research Distinction Track Program Mentors

Dr. David Collier, Department of Pediatrics
Dr. Doyle "Skip" Cummings, Department of Family Medicine
Dr. Lisandra deCastro Bras, Department of Physiology
Dr. Johanna Hannan, Department of Physiology
Dr. Suzanne Lazorick, Department of Pediatrics
Dr. Shannon Longshore, Department of Surgery
Dr. Charles Phillips, Department of Internal Medicine
Dr. David Tulis, Department of Physiology
Dr. Dmitry Tumin, Department of Pediatrics

Medical Education and Teaching Distinction Track Program Mentors

Dr. Stephen Charles, Office of Medical Education
Dr. Philip Boyer, Department of Pathology
Dr. Kelly Harrell, Department of Anatomy and Cell Biology
Dr. Danielle Walsh, Department of Surgery

Acknowledgments

Service-Learning Distinction Track Program Mentors

Dr. Irma Corral, Department of Psychiatry and Behavioral Medicine

Dr. Kelly Haven, Department of Family Medicine

Dr. Ryan Moore, Department of Pediatrics

Dr. Sara Smith, Department of Obstetrics & Gynecology

Dr. Paul Swaney, Department of Obstetrics & Gynecology

Institutional Support

BSOM Division of Academic Affairs

BB&T Center for Leadership Development

Vidant Health

Health System Transformation & Leadership Distinction Track

Title:
Routine Monitoring of the Quick Inventory of Depressive Symptomatology (QIDS-SR16) in Clinic Patients with Major Depressive Disorder

Authors:
Jubayer Ahmed, MD Candidate, Brody School of Medicine at ECU
Dr. Toni Johnson, MD, East Carolina University Department of Psychiatry
Dr. Matthew Krause, MD
Dr. Hunter Story, MD
Dr. Yogesh Jonnagadla, MD
Dr. Anthony Chatham, MD

Introduction:
According to the National Institute of Mental Health, an estimated 17.3 million adults in the United States had at least one major depressive episode in 2017, representing more than 7% of all adults in America. Patients with major depressive disorder often appear euthymic or do not associate some of their symptoms with depression. The Quick Inventory of Depressive Symptomatology (QIDS) is a 16-item self-report measure of depression that serves as an objective measure of depression and as a clinical tool in establishing the diagnosis of major depressive disorder and monitoring the response to treatment. Our aim was to improve the treatment of adult patients with major depressive disorder seen by residents in the East Carolina University (ECU) outpatient psychiatry clinic by increasing utilization of the QIDS.

Methods:
This is a small scale-single center- retrospective quality improvement project done at the ECU outpatient psychiatry clinic. Patients who were administered the QIDS were those who met a clinical diagnosis of major depressive disorder. It also included patients who were able to have the ability to read and fill out the paperwork. The model for improvement was used as a framework for this project, with the use of four main Plan-Do-Study-Act (PDSA) cycles to make small scale changes. Each PDSA cycle presented itself with unique challenges, which were addressed with weekly meetings with residents and our attending physician supervisor, either in person or through email. The challenges of the project were also outlined by utilizing fish-bone diagrams, which portrayed the small changes that could be completed to affect the outcome in a positive manner. Primary outcomes measured included the individual resident and overall cohort percentages of administering the QIDS, and the average number of times the QIDs was completed during the 1st and 2nd quarter of the year, which were assessed using linear plots of the data to track the progress over time.

Results:
The subjects included in the study were patients who met the clinical diagnosis of major depressive disorder, who were given the QIDS, and who's scores were recorded correctly into the flowsheet in the electronic health record system. The patients excluded were patients who did not have the literacy level to be able to read or comprehend English, as there were not alternative versions of the QIDS in other languages. Patients who did not meet the criteria needed for diagnosis of major depressive disorder were also excluded, as the QIDS main utility is for patients with major depressive disorder. Patients whose scores were not logged into the EPIC flowsheet were also excluded as that was the only manner in which it could be determined that the residents were appropriately recording the score into the flowsheet.

There was a 65% participation rate of logging in the QIDs score by the third month of the project, August 2017, reaching our initial goal set but this goal was difficult to maintain as the participation then decreased to 43% and 41% in September and October 2017 respectively, before reaching 56% in November 2017. In the second phase of the project, our goal was to increase the utility of logging in the QIDS by 50% between the first and second quarter of the year, which we were not able to accomplish as there was an increase of 42%.

Conclusions:
Although the goal set in the initial aim statement was met within the first 3 months of project initiation, maintaining a quality improvement project often presents with greater challenges. Despite not achieving the goal set in the second aim statement, we were able to see an increase of 42% between the first and second quarter of the residency year due to the utilization of multiple PDSA cycles and formulating solutions to determine the root cause of the low success rate . Our study demonstrated that it is possible to implement changes to increase the utilization of QIDS, but many challenges exist in maintaining and ensuring compliance from one year to the next, specifically the continuous cycle of personnel. Future initiatives will be implemented by conducting more PDSA cycles and continuing strategies that have been successful, such as surveys or individualized meetings to ensure that our goals are met, and so that the project is able to expand beyond the outpatient psychiatry clinic.

Title:
Assessment of Alert Fatigue and Utility of Modified Early Warning System at Vidant Medical Center

Author (s) with affiliation (s):
Noopur Doshi, BS, MS4
Gregory Knapp, MD
Amy Campbell, RN, MSN
Hazel Pennington, RN, MSN

Background:
Research has shown that a Modified Early Warning System (MEWS) score of 5 or greater is associated with increased ICU admissions, risk of death or admission to a high dependency unit. MEWS identifies early deterioration of a patient by generating a numeric score based on vital signs and level of consciousness. From June 2016-March 2017, a MEWS of 5 or greater was found in >50% of Vidant Medical Center's patients with a diagnosis of sepsis, and 66% of the Emergency Department (ED) patients with an initial MEWS of 5 or greater were admitted to the hospital. The aim of this project is to reduce alert fatigue and improve the utility of MEWS in taking care of acutely decompensating patients, especially those with sepsis, in the ED by February 2020.

Methods:
A robust mixed methods quality improvement (QI) project with multiple Plan-Do-Study-Act (PDSA) cycles was implemented. Using a multidisciplinary Sepsis Steering Committee, SIRS protocol was integrated into the MEWS in the first PDSA cycle. In the second PDSA cycle, a hospital wide 11 question survey was completed by 270 RNs, 75 MDs/DOs, and 13 ERTs. Discovery rounds and survey data supported a multiple pedagogical approach to ED MEWS education and MEWS BPA feedback in the third PDSA cycle.

Results:
The number of SIRS and MEWS RN alerts in April 2017 were 860, and the number of MEWS RN Alerts in April 2018 was 900. 43% of MD/DO and 56.87% of RNs agreed or strongly agreed that MEWS helps detect acutely decompensating patients earlier. 53% of MD/DO and 57.25% of RNs agreed or strongly agreed that MEWS causes alert fatigue. The survey comments emphasized that there is a need for more education about MEWS protocol, and that MEWS BPA over alerts. After the third PDSA cycle, the ED RN MEWS BPA was simplified by removing the sepsis nursing protocol order set and 2 action items.

Conclusion:
Contrary to the expectation, the total number of alerts for RNs went up in April 2018 versus April 2017. MEWS is helping to detect acutely decompensating patients earlier at VMC. However, it is also causing alert fatigue. Future PDSAs will: (i) focus on assessing how the education interventions and simplification of the ED RN MEWS BPA improves the utility of MEWS and reduces alert fatigue in the ED (ii) explore the impact of adding the MEWS column to the track board of ED Pharmacy.

Title:
Bilirubin turnaround time in an outpatient pediatric clinic: improving efficiency of time-sensitive lab results

Team Members*:*
Samantha Curtis, BSPH, Brody School of Medicine, Greenville, NC
Dmitry Tumin, PhD, Department of Pediatrics, Brody School of Medicine, East Carolina University, Greenville, NC
Fraley Greene, Vidant Medical Center, Greenville, NC
Donna Spain, RN, East Carolina University, Greenville, NC
Amanda Higginson, MD, Department of Pediatrics, Brody School of Medicine, East Carolina University, Greenville, NC

Background*:*
Hyperbilirubinemia is commonly seen in most newborns, with an estimated 60% of newborn infants exhibiting clinical jaundice.[1] While the majority of these cases resolve with no sequelae, under certain conditions bilirubin can become toxic to the central nervous system. Historically, the time from bilirubin order to bilirubin result in our academic pediatric outpatient clinic has been highly variable, and there have been times when delay in processing or reporting has impacted patient care. In Part 1, we aimed to decrease the mean turnaround time (TAT) from bilirubin orders originating in the pediatric outpatient clinic to results reported in the electronic medical record by 10 minutes over 8 months. In Part 2, we aimed to decrease the variability in TAT by 50% over 4 months. In Part 3 we aimed to analyze the impact of Epic Beaker on the mean and variability of TAT over 2 months.

Methods*:*
The project team created a flow diagram from bilirubin order to results. Part 1 included 3 plan-do-study-act (PDSA) cycles: (1) placing fluorescent sheets imprinted with "STAT lab" in the lab tube prior to transportation, (2) having clinic nurses log their calls to the lab, and (3) having lab staff log incoming calls from the clinic. Part 2 included 2 PDSA cycles: (4) analyzing sustainability of PDSA 1-3, (5) re-implementing PDSA 1/2. Part 3 included 1 PDSA cycle: (6) implementing Epic Beaker. Bilirubin TAT was analyzed using a run chart.

Results*:*
In Part 1, pre-intervention bilirubin TAT was 92±42 minutes (n=19) and 81±23 minutes in the post-intervention period (n=73). Although the mean TAT did not significantly decrease (t-test $p=0.144$; 95% CI: -25, +3), there was a significant decrease in the SD (F-test of equal variances $p<0.001$). In Part 2, pre-intervention bilirubin TAT was 113±75 minutes (n=24) and 81±20 minutes in the post-intervention period (n=24). Similar to Part 1, the decrease in mean TAT did not reach statistical significance (t-test $p=0.054$; 95% CI: -64, +1), although the decrease in variability was significant (F-test of equal variances $p<0.001$). In Part 3, pre-intervention bilirubin TAT was 81±20 minutes (n=24) and 81±40 minutes in the post-intervention period (n=15) (F-test of equal variances $p=0.019$; and t-test $p=0.951$ respectively).

Conclusion*:*
After Part 1 and Part 2 we significantly decreased TAT variability ($p<0.001$). Although the implementation of Epic Beaker lead to an increased variability in TAT, we predict that further usage and adjustment to the new technology will result in improved efficiency and mean TAT. Identifying small areas of change within a complex system improved the predictability of time-sensitive lab results.

References*:*

1.Provisional Committee on Quality Improvement, Subcommittee on Hyperbilirubinemia. Practice parameter: Management of hyperbilirubinemia in the healthy term newborn. *Pediatrics*. 1994;94(4):558.

Title:
Reducing Door to Computed Tomography Times for Acute Stroke Patients: A Quality Improvement Initiative

Authors:
Jonathan LeCrone, Medical Student, East Carolina University
Stephen Taylor, MHS, East Carolina University
Roberto Portela, MD, East Carolina University

Background:
The popular mantra for stroke care is “time is brain” and the “BE FAST” mnemonic is used to help the general population identify strokes early. This emphasis on efficiency in stroke care is well-earned because the most successful medical management options are time sensitive. The Pitt County EMS and the Vidant Medical Center (VMC) in Greenville, NC have found opportunities for improvement in the door to CT (DCT) of acute stroke patients. The authors’ aim was to decrease DCT for acute stroke patients presenting to VMC via Pitt County EMS by 10% by December 2018 by implementing specific protocol changes.

Methods:
This study is a continuous quality improvement initiative with DCT data collected from EHR patient records, beginning before the first intervention was implemented. Monthly and annual means were calculated using Microsoft Excel. The study population included patients with symptoms suspicious for acute stroke presenting to VMC via Pitt County, NC EMS. Data was collected from January 2017 through December 2019. Data analysis was performed using Microsoft Excel.

Interventions:
Changes made to stroke protocol include: 1. EMS began activating stroke alert en route to the Emergency Department, improving timeliness of activation and hospital preparedness. 2. EMS began transporting patients through the emergency department for physician evaluation and then on to the CT room to avoid time lost due to room placement and stretcher and monitor transfers. 3. The RACE stroke scale was initiated to give physicians more information on type, severity, and progression of the stroke. 4. A partnership with Pitt County Community College was initiated for Paramedic training. In-house training modules were designed, including computer-based training, individualized performance monitoring, and feedback. Interventions were implemented throughout 2017.

Results:
The mean 2017 DCT was 16.5 minutes with N = 177. 2018 mean DCT showed improvement to 15.8 minutes with N = 189. 2019 mean DCT showed continued improvement to 13.0 minutes with N = 153. The final year of the study (2019) showed a statistically significant decrease of 21.2% ($p = 0.013$) over the initial year (2017).

Conclusion:
The interventions which were implemented decreased the DCT at VMC throughout the study period. The results have the potential to increase the number of patients who receive definitive treatments which have been shown to improve functional outcomes for acute stroke patients.

Title:

Initiation of Cue-Based Feeding Guidelines in a Neonatal Intensive Care Unit – A Quality Improvement Project

Contributors, with affiliations:

Weili Chang, MD; Brody School of Medicine at East Carolina University
Katherine Taylor, DO; Brody School of Medicine at East Carolina University
Bennett Mack, MS4; Brody School of Medicine at East Carolina University

Background:

After weeks of recovering from potentially life-threatening medical issues, preterm neonates' last hurdle before discharge home is often learning how to effectively feed by mouth. While focusing on various medical issues, neonatal healthcare providers may overlook the importance of feeding infants by mouth (PO), a process that could possibly promote faster development and earlier discharge. This interdisciplinary quality improvement (QI) project aimed to master timeliness and efficiency in achieving full PO feeds in a Level II / IV NICU. The aim statement for this project was to achieve a 90% compliance of oral feeding roadmap initiation of scoring and completion of scoring in both level II and level IV NICU by January 1st, 2020

Methods:

The QI team adapted an oral feeding readiness and feeding quality scale for nurses to implement to determine PO feeding readiness for neonates 33 weeks postmenstrual age (PMA) and older. Numerous interventions were implemented through a series of PDSA cycles to promote documentation of the feeding scale and ultimately improve feeding outcomes. Interventions included team member face-to-face meetings, nursing education, and weekly reminders to nursing leadership.

Results:

Compliance of initiating and continuing documentation of feeding readiness scores was tracked over time with each intervention. Data for the month of January 2020 resulted in an initiation of 35.7% initiation of cue-based feedings when appropriate and a feed scoring occurrence of 77.7% The final outcome measure will be comparing PMA of neonates reaching full PO feeds or GI tube before and after the development and implementation of PO feeding readiness protocol.

Conclusions:

The final results of this quality improvement project can only be quantified in the aspect of compliance. This project resulted in roughly one-third of neonates initiated on cue-based feeding protocol and roughly three-fourths of feed scoring collected. This may vary depending on the institution and its employees; therefore, it has low generalizability. Further studying needs to be collected on outcome measures to determine protocol's effects on neonatal health outcomes and health system expenditure.

Title:
Breast Cancer Conference EHR Template Improves Documentation of Clinical Staging

Authors:
Chantel Morey BA, Helen M. Johnson MD, Lauren Geisel BS, Andrew Weil MD, Mahvish Muzaffar MD, Nasreen A. Vohra MD, Phyllis DeAntonio RN, Jan H. Wong MD

Background:
Clinical pathways are widely accepted tools for improving the quality of cancer care. Clinical staging of cancer patients is crucial in ensuring the correct clinical pathway is followed and that national standards of treatment are met. To this end, we created a template for the established Vidant Breast Cancer Conference (VBCC) and integrated the template into the Vidant EHR to increase documentation of clinical staging for breast cancer patients across the Vidant hospital system.

Methods:
This focused audit QI study was conducted across multiple breast cancer centers in the Vidant hospital system. The Plan-Do-Study-Act (PDSA) model was utilized and four interventions were completed: increase participation at VBCC, create a template for VBCC, integrate the template into the EHR, and study the effects of the template on documentation for breast cancer patients. Our process measure was the presence of a VBCC note and the outcome measure was documentation of clinical stage before surgical intervention. The balancing measure was a self-report by the VBCC attendees on awareness of the template, time spent in VBCC, and time spent reading notes from VBCC.

Results:
At baseline, 56.5% of breast cancer patients had an EHR note documenting their presentation at VBCC and 58.2% of new patients (n=435) had a clinical stage documented before surgical intervention. Six months after the EHR template went live, the rate of VBCC note documentation increased to 92% and clinical staging documentation increased to 88% (n=97) for new breast cancer diagnoses. In addition, most cancer conference attendees reported that they perceived no more time spent in VBCC (61%) or in reviewing VBCC notes (71%) and believed that there was an increase in efficacy of VBCC (72%) after template implementation. However, members entering the data into the VBCC template felt that their workload had increased significantly.

Conclusions:
Having a template for VBCC that was incorporated into the EHR significantly improved the documentation of clinical stage before surgery, especially at the flagship Vidant hospital. This should allow for better patient care as accurate staging documented in the EHR encourages the correct clinical pathway being activated and data concerning compliance with national standards of care can be analyzed more efficiently.

Title:
Improving the Mobility Protocol in the Cardiac ICU to Enhance Documentation and Patient Mobility

Authors:
Chirag Patel[1], Michael Ritchie[2], Toni Holden[2]

Affiliations:
[1]Brody School of Medicine, [2]Vidant Medical Center

Background:
Mobility is an essential part to a patient's recovery in the Cardiac Intensive Care Unit (CICU) since it reduces length of stay and improves patient outcomes once discharged. Vidant Medical Center uses a protocol known as Greenville Early Mobility Scale (GEMS) to progress a patient's mobility. A previous Plan-Do-Study-Act (PDSA) cycle in the CICU found that GEMS was able to identify a patient's ability to mobilize but was unclear on the exercises the patients should be performing. Furthermore, many patients were bed-bound and deemed by the staff difficult to mobilize, preventing them from meeting their mobility potential. The ICU Mobility Protocol: VMC Early (IMPROVE) movement program was created to remedy these issues and increase documentation of patient's mobility in the CICU. We aim to have a 50% increase in the total number of times activity was documented and the total amount of GEMS level progression from July 2018 to March 2019.

Methods:
A total of 4 PDSA cycles / interventions were implemented to increase documentation and patient mobility from a time frame of July 2018 to March 2019. A retrospective analysis was performed; patient census was generated for each month a new intervention was set in motion. 15 patients from each month were randomly selected and their GEMS progression as well as the amount of times activity had been documented by a healthcare worker was recorded. The goal was to observe a progressive increase in average GEMS progression as well documentation each month to meet our aim statement.

Results:
The data suggests that our aim statement was not met since our GEMS progression decreased by 52% and our activity documented increased by 44% from July 2018 to March 2019.

Discussion/Conclusions:
While there is an overall increase in activity documented, there has been a decline in GEMS progression when comparing March 2019 data to July 2018 data. Many of our patients are debilitated by the flu during the winter months, which may have shown a decrease in GEMS progression when compared to our large baseline obtained in July 2018. Moving forward, we are continuing to improve the EHR interface to make it easier to document patient mobility over time and include levels 1A and 1B. We also created a rounding aid that displays the patient mobility level outside their rooms, serving as a reminder to all staff to mobilize patients and document accordingly.

Title:

Individualized Fluid Management in Extremely Preterm Neonates to Ensure Adequate Diuresis Without Increasing Adverse Complications

Authors:

Williams A[1], Hassan N[1], Havinga J[1], Moore S[2], Dollhopf E[2], Akpan U[1]

[1]East Carolina University [2]Vidant Medical Center

Background:

In extremely premature (EPT) babies, a decrease in weight of 6-15% from birth weight in the first week of life is appropriate. Inadequate diuresis (ID) after birth in neonates has been associated with morbidities such as intraventricular hemorrhage (IVH), patent ductus arteriosus (PDA), and bronchopulmonary dysplasia (BPD). Strict management of fluid intake and avoiding early addition of sodium in the first week of life can increase postnatal weight loss. The aim of this project was to decrease the incidence of ID (weight loss <6% of birth weight) in extremely premature babies <28 weeks of gestation, within the first week of life by 50% in 1 year.

Methods:

A multidisciplinary team was formed in a level IV academic NICU. Key drivers included fluid volume, provider education, closer monitoring of hydration markers, and delayed addition of salt. During the initial PDSA cycle, the team created a protocol to encourage lower starting fluid volumes, use of smaller increments when increasing fluid volume, and closer monitoring of serum sodium, urine output and daily weight. An information session was held and a guide sheet was created for use during rounds. Subsequent PDSA cycles focused on use of the sheet during rounds. The final PDSA cycles added specific guidelines for fluid management to the guide sheet and discussion of sample cases during multidisciplinary conferences to highlight common pitfalls and suggestions for management.

Results:

One year of baseline data was compared to one year of post-intervention data. The starting fluid volume on day of life (DOL) 0 decreased from a median of 120 ml/kg to 100 ml/kg ($p<0.001$) while maximal fluid volume over DOL 0-6 decreased from a median of 150 ml/kg to 140 ml/kg ($p<0.001$). Incidence of ID decreased from 43% at baseline to 29% post-intervention. In the post-intervention period, incidence of PDA declined from 35% to 29% among a total of 100 cases with completed PDA screening, but this decrease was not statistically significant ($p=0.509$). Incidence of IVH and BPD did not change.

Conclusion:

The incidence of ID decreased from 43% to 29% during the study. The multidisciplinary nature of the team, along with the dedication to staff education factored into the success of the project. An unforeseen challenge was hidden sources of sodium such as packed cells, flushes etc. Next steps include continued provider education and continued use of the guide sheets as a longer time period may be required to reach a 50% reduction in ID.

Medical Education & Teaching Distinction Track

Title:
Patient Education in the Pre-Clinical Years of Medical School- A Pilot Study

Authors:
Allison Connelly, PT, Stephen Charles, MABMH, PhD, CHSE

Introduction:
Medical students are provided with limited opportunity to practice performing patient education during the pre-clinical years of their curriculum. This study aims to provide medical students with an exercise in patient education and to determine if this activity improves comfort level with patient education and interaction during the first clinical year of medical school.

Methods:
Participating students performed patient education with an individual with a spinal cord injury regarding autonomic dysreflexia and received feedback from this individual. There was a brief discussion with both parties following the event. The students completed a survey on the experience using a 7-point Likert scale. A follow up survey was given to all medical students in this class following their first clinical year to assess student's level of comfort with patient interaction and education.

Results:
All participating students agreed that the exercise was helpful to them and that they would like to see this activity implemented into the medical curriculum. Statistical analysis using an independent t-test indicated no significant difference in comfort level with patient interaction and education between students who had participated in the exercise and those who had not.

Discussion:
It is the hope of the authors that this exercise will illustrate the need for increased exposure to and practice of performing patient education during the pre-clinical years of medical school. The lack of statistically significant differences between the students who performed the exercise compared to those who did not can likely be attributed to the small sample size along with the single occurrence of the exercise. The authors believe that to implement such activities into the medical school curriculum will result in improved medical student interaction with patients during the clinical years, and will set a precedent for continued quality patient education as these students become physicians.

Title:
Stop the Bleed: Medical Students as Instructors of the Bleeding Control Basics (B-Con) Course

Authors:
Evans KM, Lake B, Harrell KM, Longshore SW, Toschlog EA, Walsh DS

Introduction:
Death due to uncontrolled bleeding is a leading cause of preventable traumatic death. The bleeding control basics (B-Con) course was developed to teach lifesaving hemorrhage control techniques to the community at large. However, medical students are currently limited in their abilities to act as autonomous instructors, barring prior experience as an EMT, RN, etc.

Purpose:
To assess the bleeding control knowledge of medical students (phase I), compare the knowledge of those taught by a certified instructor vs. a medical student (phase II), and to display that medical students are effective teachers of the B-Con course.

Methods:
Phase I: 20 medical students, 6 with prior clinical experience (CE) and 14 without (NCE) completed a pre-course and post-course knowledge assessment. This de novo knowledge assessment was developed from B-Con learning objectives and consists of 6 multiple choice and 6 true/false questions for a total score of 12. Independent samples t-tests were conducted. Phase II: 91 incoming first year medical students were given the B-Con course, 45 were taught by a third-year medical student and 46 were taught by a certified instructor. An ANCOVA was performed to compare knowledge assessment scores by instructor type (certified vs. medical student) with prior clinical experience and pre-test scores as confounding variables.

Results:
In Phase I of this study, the CE group scored significantly higher on the pre-test knowledge assessment compared to the NCE group ($p = 0.003$). However, there was no significant difference between the post-test scores among the two groups ($p = 0.597$). All students showed significant improvement in post-test scores. In Phase II of this study, the group taught by the medical student scored significantly higher on the post-test compared to the group taught by a certified instructor ($p < 0.01$). The covariate, prior clinical experience in this case, was not significantly related to the post-test scores ($p = 0.719$), however pre-test scores were significantly related to post-test scores ($p = 0.026$). Additionally, there was not a significant difference in pre-test scores between the group taught by a medical student compared to the group taught by a certified instructor even when controlling for prior clinical experience ($p = 0.859$). Prior clinical experience was not significantly related to the pre-test scores ($p = 0.196$).

Discussion:
Neither prior clinical experience nor use of a certified instructor impacted successful education of the B-Con objectives when taught by a medical student. A medical student led bleeding control basics course is equally effective and successful at conveying important learning objectives of the bleeding control basics course when compared to a certified instructor. Medical students who do not meet the current criteria of the ACS are still able to convey fundamental learning objectives of the course as demonstrated by near-perfect assimilation of content in post-test scores.

Title:
The Need for Pathology: A Modular Approach to Pathology Integration in the Gross Anatomy Laboratory

Authors:
Richard Jordan, BS[1], Philip Boyer, MD, PhD[2], Stephen Charles, PhD[3], Kelly Harrell, PhD, MPT[4]

[1]Medical Student, Brody School of Medicine, East Carolina University, Greenville, NC
[2]Associate Professor, Department of Pathology and Laboratory Medicine, Vidant Medical Center, Greenville, NC
[3]Assistant Dean, Medical Education Outcomes and Assessment, Office of Medical Education, Brody School of Medicine, East Carolina University, Greenville, NC
[4]Associate Professor, Department of Anatomy and Neurobiology, Virginia Commonwealth University School of Medicine, Richmond, VA

Introduction:
Pathology is an integrative medical field that exemplifies the unity of basic science and clinical medicine in patient care. All physicians will collaborate and benefit from pathology services in their career. Without a required pathology clerkship/rotation requirement, however, many students are not adequately exposed to pathology. This has led to the investigation of novel methods of introducing students to pathological characterization and the duties of a pathologist. This pilot study aims to investigate student perception of the use of digital pathology modules in the gross anatomy laboratory.

Methods:
This retrospective, mixed-methods study investigates the use of digital pathology modules, containing media describing the anatomy, histology, gross pathology, histopathology, clinical lab values, and pathology practice correlations related to high-yield diagnoses. Students from the Class of 2023 at the Brody School of Medicine were recruited to complete the four modules and associated surveys (n=80). Students also completed an end-of-course survey consisting of five-item Likert scale and short answer questions. Quantitative data was analyzed for agreement with survey questions using a composite bar graph. Qualitative data from short answer questions was individually coded for themes by the principal investigator.

Results:
A total of 80 students responded to each module survey, with 100% of all respondents using the modules on their own time. The module most often completed was “Myocardial Infarction” (92.45%) followed by “Myopathies” (90.57%). “Osteoporosis” and “Grave’s Disease” were completed equally as much (86.79%). Survey responses indicated agreement (average 97%) in improvement of basic pathology understanding. 86.54% of respondents agreed/strongly agreed that the modules would be useful in future laboratory sessions. Twelve central themes were obtained from the end-of-course survey short answer content.

Conclusion:
Student responses indicate an overall positive perception of the modules. To improve the modules, students requested the addition of more practice questions, video components showing anatomical structures in three dimensions, more high-quality images to test their understanding of the module concepts, and further clinical correlations. In future studies of module effectiveness, each module should contain information that correlates with the specific course material provided to students and more substantial active-learning components. The interventions may help students to complete the modules during the gross anatomy laboratory where they may be more engaged than at the end of the course when other responsibilities take precedence. The conclusion is that the modules are a viable method of pathology introduction but should be further validated.

Title:
The Implementation of Peer-led Anatomy Review Sessions for USMLE Step 1 Examination Preparation

Authors:
O'Connor, KE and Harrell, KM

Department of Anatomy and Cell Biology at The Brody School of Medicine at East Carolina University

Medical residency programs place significant emphasis on USMLE Step 1 scores when determining which students to invite for interviews and when ranking candidates for residency positions. While Brody School of Medicine (BSOM) students have historically scored at or above the national Step 1 average, discipline-specific data revealed that the same students consistently performed below the national average in the area of gross anatomy and embryology (GAE). This below average performance may be attributed to the time lapse between completion of GAE coursework in the first year of medical school and when students sit for the USMLE Step 1 examination prior to the start the third year of medical school. To bridge this time gap, peer-led GAE review sessions were created for second-year medical students preparing to take the USMLE Step 1. These sessions focused on high-yield, clinically correlated GAE topics, specifically in the upper and lower extremities, including nerve lesions and musculoskeletal injuries. This study describes the implementation of these revised peer-led GAE laboratory review sessions, assesses effectiveness of session on GAE knowledge acquisition, and evaluates student perceptions of the review sessions. Two, 60-minute, peer-led gross anatomy laboratory review sessions were offered to all BSOM second-year students. Session 1 and 2 reviewed high-yield upper extremity and lower extremity anatomy topics, respectively. Both sessions were offered in six time blocks and limited to 8 students (n= 33) per time block. Of the 33 participants, 30 took part in both sessions. Each session included a pre-session knowledge assessment, a clinically-focused interactive chalk-talk, hands-on prosection laboratory stations, and a post-session knowledge assessment. Each session was facilitated by the same near-peer teacher for consistency in delivery. The pre- and post-session knowledge assessments consisted of 4-6 multiple-choice, board-style examination questions focused on content delivered during the session. Participants were asked to complete a survey, designed to assess learner perceptions of the review, both immediately after the review session and after completion of USMLE Step 1—approximately two months after the sessions. Average knowledge assessment scores improved by 57.1% and 68.4% following the upper and lower extremity review sessions, respectively. Participants perceived the review sessions positively, with 77.7% reporting improved confidence with musculoskeletal content. Additionally, 88.8% reported increased comfort answering anatomy board-style questions, and that the sessions were an efficient use of study time. Results suggest that near-peer-led review sessions improved medical student knowledge, confidence and comfort with the presented content. Future studies should examine the effect of participation on discipline-specific performance on Step 1. Improved scores could support the development and delivery of additional peer-led basic science review sessions during dedicated Step 1 study time.

Research Distinction Track

Title:
Temporal Trends in Primary and Secondary Skin Cancer Prevention in the United States

Authors:
Nicole L. Bolick, MPH, MS[1,2]*; Linglin Huang, MS[1]*; Arash Mostaghimi, MD, MPH[3]; Rebecca I. Hartman, MD, MPH[3,4]
[1] Harvard T.H. Chan School of Public Health, Boston, MA
[2]The Brody School of Medicine at East Carolina University, Greenville, NC
[3]Department of Dermatology, Brigham and Women's Hospital and Harvard Medical School, Boston, MA
[4]Department of Dermatology, VA Integrated Service Network (VISN-1), Jamaica Plain, MA
*Denotes co-first authors

Background:
There are an increasing number of public health campaigns addressing skin cancer prevention to combat rising incidence. We analyzed temporal trends in skin cancer prevention behaviors to examine the impact of such campaigns. A retrospective, cross-sectional study was conducted using the National Health Information Survey (NHIS) to analyze trends in sun protective behaviors over a ten-year period to determine temporal trends.

Methods:
This retrospective, cross-sectional study used the NHIS to analyze trends in sun protective behaviors with data collected in 2005, 2010, and 2015. The weighted study included a total of 67,471 individuals. Due to substantial missing data for income, NHIS imputed data was used. Our outcomes of interest were the use of sun protective measures, lifetime history of full body skin examination, history in the past year of indoor tanning, and history of two or more sunburns in the past year. Multivariable logistic regression analyses were used to assess the association between time period and weighted prevalence of sun protective behaviors, adjusting for sex, region, health insurance, alcohol use, smoking status, education, personal history and family histories of skin cancer, income, race, and skin reaction to the sun.

Results:
A small percentage of individuals answered the sun protection questions by stating that they "don't go out in the sun." These individuals and those with unknown or missing responses were excluded from analysis. The unadjusted and adjusted prevalence of most skin cancer preventive behaviors rose including sun avoidance, sunscreen use, and full body skin examination (FBSE) with the adjusted prevalence of indoor tanning use decreasing. Primary skin cancer preventive measures increased including sunscreen (31.5% to 34.3%, $p < 0.001$) and sun avoidance (31.7% to 36.8%, $p < 0.001$). Unadjusted and adjusted prevalence of protective clothing did not rise. Secondary skin cancer prevention including FBSE also increased (19.0% to 22.4%, $p < 0.001$). Prevalence of indoor tanning use decreased significantly (14.1% to 4.1%, $p < 0.001$), but prevalence of sunburn in the past year rose significantly (18.2% to 19.9%, $p = 0.001$).

Conclusion:
Rates of primary and secondary skin preventive behaviors remain suboptimal and the prevalence of multiple annual sunburns is rising. Indoor tanning is substantially decreasing,
implying the success of targeted legislative and public health efforts. Further research is needed to determine the impact of behavioral changes on skin cancer incidence and why sunburn prevalence is rising. Additional public health efforts are needed on skin cancer prevention.

Title:
Dopamine receptor D3 agonist (Pramipexole) reduces morphine-induced tolerance and preserves cardiac health in mice during morphine exposure and withdrawal

Authors:
Gabriel Gaweda, BS; Iyer Rugmani, PhD; Patti Shaver, BS; Gabriel Grilo, PhD; Mai-Lynne Dinkins, BS; Hamilton Stoffel; Stefan Clemens, PhD; Lisandra de Castro Brás, PhD
Department of Physiology, Brody School of Medicine, East Carolina University

Prolonged morphine exposure leads to desensitization of pain receptors, such as the G-coupled mu-opioid receptor (m-OR). Additionally, extended morphine exposure is related to cardiac dysfunction. This is problematic for patients undergoing withdrawal from extended morphine pain management, especially those with pre-existing heart conditions. Current literature suggests a synergism between m-OR and dopamine receptor 3 (DRD3). The purpose of this study is two-fold. It aims to show that using a DRD3 agonist (DRD3ag) as an adjunct therapy to morphine improves pain tolerance by preventing the desensitization of pain receptors. Additionally, it aims to show that DRD3ag preserves cardiac function in mice withdrawing from morphine, compared to those withdrawing from morphine alone. 30 mice were randomly divided into 5 groups (G1-G5) and given morphine (2 mg/kg/day) for 7 days (D7). Two groups were euthanized after morphine tolerance was established at D7 (G1, morphine only; G2 morphine + DRD3ag). The other 3 groups (D14) underwent a 7-day period of morphine withdrawal (G3, withdrawal no treatment; G4, morphine+DRD3ag until D7 followed by withdrawal; G5, D7 morphine and withdrawal + DRD3ag). Echocardiography was performed on each animal at D0 to establish a baseline for cardiac function, on D7, and again on D14. Histology and immunoblotting were conducted on the left ventricle (LV) to measure tissue fibrosis; collagen 1 deposition; myocyte hypertrophy; and Col1a1, Col3a1, DRD1, DRD3, SMAD2/3, and SMAD2/3-p expression. Pain tolerance testing indicates significantly decreased sensitivity to pain in animals receiving DRD3ag adjunctive therapy, compared to animals receiving only morphine. Echocardiography shows preserved cardiac function in animals treated with DRD3ag. Picrosirius red (PSR) staining showed significantly less fibrosis in animals receiving DRD3ag, independent of time. Significantly decreased cardiomyocyte hypertrophy was noted in all groups receiving DRD3ag after morphine withdrawal. Immunoblotting shows increased Col1a1 and Col3a1 expression in morphine only groups. DRD1 expression was increased in groups treated with DRD3ag compared to their morphine-only counterparts, while DRD3 expression remained unchanged across all groups. Lastly, increased SMAD2/3 phosphorylation occurred in groups withdrawing from morphine, indicating a likely upstream pathway for the observed morphine-induced fibrosis. Our data suggests that using DRD3ag as an adjunctive therapy with morphine improves pain management and decreases morphine-induced cardiac dysfunction. Additionally, using DRD3ag during morphine withdrawal shows cardioprotective potential that should be further studied for its therapeutic advantages over morphine administration alone.

Title:
Food Insecurity Associated with Increased Weight Gain and Sugar Sweetened Beverage Intake

Authors and Affiliations:
Thomas George, BS, Brody School of Medicine at East Carolina University
David Collier, MD/PhD, Brody School of Medicine at East Carolina University

Background:
Adverse childhood experiences have been correlated with not only obesity, but many of the leading causes of adult morbidity and mortality in the U.S. Unfortunately, due to the sensitivity of some of the questions pertaining to adverse childhood experiences, posing them to children and parents can be challenging. We navigated this challenge by using food insecurity (an adverse childhood experience) as a surrogate for adverse childhood experience exposure.

Objectives:
To determine the association of adverse childhood experiences exposure with initial BMI-Z-score, BMI-Z Score at first follow up and baseline sugar sweetened beverage consumption.

Methods:
Research design: Retrospective cohort study
Research setting: Pediatric Healthy Weight Clinic
Participants: 194 patients selected by convenience sampling from 2018 to 2019. Outcomes: food security status, initial sugar sweetened beverage intake, body mass index z-score, body mass index z-score at first follow up. All data taken from nutritional intake questionnaire.

Results:
9 patients failed to answer pertinent portions of survey and were therefore excluded from certain portions of the study. 50 of the 185 participants use in the study self-identified as having some form of food insecurity. Initial body mass index z-score significantly higher in the food insecure group, although this trend was not seen across all races studied. Baseline sugar sweetened beverage consumption was significantly higher in the food insecure group compared with the food secure group with considerable variance among races. No difference in 6-week follow up body mass index z-score when comparing those without and without food insecurity, again with considerable variance amongst races.

Conclusion:
Food insecurity was shown to be associated with overall higher BMI Z-scores and sugar sweetened beverage intake. This opposite correlation was seen in the black subgroup. Food insecurity associated with increased weight loss at first follow up among Hispanic and White individuals with the opposite trend seen among black individuals.

Title:
INTERACTION OF PROTEASE-ACTIVATED RECEPTORS IN VASCULAR SMOOTH MUSCLE GROWTH PATHOLOGY

Authors:
Sean C. Johnson, Michael T. Bullock, Nathan A. Holland, David A. Tulis
Department of Physiology, Brody School of Medicine at East Carolina University

Background:
Protease-activated receptors (PARs) are G protein-coupled receptors (GPCRs) that are cleaved and activated by extracellular proteases. PAR activation is notably known for involvement in platelet activation, which contributed to development of FDA-approved anti-platelet drugs such as Vorapaxar for the prevention of secondary thromboses. PAR activation has been theorized to regulate, at least in part, pathologic growth of vascular smooth muscle (VSM), yet discrete mechanisms have yet to be elucidated. The goals of our project are to determine if PAR2/4 signaling is upregulated in response to vascular injury potentially contributing to pathological vascular remodeling and to determine regulatory involvement and interaction of PARs, specifically trypsin-sensitive PAR2 and thrombin-sensitive PAR4. We hypothesized that PAR2/4 expression and activity would be upregulated in the response to experimental vascular injury. Secondly, considering earlier data showing that PAR2 and PAR4 form a heterodimer during normal membrane trafficking, and that PAR4 can rely on other PARs as cofactors to elicit biological effects, we hypothesized that PAR2 serves as a biological cofactor for PAR4 in VSM growth control.

Methods:
An experimental in vivo model of carotid artery balloon injury, Western blot analyses, and Erk1/2 phosphorylation were used to determine expression and activity of PAR2 and PAR4 before and after injury. In vitro VSM cell culture, we investigated the cooperativity of PAR2/PAR4 using PAR2/4-selective agonist and antagonists.

Results:
Injured carotid arteries showed increased expression and activity of PAR2 and PAR4 compared to uninjured arteries 30 minutes post-injury, suggesting their involvement in pathologic growth in in vivo vasculature. Interestingly, under in vitro conditions, pretreatment of primary VSM cells with a PAR2 agonist or a PAR2 antagonist individually reduced PAR4 activation compared to vehicle-treated controls.

Conclusion:
This data showing induction of PAR2/4 following arterial injury as well as the susceptibility of PAR4 to be inhibited by PAR2/4 control in cultured cells suggest that exogenous modulation of PAR2 may inhibit PAR4 activity in response to an agonist. Further, we postulate that co-endocytosis of PAR2 and PAR4 following manipulation of PAR2 may be a mechanism underlying these observations. While these preliminary data highlight the biological importance of PARs in vascular growth, further work is needed to fully understand the interactions among PAR family members in mechanisms underlying vascular growth pathology. We are advancing our work to unravel this cooperative PAR2/PAR4 relationship as it could potentially identify unique therapeutic pharmacologic targets that could help prevent or reduce abnormal VSM proliferation foundational to CVD.

Acknowledgements:
We would like to acknowledge Dr. Shaquria P. Adderley, Joshua M. Morgan, and Jake T. Francisco for their valuable contributions to this work.

This work was supported by National Heart, Lung and Blood Institute awards R01HL81720 and R15HL135699 and by an ECU Interdisciplinary Research Collaboration Award.

Also, we would like to thank Dr. Kori Brewer and everyone involved in the Summer Scholars Research Program through the Brody School of Medicine at ECU for their support.

Title:
Does a Medical Home Buffer the Association Between Child Poverty and Poor Health?

Authors:
Rebecca M. Jones, RN, BSN;[1] Chidiogo Anyigbo, MD, MPH;[2] Hannah Morris, BA;[3] Dmitry Tumin, PhD;[3] Shaundreal Jamison, MD[3]

[1] Brody School of Medicine at East Carolina University, Greenville NC
[2] Children's National Health System, Washington DC
[3] Department of Pediatrics, Brody School of Medicine at East Carolina University, Greenville NC

Background:
The medical home has been proposed as a way to improve health outcomes of children living in poverty. However, children living in poverty face challenges to medical home access and little is known about how the effectiveness of the medical home among children living in poverty compares to its effectiveness among children not living in poverty.

Objective:
Evaluate effects of the medical home on health status and health care use among children experiencing poverty and as compared with children not experiencing poverty.

Methods:
Data from the 2016-2018 National Survey of Children's Health were used to examine the associations of overall health, preventative medical and dental care, specialist care, unmet health care needs, and emergency room visits with having a medical home. The medical home was defined using a composite measure with 5 components (having a personal provider, having a usual source of care, access to needed referrals, receipt of care coordination and receipt of family-centered care). Multivariable logistic regression with interaction terms between poverty (family income <100% Federal poverty level) and medical home access was used to estimate the impact of the medical home for each group defined by poverty status.

Results:
In our sample (N= 98,598 children ages 0-17) children experiencing poverty have less medical home access (28%) compared to those not experiencing poverty (72%). In multivariate logistic regression models (**Table**), medical home access was favorably associated with general health and unmet health care needs, and was associated with increased health care use of each type. All interaction terms between poverty status and medical home access were not statistically significant, indicating the effects of a medical home were of the same magnitude regardless of family income.

Conclusions:
Medical home appears effective at promoting child health among children living in poverty and those not living in poverty. However, the equivalent benefits of the medical home between these groups imply that health disadvantages associated with poverty persist even among children who had access to a medical home. Further work is needed to understand which mechanisms of poverty the medical home may not be able to overcome, and enhance the efficacy of the medical home for addressing the health care needs and social determinants of health of children living in poverty.

Table. Multivariable logistic regression models of study outcomes.

Independent variable[a]	Dependent variables					
	Fair/poor health	**Preventive care**	**ED use**	**Dental care**	**Specialist care**	**Unmet health care needs**
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Medical home						
Among children not living in poverty	0.50 (0.37, 0.68)	1.60 (1.36, 1.87)	1.10 (1.01, 1.20)	1.33 (1.22, 1.44)	1.36 (1.26, 1.47)	0.45 (0.35, 0.58)
Among children living in poverty[b]	0.55 (0.34, 0.88)	0.97 (0.58, 1.62)	1.02 (0.83, 1.26)	1.47 (1.16, 1.86)	1.44 (1.15, 1.80)	0.46 (0.30, 0.71)

[a] All models control for child age, sex, race/ethnicity, household structure, parents' educational attainment, child's health insurance coverage, special health care needs status, and region of residence.
[b] For all outcomes, magnitude of the medical home coefficient was not statistically significantly different between children living and poverty and children not living in poverty (interaction OR $p>0.05$).
CI, confidence interval; ED, emergency department; OR, odds ratio.

Title:
Cardiovascular fitness among young adolescents: local and school-level exercise opportunities predict baseline fitness

Authors:
Opper, Chloe; Lazorick, Suzanne; Bian, Hui; Jilcott Pitts, Stephanie B

Background:
Schools are common settings for interventions to improve cardiovascular fitness and weight status, and social determinants of health (SDH) can support or impede these efforts. The Motivating Adolescents with Technology to Choose Health™ (MATCH) wellness program has been in middle schools in North Carolina since 2006, currently reaching nearly 10,000 youth annually. We have demonstrated previously that a cumulative score of environmental determinants predicted better participant baseline cardiovascular fitness testing (results of PACER test), but it was not known if sub-categories of SDH determined the relationship.

Objective:
Using measures of SDH around middle schools participating in MATCH, analyze predictors of baseline PACER results in young adolescents.

Design/Methods:
We used existing cross-sectional data from the 2017-18 school year from MATCH in 47 schools. The analysis of linear mixed models was conducted to examine the effects of local and school-level determinants on baseline PACER score while controlling sex and age at individual level. Sub-scales included: physical activity (PA) opportunities (physical education, physical activity, exercise access), poverty (free/reduced school lunch, median household income, child poverty, housing problems), healthcare access (primary care provider and school nurse ratio, rurality, mental health access), nutrition (food environment index,water availability and access, snack availability, nutritional environment), safety (county safety and suspension rate), and school academic performance.

Results:
Analyses included 4,222 participants, half female, with mean age 12.8 years. Estimates of fixed effects on baseline PACER showed that better PA opportunities ($b = 3.51$, $p = 0.04$) and male sex ($b = 9.75$, $p = 0.00$) had significant effects on PACER. However, no significant effects were found of poverty, health access, school performance, nutrition, safety, and age.

Conclusion(s):
Results suggest that focusing on physical activity opportunities in and around schools can have positive impact on cardiovascular health of young adolescents and may have more impact on fitness in this age group than other health determinants; longitudinal studies and/or interventions can explore further this relationship.

Title:
Severe Neuropathy and Erectile Dysfunction After Androgen Deprivation and Cavernous Nerve Injury Are Improved With Testosterone Administration

Authors:
Shelby A. Powers, Michael R. Odom, Jennifer C. McMains, Elena S.Pak, Johanna L. Hannan
Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC

Background:
Testosterone (T) is essential to maintain neuron health and to recover from neuropraxia. Neuronal injury from prostate cancer treatments, such as radical prostatectomy (RP) and androgen deprivation therapy (ADT), are implicated in erectile dysfunction (ED). Nerve injury from RP during periods of low T increases the incidence and severity of ED. Our objectives were to: 1) examine the effects of bilateral cavernous nerve injury (BCNI) during T deprivation on both erections and major pelvic ganglia (MPG) neuron survival, growth, and regeneration; and 2) assess if T supplementation restores erections and MPG health.

Methods:
Male Sprague-Dawley rats (12 wks, n=9/grp) were separated into 5 groups: control (CON); castrated (CAST); BCNI; CAST and BCNI (C+B); CAST, BCNI and T supplementation (C+B+T). CAST was performed at 12 weeks, and BCNI and T supplementation (3 mg/kg/day) began at 16 weeks. At 18 weeks, erections were assessed by cavernous nerve stimulated intracavernosal to mean arterial pressure (ICP/MAP). MPG neurons were dissociated, cultured and stained for beta-tubulin, TUNEL assay and neuronal nitric oxide synthase (nNOS) to assess length, branching, apoptosis and nitrergic neurons (n=4/grp). MPG gene expression of beta-tubulin (TUBB3), nNOS (NOS1), Schwann cells (GFAP), markers of nerve injury (ATF3) and regeneration (GAP43) was measured (n=5/grp).

Methods:
CAST and BCNI lowered ICP/MAP; however C+B resulted in further decreased ICP ($p<0.01$). Cultured MPG neurons from BCNI and CAST had increased apoptosis, but apoptosis was highest in C+B ($p<0.01$). Compared to CON, BCNI, CAST and C+B demonstrated decreased neurite branching and nitrergic neurons ($p<0.05$) while neurite length was unchanged. MPG gene expression of activated Schwann cells (GFAP) was greatly increased after nerve injury in both androgen intact and deprived rats ($p<0.01$). nNOS positive neurons were decreased while markers of nerve injury and repair (ATF3, GAP43) and TUBB3 were unchanged. T supplementation in C+B rats markedly improved erectile function, suppressed neuronal apoptosis, and increased nNOS neurons ($p<0.01$). Additionally, T decreased GFAP and increased NOS1 gene expression ($p<0.01$).

Conclusions:
The combination of ADT and BCNI caused severe ED and markedly impaired neuronal health. Low T leaves post-RP nerves highly susceptible to increased apoptosis and Schwann cell activation. T supplementation rescued erections, improved neuron health and should be considered for prostate cancer survivors with urogenital dysfunction.

Title:
Ground Level Falls in Patients Aged 65 and Older: Implications for Targeting High-risk Individuals in a Falls Prevention Strategy

Authors:
Saylors S, Longshore S[1], Newell M[1], Guillemette K[2]

1. Department of Surgery, Brody School of Medicine at East Carolina University, Greenville, NC, USA.
2. Center for Research and Grants, Vidant Medical Center, Greenville NC, USA.

Background:
Falls are the leading cause of doctor and ED visits, hospital and nursing home admissions, and accidental death in people 65 years and older. Previous studies have shown the efficacy of a structured interdisciplinary approach, including occupational therapy assessment, to reduce the occurrence of falls in the geriatric population.

Objective:
This study aims to describe the current geriatric population seen for ground level falls and to identify potential targets for a future falls prevention strategy.

Methods:
This retrospective chart review analyzed the demographic and clinical characteristics of 774 patients aged 65 and older that were seen and treated for ground level falls during 2015.

Results:
Most of the patients in this study fell in their own homes (59.5%) and lived in Pitt county (32%) with the next most common counties being Beaufort and Lenoir (6.9% each). Most patients had previous comorbidities and on average were taking 6.5 medications prior to their fall. Patients were predominantly white (84.7%) and more frequently female (63.5%). 24.8% of patients seen had a history of previous falls within the previous 12 months. The most common risk factors for falls that were observed in this study were patients taking ≥4 medications (82.7%), patients with history of arthritis (36.5%), patients with history of stroke/CVA (23.7%), and patients with impaired cognition (14.1%). Of the medications shown to have the strongest links to an increased risk of falling, the most prevalent medications being taken prior to falling were selective serotonin-reuptake inhibitors (28.7%), benzodiazepines (28.2%), anticonvulsants (21.5%), antidepressants (19.5%), and neuroleptic agents (12.4%). There was no significant difference in ICU or hospital length of stay in patients who received a PT consult (ICU LOS: p=0.531; Hospital LOS: p=0.96). Significant predictors of a repeat fall for patients included age (OR=1.036) and prior admission in the past 30 days (OR=6.919).

Conclusions:
Current results show that a majority of the geriatric patients being treated for ground level falls are falling in their own homes. These results also suggest that a significant portion of these patients have predisposing factors known to increase risk of subsequent falls, including the use of 4 or more prescription medications. Further analysis will use these observed characteristics to implement a targeted fall prevention strategy. Success will be based on the reduction in overall occurrence of ground level falls and associated morbidity and mortality.

Title:
Established Medical Education Infrastructure and Human Resources Needed to Provide Practice Facilitation in Rural Primary Care Practices to Improve BP Control

Authors:
B. Lynette Staplefoote-Boynton, M.P.H.[1]; Jacqueline R. Halladay, M.D., M.P.H. [2]; Doyle M. Cummings, Pharm.D. [1] ; Shannon H. Peaden, M.B.A, C.P.F [3]; Alyssa Adams, M.P.H. [1];

1. Department of Family Medicine, Brody School of Medicine at East Carolina University
2. Department of Family Medicine, University of North Carolina at Chapel Hill
3. Eastern Area Health Education Center

Background and significance:
Practice facilitation (PF) can be a useful tool to help guide rural primary care practices develop strategies for improving hypertension related outcomes that address their unique populations and needs. Rural areas, especially in the southeastern United States, bear a disproportionate burden of hypertension (HTN) morbidity and mortality, but have limited resources to address these issues. Understanding the resources needed to provide practice facilitation in rural areas can help providers, healthcare administrators and public health officials when considering PF in ongoing quality improvement efforts. This abstract provides an overview of the infrastructure, training, and time resources used by the Southeastern Consortium for BP Control Study (SEC-BPC) to provide PF.

Methods:
The SEC-BPC is a cluster-randomized, pragmatic, comparative effectiveness trial that compares 3 interventions with enhanced usual care, to improve BP control among rural African Americans with uncontrolled BP. Ultimately 80 primary care practices (50 practices in AL and 30 practices in NC) will be randomized into 1 of four arms: 1) enhanced usual care (control group), 2) practice facilitation, 3) peer coaching, or 4) practice facilitation plus peer coaching. Twenty-five (n=25) African American patients with uncontrolled HTN at each practice (total n=2000) will participate.

The PF intervention (50% of practices) includes an initial meeting with a core group of clinic providers and/or staff that agree to be involved in quality improvement efforts. Practice facilitators communicate at least monthly with a practice champion via onsite visits or phone meetings and supplemental emails in between visits, over a total of 12 months. Practice facilitators follow the Model for Improvement to build internal practice capacity for QI and engaging in data driven quality improvement. Additionally they embed their activities in Key Drivers of Implementation such that they can rate not only if practices are engaging in new activities, but also having them become part of the fabric of every day operations. The SEC-BPC leverages the existing PF infrastructure of the NC Area Health Education Center (AHEC) to provide field experience and ongoing training. Practice facilitators in AL are hired through their regional AHEC, with the hope of establishing their own practice support program over time. Each practice facilitator is trained and certified through the University of Buffalo Practice Facilitation program and participate in twice monthly webconferences to share best practices, and to problem solve on how to move practices forward.

Practice facilitators use an electronic data collection tool, to track progress being made for each practice, the amount of time they spent in supporting practices in completing PDSAs, and the type of interaction they had (e.g. onsite, email, phone, remote access, driving).

Results:
To date there are data for 24 practices receiving the PF intervention. Regarding payer mix, the average percentage of patients covered by either Medicaid, are dually eligible (Medicare plus Medicaid), or are uninsured is 26.7% (SD 13.1), 8% (SD 8.4) and 23.4% (SD 22.5) respectively. Of practices in the arms receiving PF, 36% are certified by the National Committee for Quality Assurance (NCQA) as Primary Care Medical Homes (PCMH). Further, 40%, 60%, and 32% of these practices respectively report that they 1) already had a registry of hypertensive patients, 2) implement an evidence-based protocol to address hypertension, or 3) have established support systems to help patients with hypertension self-management.

Per practice, per month, practice facilitators reported spending an average of 301 minutes on all activities (SD = 98), 93 minutes physically onsite (SD = 31), 50 minutes communicating via email (SD=20), 18 minutes on phone calls (SD=21), 2 minutes via remote access (SD = 5), and 138 minutes driving to and from a participating practice (SD = 75).

Conclusion:
Preliminary data suggests that providing PF to rural practices using centralized staff requires substantial investment of time and resources. More information is needed to gain a better understanding of the time and resources used by providers and clinic staff to interact with practice facilitators and to complete PDSA cycles. At the end of the intervention, providers and clinic staff that work with practice facilitators will be given a satisfaction survey that will provide more insight into their experience with the practice facilitator. Collecting this detailed process information throughout implementation of the study provides important information needed to document the fidelity of the intervention and to help with future strategic planning and allocation of resources.

Service-Learning Distinction Track

Title:
Closing the Gap: Incorporation of Sexual and Gender Diverse Standardized Patient Cases in Medical Education

Authors:
Matthew Drake, Mansi Trivedi, Sean Johnson, Zack Taylor, Stephen Charles PhD, Brandon Kyle PhD, Kelley Haven MD
Brody School of Medicine, East Carolina University

Introduction:
Despite societal advances, significant health disparities still impact LGBT people. One factor is a lack of medical education on providing LGBT culturally competent care. At ECU, we identified that only three hours of our curriculum were dedicated to LGBT healthcare. To address this gap, we created a LGBT Objective Structured Clinical Examination (OSCE).

Methods:
The OSCE was created for first- and second-year medical students. It consisted of a lecture, two patient encounters with feedback time, and a large group debrief. Pre and post Likert scale surveys recorded participants' attitudes on the importance of LGBT health care and their confidence in providing it. ECU's LGBT Resource Office recruited community volunteers to act as standardized patients. Patient cases were written for volunteers utilizing resources from the AAMC's MedEd Portal.

Results:
A total of nineteen medical students participated in three OSCEs. Most students identified LGBT health topics as important on pre-survey but expressed low confidence. In the post-survey, there was an increase in confidence on all topics measured, such that participants were at least "moderately confident" in 4/5 categories. The greatest improvement occurred in counseling patients with gender dysphoria.

Discussion:
While medical students recognize LGBT healthcare as important, they do not feel confident caring for this population. Our results suggest a LGBT OSCE is helpful in improving student confidence and would be beneficial in medical education. Particularly, it may provide practice for skills difficult to cover in a lecture format, such as inquiring about sexual orientation/gender identity or counseling a patient.

Title:
Sociocultural barriers to medical care for pregnant, Latina women with diabetes in Eastern NC

Authors:
Lauren E. Geisel B.S.[1], Noopur S. Doshi B.S[1], Kaylin R. Prestage B.S.[1], Jessie Tucci-Herron B.A[1], Irma Corral PhD., MPH[1], and Sarah E. Smith M.D.[1]

Affiliation:
1. The Brody School of Medicine, Greenville, NC, USA

Introduction:
Latina women in NC are at significantly increased risk of developing gestational diabetes in comparison to non-Hispanic whites. Little is known about possible sociocultural factors that may explain this health disparity for this population, especially in rural settings. The purpose of this pilot study was to examine possible behavioral and sociocultural barriers to care among pregnant Latina women with a current diagnosis of gestational diabetes in (rural) Eastern North Carolina.

Methods:
Participants were patients at a Regional Perinatal Center. They were approached during their non-stress test appointment and asked to complete an anonymous 2-page survey in either English or Spanish. The survey assessed basic information about current and past pregnancies, diabetes-related knowledge and behaviors, current access to medical care, and perceived barriers to medical care.

Results:
The average participant was in their 3rd pregnancy, with 41% reporting gestational diabetes in prior pregnancies. Knowledge of the seriousness of diabetes was moderate (50%), but knowledge of glucometer use, and current medication adherence were both high (91%), and the majority (77%) knew where to get care. Significant barriers to care included problems paying for the cost of medical care (77%), lack of social support to get to appointments (50%), and problems with transportation (41%). Language was not perceived as a significant barrier by the majority of the sample (64%), although 73% of the sample opted to complete the survey in Spanish.

Conclusion/Implications:
These preliminary findings suggest that cost-reducing or transportation interventions may be the most useful targets for future interventions for this population.

Title:
Empowering Trainees With the Tools Needed to Deliver Effective Palliative Care to Vulnerable Patients

Authors:
Robin Harrison, B.S.[1] Tai Lee, M.D.[1]

Palliative Care: two words that make most people either freeze in fear or crumble in dread. Usually stigmatized and associated with hospice or giving up hope for recovery, palliative care issues are avoided not only by patients and their families but unfortunately also by physicians. It is true that palliative care reigns over end-of-life scenarios, but the versatility of the specialty extends also to those with chronic and debilitating diseases, or those experiencing temporarily extreme symptoms. Everyone ideally should have some level of palliative care at any stage in their life, since at its core palliative care simply means symptom management, optimizing quality of life, and defining goals of care. These are hard conversations for patients and families to have and think through, so their apprehension about the topic makes sense. The apprehension of physicians to bring it up is less justified. Why are doctors so uncomfortable talking about death? Or, if they do talk about it, why are they often so *bad* at it?

Knowing where to start is a huge barrier to many physicians desiring to have palliative care discussion with patients. Palliative care is not a required rotation for medical students, so in-depth understanding of the topic is not usually attained at that level. Residents may rotate on, work with, and sit through lectures about palliative care, but watching is not the same as doing. Palliative care patients are vulnerable because they are often not getting the care they deserve – to either live with difficult symptoms and conditions or to die with dignity.

In an attempt to better serve this population, a learning document was created to help physicians become comfortable with providing palliative care for patients and their families. Working with the palliative care team at Vidant Medical Center, a list was generated of commonly encountered difficult palliative care situations. Interviews were then conducted with a variety of palliative care team members asking how they navigate those scenarios. Their insight was compiled into a document full of helpful key phrases and general advice. The final document will be used for future medical students rotating on the palliative care service and is slated to be distributed and discussed as a class session during the graduating medical student's Transition to Residency course. It is hopefully the first step of many to make palliative care less intimidating for physicians and therefore more attainable for patients.

[1] Brody School of Medicine at East Carolina University

Title:
Expanding the Syringe Services Program in Eastern North Carolina

Authors with affiliations:
Danae Massengill, BS, Brody School of Medicine at East Carolina University
Diannee Carden-Glenn, Syringe Exchange Program Founder

Background, Rationale or Need:
Deaths from drug overdoses pose a national public health burden. Despite increasing awareness of the opioid epidemic, such deaths continue to rise at an alarming rate in the United States. While North Carolina was one of 15 reported states to see drug overdose death rates decrease from 2017 to 2018, Pitt County in particular saw a 150% increase opioid overdose calls to Pitt County's EMS in 2019.

Syringe services programs (SSPs) are one stride in addressing this public health crisis. SSPs were legalized in North Carolina in July 2016, and the SSP serving Pitt County (ekiM for Change) was started in October 2017.

Thus, in order to assess the perceived success of Pitt County's only SSP, we wanted to know what changes could be implemented to expand the number of individuals that our program impacted and better serve those who come on a regular basis.

Methods or Description:
We administered a sixteen-question survey in conjunction with the CDC and the Pitt County Health Department addressing demographic information and potential venues for improvement.

Results:
A total of 28 ekiM participants completed the survey.

	Male n (%)	Female n (%)				
Sex	15 (54)	13 (46)				
Age (years)	18-24 n (%)	25-29 n (%)	30-39 n (%)	40-49 n (%)	50-60 n (%)	>60 n (%)
	1 (.04)	4 (.14)	12 (.43)	6 (.21)	4 (.14)	1 (.04)

	Yes n (%)	No n (%)	Participant comments (copied verbatim)
Satisfied with overall program	28 (100)	0 (0)	
Satisfied with location	28 (100)	0 (0)	
Satisfied with timing (Saturdays 12-4pm)	27 (96)	1 (4)	"Wish it was during the week too" "Would like to see it during the week" "Maybe one hour longer"

	Yes n (%)	No n (%)	Participant comments (copied verbatim)
Satisfied with the current supplies provided (Ex: syringe gauges, naloxone, ties, cookers)	15 (54)	2 (7)	"I like everything" "Love all you have just wish we could have more cards" "I am happy with everything" "Gauges"
Requested additional supplies	1 (4)	17 (61)	"Short shorts"
Return used syringes at SEP	25 (89)	3 (11)	"Trash" "My sis works at hospital, my sister disposes"
Satisfied with community resources and information provided	28 (100)	0 (0)	
Would like to see information on safe injection, infection prevention or abscess care	18 (64)	9 (32)	
Have been treated for a substance use disorder	22 (79)	6 (21)	
Have had to reverse someone from an overdose	24 (86)	4 (14)	Prefer intramuscular (IM) or nasal naloxone? IM 4 Nasal 8 Both 3 "nasal doesn't really work"
Would attend CPR classes	21 (75)	7 (25)	
Would attend support groups to talk about disease processes, such as HIV and Hepatitis C	17 (61)	11 (39)	
Would tell friends and peers about ekiM for Change	28 (100)	0 (0)	
Other comments			"Yall doing a great job. Thanks for all you do." "No" "Not at the moment" "Very happy" "None" "No" "More than one day a week if possible"

			"Not at the moment" "Awesome program! Awesome leader!" "Not right off hand but if I can think of anything I will let you know" "Not today!" "No"

Conclusions, Potential Impact or Lessons Learned:
Overall, the participants were satisfied with the services provided, but identified venues for improvement, such as expanding the hours and educational materials provided. We have developed educational materials on hepatitis A, B and C, and are working with the health department to organize vaccination days for hepatitis A and B. We will continue to develop our educational materials and explore ways to address the rising death rates from other drugs of abuse.

Title:
Child Passenger Safety: Parental Assessment and Education in General Pediatric Clinic and Neonatal Intensive Care Unit

Project Team Members:
Leaders: Yasamin Sanii and Katherine Mulligan
Faculty Mentor: Dr. Ryan Moore
ECU Outpatient Pediatrics Clinic contact: Dr. Shaundreal Jamison
Community Partner: VMC Injury Prevention Program, Ms. Ellen Walston
NICU contact: Ann Sanderson and Jessica Scheller

Motor vehicle collisions (MVC) are one of the leading causes of death and injury in the pediatric population. While car seat use reduces the risk of MVC-related injury by 71-82% compared to seat belt use alone, the National Highway Traffic Safety Administration reports that up to 72% of car seats are used incorrectly in a manner that may increase injury risk in the event of a crash. This project aimed to: 1) identify gaps in parental knowledge of child passenger safety and practical car seat use and 2) assess the impact of an educational intervention on parental knowledge. Parents of children 0-30 months were eligible to participate in the study. The study was conducted as part of well child visits to the ECU Pediatrics Outpatient clinic or through existing NICU discharge courses at Vidant Medical Center in July of 2019. Parental theoretical knowledge of motor vehicle safety topics was assessed before, immediately after and 2-4 weeks after the parent received car seat safety and pediatric passenger safety education. Parent's practical knowledge of car seat safety was assessed using a hands-on, interactive curriculum involving physical car seats. Car seat misuses identified were subsequently addressed either through verbal education or hands-on education by adjusting the parent's car seat to fit best practice standards. Preliminary data illustrates that although many parents have significant theoretical knowledge of car seat safety, 89.5% of parents initially demonstrated one or more car seat misuses either when verbally reviewing car seat practices or during the hands-on portion of the intervention. This finding illustrates the need for practical skills assessments and additional education of parents.

Title:
Development and Acceptability of Pregnancy-Related Educational Videos in the High-Risk Obstetric Clinic - A Small Scale Pilot Study

Authors:
Brandon Yates, MS; Mansi Trivedi, BS; Whitney Green, MS; Radhika Kothadia, BS; Paul Swaney MD, MPH.

Purpose:
To conduct a pilot study to understand the effectiveness and feasibility of introducing pregnancy related educational videos for high-risk obstetric patients.

Background:
Healthcare professionals and prospective parents consider pregnancy-related education important for achieving positive health outcomes. Several quantitative studies have demonstrated that mothers want an equal emphasis placed on postnatal issues within their antenatal education classes. There are often limitations to antenatal classes such as time constraints, limits on the breadth of topics covered, and the mode of delivery of information. Taking into consideration the varied health literacy of patients, traditional reading materials and lecture-oriented methods may not be the most effective tools for education. Utilizing technology, such as videos, can serve as an engaging and attractive vehicle for delivering information to patients of all health literacy levels.

Methods:
Contraception, lactation, postpartum red flags, and postpartum depression were chosen as educational video topics based on clinical experience. Medical information was reviewed in a collaborative effort and checked against the Association of Professors of Gynecology and Obstetrics (APGO) educational videos, UpToDate and additional resources. We developed story-board outlines and scripts in conjunction with the Multimedia & Animation Services at East Carolina University. These videos were then transferred to six IPads' with a survey and placed in the high-risk obstetric clinic at East Carolina University. Participants were able to choose the video to watch that they felt was most interesting or relevant. At the end of each video, patients were asked to complete a survey with demographic information and a five-point Likert scale assessing the video's effectiveness.

Results:
100% of patients strongly agreed or agreed that the videos were an effective learning tool and 95% stated that the information presented to them was relevant to them, as a patient._In addition, 95% of respondents strongly agreed or agreed that they found the information in the videos were presented in an understandable language. 95% of the respondents strongly agreed or agreed that they learned something new from the videos. Additionally, 100% of respondents strongly agreed or agreed that the videos were offered at a convenient time and 95% would recommend these videos to other pregnant patients.

Conclusion:
The introduction of pregnancy-related early educational videos in a hospital-outpatient clinic setting serves as an effective learning tool for expectant mothers and their partners. Going forward, this resource could be shared in other obstetric clinics and further topics could be developed.