

2024 Distinction Symposium Abstracts

Distinction in Bioethics

Michael Enich

What Can Palliative Care Teach Us About Addiction Medicine?

Project Mentor: Dr. Eric Singer

This narrative ethics project reviews the case of Mae, a person who used drugs who would die of a preventable severe bacterial infection. At the end of her life, a friend would administer the heroin she would otherwise have administered herself to make her feel comfortable; her case progressed to this severity because she refused to present to a hospital that had previously treated her so poorly due to stigma around her drug use and chronic pain.

This case highlights issues in addiction medicine, pain medicine and palliative care and ultimately lead me to explore a central question—each of these fields spends some time managing controlled substances in order to meet patient goals. How then, are they actually different? Besides the obvious, it became clear through that palliative care values patient autonomy and self-determination arguably the most of these fields. Through the narrative I suggest that addiction medicine, in appropriate contexts, may benefit from embodying this perspective more.

Jennifer E. Geller and Juliana E. Kim

COVID-19 Vaccine Distribution: A Current Ethical Assessment

Project Mentor: Dr. Eric Singer

With the declaration of COVID-19 as a global pandemic on March 11, 2020, difficult discussions concerning the ethical allocation of limited resources such as ventilators began. With the approval of vaccines worldwide, the conversation has pivoted to how to ethically and efficiently distribute vaccines worldwide to achieve global herd immunity. As vaccine distribution progresses in countries such as the United States, and stalls in others such as India, the strategy of vaccine allocation must be revisited. In doing the greatest good for the greatest number of people, efforts must target those who are vulnerable and from poorer countries to not only distribute the vaccine but establish a vaccine administration program. In addition to being a moral quandary concerning human rights, the breakdown of proper primary prevention poses the potential development of perpetual variants that can further destroy the world economy as a result. This review piece seeks to describe the present status of vaccine distribution to assess where wealthier nations need to go from here in protecting the world stage.

Juliana E. Kim

Survey of Informed Consent Procedures in Urology

Project Mentor: Dr. Eric Singer

Introduction:

The American Urological Association (AUA) and American College of Surgeons (ACS) codes of professionalism require surgeons to disclose the specific roles and responsibilities of trainees to patients during the informed consent process. The objective of this study is to analyze how these requirements are met by urology training programs.

Methods:

An anonymous electronic survey was distributed to the program directors (PDs) of the 143 Accreditation Council for Graduate Medical Education (ACGME) urology residency programs in the US in 2021. Responses were procured over three months. Information was collected regarding program demographics, aspects of the program's consent process, and the disclosure of the role and participation of residents to patients.

Results:

Of 143 distributed surveys, 30.0% (N=43) received a response. 67.4% of responding PDs reported that attending physicians lead the consent process. The topics covered during consent discussion include: possible complications (25.1%), expected recovery time (22.8%), length of the surgery (22.2%), the people involved (18.0%), and their specific roles (7.2%). 48.8% and 87.8% of PDs do not explicitly discuss trainee involvement or when a resident performs the majority of the case, respectively (Figure 1). 78.8% of PDs do not communicate medical student involvement. 73.2% reported having a patient decline participation of a trainee after describing their role.

Conclusions

Despite the AUA and ACS codes of professionalism, many urologists involved in the training of residents may not disclose resident participation in surgery to patients. Further discussions are needed to explore how to better balance resident education while strengthening the informed consent process.

Distinction in Global Health

Hugh Haring Bartlett

An Ecologic Assessment of Access and Service Delivery for Colombian Neurosurgical Services

Background

Project Mentor: Joseph Hanna, MD PhD

Five million people in low-and-middle-income countries lack access to emergency and essential neurosurgical services (NEES). The Lancet Commission on Global Surgery (LCoGS) core surgical indicators and the World Health Organizations (WHO) framework for health system building blocks enables performance of a granular, objective characterization of national surgical anesthetic and obstetric systems. They can also be leveraged to analyze sub-national service line specific ecosystems to better understand individual disease processes.

Methods

NEES were defined and measured vis-a-vis neuro-trauma, neuro-oncologic, and stroke disease. RIPS and REPS were queried using ICD10 codes to identify all procedures and performing facilities in 2016 and 2019. These data were compiled along with socioeconomic status and mortality statistics to generate an SAO landscape.

Results

Total NEES operative volume increased 2-fold from 2016 to 2019, with 5195 operative cases performed in 2019. With respect to access, 6% of municipios performed neuro-trauma, 19% performed neuro-oncology and 27% performed stroke procedures. Patients earning less than 1 minimum wage were 1.6x more likely to have to travel to another municipio to access NEES care and mortality rates were 1.4x higher among patients who travelled for care related to neuro-trauma.

Conclusions

This study represents a systematic characterization of Colombian NEES using the framework established by the LCoGS and WHO. Colombia is benefited by a data collection system that makes this work possible. While NEES total operative volume has increased 2.2x between 2016 and 2019, access to NEES capable facilities appears insufficient to meet population need and people of low socioeconomic status are affected disproportionately.

Samavia Khan

The Untold Stories of Burn Victims in Pakistan

Project Mentor: Dr. Babar Rao, Rutgers RWJMS Department of Dermatology

Low- and middle-income countries account for 90% of global burns annually. We present the story of the first burn center in Rawalpindi, Pakistan, serving the socioeconomically disadvantaged of rural and urban Punjab. This burn center was established by a small group of visionaries in the basement of Holy Family Hospital. It has now served thousands of patients, treating scald, chemical, and heat burns. Our presentation highlights a retrospective chart review of the most common causes of burns in this province. In addition, we discuss the latest clinical research projects taking place at the burn center that explore the potentials of laser technologies in burn scar healing.

Roshni Rajan

Identifying Disparities in Access to Surgical Care in Colombia

Project Mentor: Joseph S. Hanna, MD, PhD

Objective: In Colombia, an estimated 31% of the population lacks access to emergency and essential surgical, anesthesia, and obstetric (SAO) services when needed. We developed a representation of the SAO landscape incorporating access, capacity, and quality to inform actionable access gap resolution initiatives.

Methods: A database of Colombian operative facilities was compiled using 2016 data abstracted from the national health information system. Facilities were stratified by capacity to perform one, two, or all three Bellwether procedures (cesarean section, laparotomy, open fracture care), identified as B1, B2, B3s. Performance characteristics and location were used to generate a transportation-time informed SAO landscape.

Results: In 2016, 500 Bellwether capable facilities were identified. The majority of B1 and B2 facilities were clustered around B3s resulting in a 1.8% (671,500 individuals) increase in population coverage with 2-hour access. An increase in mean total operative volume (TOV) (435 ± 87 vs. 2607 ± 318 , $p < 0.0001$) and decrease in mortality variability (SD 2.87% vs. 1.13%, $p < 0.00001$) was observed with increasing Bellwether procedure capability. Electrical utility stress was experienced by 0.60% of facilities, and 9.20% of facilities operated in municipalities with poor water quality.

Conclusions: Clustering of Bellwether capable facilities results in minimal improvement in access to essential SAO services for disadvantaged Colombians. Furthermore, lack of access is associated with disparities in social determinants of health such as utility stress. Finally, increasing Bellwether capability is associated with increased operative capacity and better quality. Equitable gap resolution will require multi-disciplinary engagement to develop resource sensitive access expansion.

NaYoung K. Yang, MPH

Novel Community-Based Approach for Enhanced Post-Operative Follow-up in Rural Sierra Leone: Is it Sustainable?

Project Mentor: Ziad C Sifri, MD

Introduction

Barriers to patient follow-up after humanitarian short-term surgical trips (STSTs) are multi-factorial. Follow-up is essential for early detection and management of post-operative complications. Our pilot post-operative protocol for enhanced follow-up previously demonstrated >90% adherence. We hypothesized reduced post-operative follow-up after three years hiatus due to the global pandemic.

Methods

We performed a chart review of our STSTs to Kabala Government Hospital in Sierra Leone in 2017-2019, and subsequently 2022-2023. We used the same community-based post-operative follow-up protocol, emphasizing 1) timely patient education, 2) community leader recruitment, and 3) logistical support from local and volunteer personnel. Demographics, surgeries performed, post-operative follow-up, and complication rates were obtained and analyzed using Fisher's Exact and Wilcoxon Rank Sum Tests for categorical and continuous variables, respectively. Significance was set at $p=0.05$.

Results

A total of 313 patients in five STSTs were studied. Patients during post-pandemic years tended to be older, but there was no difference in gender. Similar surgeries were performed throughout all the missions, consisting mostly of hernia repairs and hydrocelectomies. Our post-pandemic STST's in 2022 and 2023 following a three-year hiatus prior demonstrated > 90% post-operative follow-up rate like previous STSTs.

Conclusions

High post-operative follow-up rates in rural Sierra Leone were sustained despite a pandemic-related gap in surgical trips and distancing safeguards. A multifaceted protocol incorporating the local community and dedicated volunteers can achieve consistently high follow-up rates and accountability in the setting of repeat short-term surgical trips.

Michelle Zhao, MPH

Exploring Perceptions About Contraceptive Counseling with a Focus on East Asian Immigrants: A Local-global Qualitative Study

Project Mentors: Karen Wei-Ru Lin, MD; Jennifer Amico, MD, MPH

Department of Family Medicine and Community Health, Rutgers Robert Wood Johnson Medical School

Concerns of contraceptive coercion are prevalent both globally and among minority women in the United States. Improving contraception counseling practice within a reproductive justice health framework is imperative in promoting positive health outcomes among pregnancy capable populations. There are few qualitative studies that explore contraceptive counseling experiences of diverse populations in the United States. This study aims to explore perspectives and experiences of contraceptive counseling among a diverse population in New Jersey with a focus on East Asian immigrants.

This is a prospective cohort study involving pregnancy-capable persons of reproductive age who attended a contraceptive counseling appointment between April 1, 2020 and March 30, 2023 in an urban New Jersey setting. The first study was stratified into three groups: white, U.S.-born minorities, foreign-born minorities. The second study involved only East Asian immigrants from Taiwan or China. Semi-structured interviews containing 27 questions concerning demographics, experiences with contraception, and contraceptive counseling were conducted and analyzed for pertinent themes.

Participants discussed a variety of preferences for contraceptive counseling. They reported a preference for health care providers who were informative and discussed options for their contraception, which instilled more trust in the provider. While some participants expressed having full autonomy in contraception selection, others reported pressure to choose a certain method. East Asian immigrants more frequently discussed differences in their contraceptive counseling experiences in their home countries versus in the U.S.

Participants indicated diverse preferences and experiences with contraceptive counseling with pertinent overlapping themes. East Asian immigrants discussed cultural barriers relating to health systems. This study provides insight into best practices for contraceptive counseling on a local- global scale.

Distinction in Inclusion and Diversity

Kemi J. Alabi, Veena Bhagavathi, Marissa Carranza, Melanie Babi, and Radhika Narasimhan

Uprooting Structural Racism in Medicine: The Impact of Dedicated Sessions for Preclinical Students

Project Mentor: Brad Kamitaki, MD

Research shows that racism is inextricably linked to health. However, American medical schools include little coverage of race-related health disparities. Any mention of race is often limited to a discussion of microaggressions and cultural competency, rather than addressing racism on a structural level. Given the need for anti-racist medical curricula, the RWJMS chapter of White Coats for Black Lives developed a didactic session on the history of race in medicine. The session, which was mandatory for all incoming first- and second-year students, consisted of pre-reading from Harriet A. Washington's *Medical Apartheid*, a set of lectures from medical professionals and historians, and a small-group discussion facilitated by trained faculty.

The session led to a statistically significant change in attitudes toward structural racism as measured by an average decrease of 2.55 points on the Color-Blind Racial Attitudes Scale, indicating lower "color blindness," and less racial prejudice. Regarding implementation, the majority of students surveyed strongly agreed that the session was applicable to medical education (83.02%) and that the curriculum should include a dedicated session on the history of structural racism (69.81%). Although analysis was limited by the conclusion of the M2 session in a walkout, collected data indicates the session had a significant impact on students' attitudes and that such a session is appropriate, acceptable, and feasible. Further work can focus on measuring the effects of this session through later stages of training, and to bolster the session with more strategies to empower students to address racism in their careers.

Distinction in Leadership in Academic Healthcare

Kayla N. Laraia and Alyssa Pilch

Implementation of a Surgical Culture and Etiquette Workshop for Pre-clinical Medical Students

Project Mentor: Dylan Nieman, MD

Introduction

Professional expectations and social behavior norms of the operating room (OR) are poorly articulated to medical students which can lead to anxiety and impair the operative learning environment. We developed a Surgical Culture and Etiquette Workshop for preclinical students to introduce these poorly defined concepts.

Methods

Needs assessments were performed to identify objectives for the workshop. The half-day workshop began with a 1-hour lecture. A surgical resident spoke about preparing for a case, daily activities of a surgical clerk, OR staff roles and responsibilities, and responding to feedback. A surgical faculty member spoke about student expectations, active involvement in the OR, asking questions in the OR, and language used in the OR. Students then proceeded to one of the two 45-minute small group sessions, facilitated by upper-level medical students or faculty and residents. The student-led session demonstrated OR workflow and patient transfer. Students read excerpts from previous students' surgical clerkship reflections highlighting the emotional difficulty that can arise in surgery. The resident and faculty-led small group sessions patient case discussions. The group proceeded with a knot-tying demonstration with a volunteer demonstrating knot-tying with direct, immediate feedback from the facilitator.

Results

Quantitative and qualitative outcomes from pre- and post-workshop surveys indicated that our objectives were met and introduction to the OR was well received by students.

Discussion

Our novel workshop offers an introduction to the basic workflow and expectations of medical students, providing them with insight that is generally only acquired with time and experience in the environment.

Distinction in Medical Education

Clare T. Flanagan

The Perfect Storm: A Virtual Learning Environment and the USMLE Step 1 as a Pass/Fail Exam

Project Mentor: Hanin Rashid, Ph.D

Purpose: To explore the experience of a cohort of students who started medical school virtually during a pandemic and were also of the first class to take the USMLE Step 1 as a pass/fail exam.

Background: The prevalence of peer interactions in higher education is well-documented. These informal interactions between medical students were lost during the COVID-19 pandemic. In addition, study behaviors likely changed when Step 1 became pass/fail. Combined, these elements provide a unique context to explore students' experience preparing for this exam.

Methods: Thirteen students who sat for Step 1 as a pass/fail exam in the spring/summer of 2022 volunteered to take part in a focus group session. Three 1-hour focus group sessions were conducted over Zoom with 4-5 students in each group. Data was analyzed qualitatively by two-coders using thematic analysis and tracked through ATLAS-Ti software.

Results: Findings revealed significant factors that impacted the learning environment, making students feel uncertain about their readiness to pass Step 1. The largest factors mentioned across all three groups included: social and physical isolation experienced due COVID-19, limited advice from upperclassmen, and a lack of awareness of the amount of studying necessary to pass Step 1. In addition, students detailed elements of support services that were most helpful including: virtual collaborative learning groups, baseline and progress-marker CBSEs, and individualized planning sessions with learning specialists.

Conclusions: The virtual learning environment imposed more independent learning and restricted access to upperclassman who may have modeled the intensity of study required to be prepared for Step 1. However, organized support services

helped students overcome these challenges. This study is limited by being single-institution with a small sample size, although saturation of data was reached after the third focus group. Future studies may focus on the long-term implications of study behaviors learned through Step 1 as a pass/fail exam.

Erica R. Levin

Beyond the Diagnosis: Health Promotion and Anticipatory Guidance in the Pre-Clinical Pediatric Medicine Curriculum

Project Mentors: Dr. Usha Ramachandran, Dr. Betsy Mathew, Dr. Kristen Coppola, Dr. Paul Weber, and Dr. Elizabeth Goodman

Purpose: To evaluate the acceptability and effectiveness of a newly introduced small group session for first-year medical students, designed to build knowledge and confidence in pediatric preventive care.

Methods: All 2022-2023 RWJMS first-year medical students participated in the session, which involved role-playing with faculty members focusing on pediatric history-taking, physical examinations, and anticipatory guidance. Participation was voluntary and anonymous. Pre- and post-session surveys were administered to evaluate changes in student knowledge, comfort, and confidence. Acceptability and impact of the session were assessed through analysis of post-session student feedback. Improvements from this pilot program were incorporated into a revised session for 2023-2024 first-year students. Analysis of the qualitative survey given to these students is ongoing.

Results: Of the 139 pre-session surveys and 68 post-session surveys completed, a significant increase in students' confidence in interviewing children and parents was observed post-session ($p < 0.01$). While there was no statistically significant difference in student comfort levels ($p=0.165$), participants demonstrated enhanced knowledge in providing anticipatory guidance and health promotion ($p=0.029$). The session facilitated better understanding of early literacy promotion through Reach Out and Read (92%). The majority of students found the session format effective (77%) and believed it contributed to their development as future physicians regardless of specialty choice (91%). 86% of participants endorsed offering the session to future first-year medical students.

Conclusion: This pilot session was very well received by medical students and was effective in increasing students' knowledge and confidence in pediatric preventative care. By emphasizing the importance of prevention, anticipatory guidance, and health promotion, this session can educate medical students from early in their careers to approach pediatric medicine from a life-course perspective and a health promotion and prevention lens.

Nadia K. Palte

Improving Study Skills in Medical Students through Spaced Repetition: An Interactive Workshop

Project Mentors: Dr. Kristen Coppola, Dr. Robert Lebeau, and Dr. Hanin Rashid

Introduction:

Medical students spend significant time learning material but often employ less effective methods, such as mass studying or cramming. Spaced repetition is an effective study skill that can significantly improve learning outcomes, but students are often left to learn this method independently. We developed a one-hour-long interactive workshop that teaches students the theory of spaced repetition and the necessary skills to immediately use this method in their studies through the free, commonly used, open-source software tool "Anki."

Methods:

This workshop was designed for first- and second-year medical students. Through an interactive presentation, students were taught the benefits of spaced repetition for long-term memory and a step-by-step approach to using Anki to incorporate spaced repetition into their studies. Pre- and post-workshop survey responses were used to compare students' knowledge, experience, and confidence.

Results:

After attending the session, post-workshop survey results from thirty-three pre-clerkship medical students indicated increased knowledge of the theory of spaced repetition. Furthermore, students' confidence levels were improved across all workshop tasks involving the use of Anki.

Conclusion:

Pre-clerkship medical students had highly positive feedback for this interactive workshop as an effective method of teaching spaced repetition.

Erini D. Papas

Implementing a Clinical Reasoning Assessment Tool at the Transition from Pre-clerkship to Clerkship: An Exploratory Study

Project Mentor: Archana Pradhan, MD

Background: Clinical reasoning is a critical skill learned in medical school, but its teaching is not standardized. The IDEA tool (Interpretive summary, Differential diagnosis, Explanation of reasoning for lead & Alternative diagnoses) provides a framework for assessment and feedback for students (Baker et. al 2015).

Methods: Students entering clerkships at Rutgers RWJMS took part in Simulation, Procedures, Introduction to Clinical Experience (SPICE) week. Students used the IDEA rubric to self-assess history and physicals (H&Ps) (Days 1+4), peer-assess (Day 2), and were faculty-graded (Day 5). One standardized grader assessed the final H&P from 2nd year using the IDEA rubric. Analysis performed using Wilcoxon signed-rank test determined significance between within-subject score values. Nine randomly selected H&Ps were re-graded by faculty to assess inter-grader reliability.

Results: 161 students had data analyzed. On pre-SPICE H&P, 31.48% of students (n=51) did not have passing scores (≥ 7), with most errors in “differential/diagnosis”. Following IDEA rubric introduction during SPICE week, 1.86% of students (n=3) did not have passing scores (Days 1+4).

All pre-SPICE H&P vs Comparison (Day 1/Self, Day 2/Peer, Day 4/Self, Day 5/Faculty) resulted in statistically significant differences ($p < 0.001$). The 9 re-graded H&Ps demonstrated poor inter-rater reliability ($p < 0.0479$).

Implications: Standardized grading of a cohort’s H&Ps using this rubric indicated curriculum-wide areas for improvement. Significant differences in inter-grader reliability point to need for distinct assessor training. There were statistically significant differences in all comparison assessments of clinical reasoning when compared to pre-SPICE H&Ps. Many factors likely play a role in this difference, offering opportunities for continued investigation.

Catherine Roukhadze

Evaluating the Effect of Traditional vs. Virtual vs. Blended Clinical Experience on NBME Shelf Performance

Project Mentors: Archana Pradhan MD and, Hanin Rashid, PhD

The COVID-19 pandemic interfered with delivery of clinical training in undergraduate medical education. At Rutgers RWJMS, curriculum adaptations during the pandemic, included virtual learning and blended learning (combination virtual and in-person experiences), provided an experimental environment to assess impact of curricular innovations on National Board of Medical Examiners (NBME) subject (“shelf”) exam performance.

In March, traditional 6-week in-person core specialty clerkships were interrupted and students postponed their shelf exam to various times throughout 2020. Students were stratified based on approximated test-taking ability using previous STEP1 scores. Shelf exam scores and number of days post traditional-clerkship end were evaluated to assess impact of timing on test scores. During the hiatus, students completed 2-week specialty-based virtual didactics, with an additional 4-week clinical experience when clinical training resumed. Students chose to take the shelf exam either after the virtual didactics but before clinical experience or after completion of both experiences. Shelf exam scores for students virtual or blended clinical experiences v. traditional were analyzed using paired t-test.

Students on virtual clerkship in the top 25% and middle 50% of test-takers out-performed themselves on traditional clerkships ($p < 0.05$, $p < 0.01$) while performing no differently in the bottom 25%. Students on the blended clerkship showed no change in performance (p -value 0.06). Additionally, students who took the examination closer to end of traditional experience performed better than students who delayed the exam.

Both virtual and blended teaching modalities did not hinder shelf exam scores. Reducing the competition between study time and clinical demands may have contributed to an increase in scores despite lack of clinical exposure. Re-considering timing of testing in the curriculum may improve test scores and emphasize focus on developing clinical skills.

Ruchi Tejwani

Evaluating Medical Student Comfort in Obtaining Informed Consent After Implementation of Preclinical and Clinical Interventions

Project Mentor: Archana Pradhan, MD

Background:

The AAMC outlines 13 Entrustable Professional Activities (EPAs), or competencies expected of all graduating medical students. EPA11 is the ability to obtain informed consent, and Rutgers RWJMS provides a lack of comprehensive education and practice on this topic. We surveyed RWJMS class of 2022 graduating M4s and ~50% of students feel uncomfortable and unprepared to perform this skill. By giving medical students more preclinical instruction and standardized clinical practice, we hope students will perform better and feel more confident in their abilities to obtain informed consent from patients.

Methods:

For the class of 2024, a lecture on informed consent for blood transfusions (ICBT) was given during SPICE week to bridge the gap between preclinical education on blood transfusions with what is expected of clinical students, including a pre and post-test. An OSCE mimicking the M4 bootcamp OSCE was added to an M3 clerkship for students to practice ICBT.

Results:

The SPICE week lecture significantly increased student knowledge of ICBT; for classes 2024 and 2025, there was a statistically significant increase in knowledge on the post-test. In both groups with an alpha of 0.05, p was < 0.05 with a 95% CI excluding zero.

Conclusions:

The implementations added to the RWJMS curriculum had a measurable impact on student comfort and skill thus far, and it is safe to predict that these effects will carry through the class of 2024's M4 bootcamp, resulting in increased comfort with EPA11, and these implementations should continue for the classes of 2025 and beyond.

Evelyn Wu

The Effect of an Interdisciplinary Case Discussion (ICD) and Lecture on Knowledge and Attitudes towards Eating Disorders

Project Mentor: Diana Glendinning, PhD

Introduction: Approximately 20 million females and 10 million males between the ages of 12-25, in America will develop an eating disorder [1]. Unfortunately, negative stereotypes and attitudes from the health care system about eating disorders form a barrier to seeking treatment. Research has shown that physicians and other healthcare professionals have stigmatizing attitudes about eating disorders, which develop from misperceptions that may not have been sufficiently challenged during their training [2, 3]. It has been shown that patient perspective sessions improve empathy and enhance recall [4]. Such a session for eating disorders has not yet been published in the medical education literature. **Methods:** We designed an interactive interdisciplinary case discussion (ICD) that was paired with a lecture and evaluated its efficacy in improving knowledge about and attitudes towards eating disorders in pre-clerkship medical students. The ICD included a presentation from healthcare professionals (psychiatrist, pediatrician, and dietitian) with expertise in treating eating disorders and a testimony from a patient who has a diagnosed eating disorder, followed by a moderated Q&A. We used a one-group pre/post-test design to measure the efficacy of participation in a lecture and ICD on improving knowledge of and attitudes towards eating disorders. The assessment was designed by the authors. Questions were categorized into evaluation of objective knowledge and subjective attitudes. **Results:** A total of 12 students completed both the pre- and post-test. There was a significant difference in pre/post-test objective scores while there was no difference in pre/post-test subjective scores. The lack of improvement in subjective scores was likely due to self-selection bias, where individuals who completed the pre/post-test already had empathy for this population at baseline. **Discussion:** By exemplifying the interdisciplinary nature of treating eating disorders and offering the opportunity to engage with a patient, this session successfully challenged common misperceptions about eating disorders and helped students better understand the experiencing of living with an eating disorder.

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2. Fleming, J. and G.I. Szmukler, Attitudes of Medical Professionals Towards Patients with Eating Disorders. Australian & New Zealand Journal of Psychiatry, 1992. 26(3): p. 436-443.

3. Thompson-Brenner, H., et al., Clinician Reactions to Patients with Eating Disorders: A Review of the Literature. Psychiatric Services, 2012. 63(1): p. 73-78.

4. Hendriks, T., Using Patient Perspective Sessions to Increase Empathy and Recall in Preclinical Medical Students. Journal of Osteopathic Medicine, 2016. 116(10): p. 662-666.

Distinction in Medical Humanities

Jennifer E. Geller

I am Dying

Project Mentor: Meigra Chin, MD

The narrative medicine piece I published for my capstone is entitled, “I am Dying” that was published in the Journal of Pain and Symptom Management online in July 2023. In this manuscript, I detail the care of Mark (name is changed for privacy reasons) — a patient whose care I had the privilege of taking part in during my palliative care rotation in December 2022 which was my third year of medical school. Mark was a critically ill patient who had a hard few months preceding his death. After the death of his wife and sister over the past six months, he was admitted to the hospital floors for worsening of his cancer symptoms — pain in his back and chest and shortness of breath. Each day, my preceptor and I would sit with Mark and learn about the goals of his care as his lung cancer continued to spread through his diseased lung and into his previously non-diseased lung. Culminating with Mark’s unfortunate passing a week after I met him, I highlight in this piece the importance of 1) palliative care education for medical students who often do not have experience with family meetings or holding end-of-life discussions, 2) the importance of just listening to patients talking about their life story and what is important to them in some of the most vulnerable moments of their life, and 3) how a patient’s wishes and goals for their care may change quickly and we must learn to adapt and change course with the patient.

Madeleine Granovetter and Patricia Shelton (Co-first authors and co-presenters)

The Power of Storytelling: An Original Narrative Medicine Elective for Medical Students

Project Mentor: Meigra Chin, MD

Introduction: Narrative medicine is used to teach students empathy skills and reduce burnout. Engagement with literature and personal reflections allow for deeper appreciation of the holistic patient, can strengthen the patient-physician connection, and has potential to improve patient care. We developed a Narrative Medicine non-credit elective (NCE) to promote empathetic understanding of situations and themes common to patient care.

Methods: We developed and led an NCE for 20 pre-clinical students which incorporates literature discussion and creative writing exercises. In Spring 2021, we piloted a 6-seminar curriculum. During the first four seminars, students discussed assigned readings and participated in independent creative writing time. Themes included: unreliability in storytelling, describing illness through metaphor and symbolism, connecting with strangers, and writing about patient interactions subjectively versus objectively. During the last two seminars, students read aloud their own writing and discussed storytelling techniques. Students were encouraged to consider how stories enhance empathy and can inform patient-physician interactions.

Results/Evaluation Plan: Seventeen medical students completed the pilot. Informal written and verbal feedback about the program was solicited and adjustments were made accordingly. This elective became a permanent NCE at RWJMS and is now in its fourth year. Future formal evaluation may include: assessing acceptability through attendance, validated acceptability surveys, written feedback after NCE completion, and sending a follow-up survey after graduation to assess whether and how exposure to narrative medicine impacted patient interactions.

Conclusion: RWJMS students are interested and engaged in Narrative Medicine education, which may improve patient interactions and help providers connect through shared experience.

Adrian Kase

The Roles We Play on Healthcare Teams and the Importance of Narrative Writing in Moving Past Them

Project Mentors: Benjamin Bates, MD and Meigra Chin, MD

Using reflective writing as a tool for medical students can help them build empathy for their patients as well as help them tailor and communicate information to patients when delivering bad news [1]. Reflective writing has begun to be implemented in medical school education as a means of discussing emotional, interpersonal, and structural issues within the hospital setting and is shown to be most effective when married with other forms of medical school teaching [2]. The communication skills students learn can have a profound impact on patients' treatment, especially when it comes to goals of care discussions and decisions around end of life care, leading to profound impacts on patients' quality of life [3]. Over the course of the past six months, I have worked with an attending physician to write a narrative medicine piece discussing our experience treating a patient with terminal cancer from our varied perspectives. We evaluated our roles in the treatment of the patient and thought about how we could step outside of them in the future to improve interprofessional and patient communication.

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2. Franco RS, Franco CAGDS, Severo M, Ferreira MA, Karnieli-Miller O. Reflective writing in the teaching of communication skills for medical students-A systematic review. *Patient Educ Couns*. 2022 Jul;105(7):1842-1851. doi: 10.1016/j.pec.2022.01.003. Epub 2022 Jan 12. PMID: 35063310.
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NaYoung K. Yang, MPH

Heartstrings—Development of a Music and Medicine Course at a Medical School

Project Mentors: Leonard Y Lee, MD and Meigra M Chin, MD

Idea: Broadening exposure to skills learned and fostered through musical practice or the intersection of music and medicine in medical students through discussion of current research, career opportunities, and literature in the field

Need/Rationale

Over centuries, music and medicine have been entwined as forms of art and science practiced by many. Ancient civilizations have long acknowledged the link, connecting the body and the mind in healing, thereby emphasizing the need for both. However, as Western medicine started to distinguish itself, the blend of the 'physical' and the 'spiritual' became divided. French philosopher Rene Descartes constructed a theory of the duality of the body and mind, where the body was a physical object that followed the laws of nature and the mind was unpredictable and therefore a separate entity. However, stories of music's benefits to health continued to exist: Even in World War II, soldiers who used music to alleviate boredom noticed benefits such as reduced depression and increased morale.

Newfound interest in the field has led to research linking music's holistic benefits to the mind and body. Music education uses this research to advocate for musical training and exposure to broaden skill-sets of physicians when approaching healthcare. Learning a sense of rhythm and tone can help with diagnostic skills in physical exam. Understanding the stories behind composers can transfer into understanding patient stories or allowing for routes of musical expression—for either the patient or physician experience.

Herein, we discuss the development of an original music and medicine course for first- and second-year medical students to show students the history of the intersection of music and medicine, along with how music is used in the field as therapy, communication, and self-expression through examination of current and historical applications and figures.

Methods/Structure

A non-credit elective for preclinical medical students was developed to broaden knowledge and awareness of the field of music and medicine through lecture, reflection, and discussion. During its pilot half-year curriculum in Spring 2022, students attended lectures by professors around the country and internationally regarding topics from music therapy and wellbeing to great composers and mental illness, musician-centered patient-based medicine, and music in development and in daily medical practice. Students also analyzed and interpreted pieces discussing the importance of listening and effective communication in the context of the patient encounter. Student-facilitators aided guest lecturers in encouraging students to

consider how storytelling related to patient-physician communication and expression of illness, grief, and joy. Since its pilot, the elective has now become permanent and successfully completed its 3rd iteration.

Evaluation

From 38 students who attended any one session, 10 students completed the half-year 6-seminar pilot in Spring 2022. During the pilot, students submitted written and verbal feedback including reflections and suggestions for topics or musical genres they wish to learn more about. While the effects of the course have not been formally studied for research purposes, future evaluations should include consideration to obtain attendance retention, accountability, and effect on student perception of the field and incorporation into their clinical lives.

Impact:

Exposure to music and medicine may improve physicians' clinical skills, diagnostic assessments, and understanding of self and patients' experiences. Formal introduction to the field of research regarding this intersection can broaden career interests of students looking for career building advice and opportunities.

Distinction in Medical Innovation and Entrepreneurship

Stephen Barr

ProviderPair

Project Mentor: Paul Weber, MD, RPh, MBA

In a healthcare landscape marked by technological advancements, the fundamental cornerstone of medicine remains the rapport between patients and physicians. Yet, many individuals lack a primary care provider or are dissatisfied with their current provider. More than ever before, individuals are relocating and switching healthcare insurers which ultimately leaves them in need of finding a new healthcare provider. Each individual is unique and currently there is no one-size-fits-all solution to pairing patients with providers.

ProviderPair is a novel healthcare provider directory that leverages data analytics to pair patients with the right providers. ProviderPair provides a convenient, efficient, and intelligent way for patients to find healthcare providers that meet their unique needs and preferences.

ProviderPair offers a resolution to key challenges faced by patients and providers, such as difficulty finding the right provider, high patient turnover, and lack of actionable patient feedback. ProviderPair overcomes these challenges by utilizing a comprehensive questionnaire to profile patients and physicians. This questionnaire-based system makes it easy for patients to find providers compatible with their unique needs and preferences. This personalized approach helps to cultivate long-term, satisfied physician-patient relationships and improve health outcomes.

Taylor Chiang

From Idea to Beta: Creating an Online Platform for Transgender Patients Seeking Gender-Affirming Health Care Providers

Project Mentors: Gloria A. Bachmann, MD and Paul Weber, MD, RPh, MBA

Many transgender individuals seeking healthcare have had at least one negative experience related to being transgender. These experiences included verbal harassment, refusal of treatment, or having to teach Healthcare Providers (HCPs) about transgender people to receive appropriate care. As a result, trans patients may forego seeking healthcare treatment at all, or will seek non-traditional healthcare services elsewhere, leading to adverse long-term health outcomes. TranZap is a healthcare, web-based application that was born out of a need to connect patients with gender affirming healthcare providers. To create this app, we asked the community what they thought would be useful to know before walking into a doctor's office, and generally about their experiences with healthcare providers in general. Using this information, and in conjunction with the PROUD Gender Center of NJ, TranZap was created. This application is a platform where users can share their experiences about their HCPs in order to connect other trans individuals with HCPs who are gender affirming, trans-competent, and trans-sensitive. We then sought to beta test TranZap. A total of 16 individuals who identified as transgender or were related to someone who's transgender beta tested the app, giving feedback on application function, layout, and ease of use. Users found TranZap to be functional and easy to use to find gender affirming healthcare providers. Improvements to be made before public release of the app include a more dynamic search bar, increased number of searchable providers within our database, and automating how reviews become live on the app.

Aditi Gore and Sonia Bhala

PicClinic: Customizing Visual Clinic Visit Summaries for Diverse Health Literacies

Project Mentor: Paul Weber, MD, RPh, MBA

Amidst the COVID-19 pandemic's chaos in April 2020, the need for clear, consistent information became critical, especially for vulnerable populations grappling with low health literacy. To address this, we developed bilingual visual aids for the New Brunswick homeless community and expanded this concept into PicClinic—a tool for customizing visual clinic visit summaries.

Our rotations through various clinical specialties revealed the inefficiency of existing electronic medical records (EMR). Typically, these provide dense, generalized information, overwhelming patients and diluting critical points. They are often unsuitable for those with lower health literacy and increase physicians' workload due to the need for customization. Responding to this, PicClinic works as an EMR add-on to enable healthcare providers to create easily customizable infographic summaries, highlighting key aspects of the physician-patient interaction and actionable items. Providers can use pre-designed templates from a Design School for common diagnoses and sensitive topics. PicClinic's unique algorithm also suggests incorporating custom graphics, referencing up-to-date public health research, and adjusting verbiage in real-time to suit different literacy levels.

Feedback from healthcare providers indicates that PicClinic enhances communication efficiency between physicians and patients, bridging the literacy gap and fostering more meaningful clinic interactions. It is a step towards sensitive and preventative patient care. Moving forward, we aim to further develop and refine PicClinic, seeking seed funding and conducting beta testing in diverse clinical settings to ensure it meets the evolving needs of both patients and healthcare providers.

Jeremy M. Perrelle

A Cellularized Nerve Regeneration Graft for the Repair of Peripheral Nerve Injuries

Project Mentors: Dr. Zhiping Pang, MD PhD, RWJMS, Child Health Institute of New Jersey, Department of Neuroscience and Cell Biology, RWJMS, Rutgers University; Dr. Sanjeeva Murthy, PhD, Laboratory for Biomaterials, Department of Chemistry and Chemical Biology, Rutgers University; Dr. Paul Weber, MD, RPh, MBA, Associate Dean for Continuing Medical Education, RWJMS

Treatments for peripheral nerve injuries (PNI) using current methods, including autografts, cadaveric allografts, and simple hollow conduit tubes, rarely restore full pre-injury function, particularly for large nerve gaps. To mimic the best-performing patient-derived autografts, we are developing a nerve guidance conduit (NGC) with four unique aspects: (1) semipermeable walls which permit nutrient and waste exchange, limit cell infiltration, and resorb into the body while being replaced by endogenous tissue; (2) bi-layered walls with an outer unoriented texture to localize inflammatory cell deposition to the graft exterior and inner, axially-aligned fibers to promote axonal growth and alignment; (3) a hydrogel lumen patterned with microchannels and supplemented with growth factors to support axon regeneration; and 4) human induced Schwann cells within the lumen to support axon ingrowth via myelination, guidance cues, and growth factor secretion. Notably, the Schwann cells utilized can be obtained from patient cell lineages, mitigating graft rejection and obviating the need for invasive harvesting of other tissues. The multi-layered nerve guidance conduits are fabricated by electrospinning from a hydrolytically degradable polymer. Microchannels within the hydrogel lumen are produced via directional freezing and by incorporating co-axially spun hollow microfibers. A cell line of human induced Schwann cells line (hiSC's) was generated from human induced pluripotent stem cells (hiPSC's), characterized, and cultured on the NGC hydrogels. Characteristics of these conduits and the results of the in vivo studies with rodent models incorporating these channelized and cellularized NGCs that show their efficacy in promoting PNI repair will be presented.

Distinction in Research

Lily S. F. Adler

Neutrophil-to-Lymphocyte Ratio as a Predictive Tool for Post-Operative Outcomes in Patients Undergoing Open Lower Extremity Revascularization Procedures

Project Mentors: Dr. Bill Beckerman, Dr. Anna Petrova, Dr. Toni Beninato

Introduction:

Elevated neutrophil-to-lymphocyte ratio (NLR), a marker of systemic inflammation, has been shown to correlate with worse outcomes in patients undergoing vascular surgery. Limited data exists on the association of NLR and outcomes in patients undergoing lower extremity vascular surgery. We sought to investigate whether preoperative NLR correlates with outcomes in patients undergoing open lower extremity revascularization procedures.

Methods:

We conducted a retrospective analysis of a prospectively maintained database of patients who underwent open lower extremity revascularization procedures from January 2011 to January 2017 (N=535). Preoperative NLR was calculated within six months of surgery. Primary outcomes were major adverse limb event (MALE) or death. The maximally-ranked statistic method was used to determine the NLR cut-off point. Kaplan-Meier analyses of death and MALE and NLR were used to compare the groups by NLR cut-off point. We conducted a multivariate analysis of the association between NLR and mortality using Cox proportional hazard models, including confounding variables such as age, smoking status, and diabetes. P-values ≤ 0.05 were considered statistically significant.

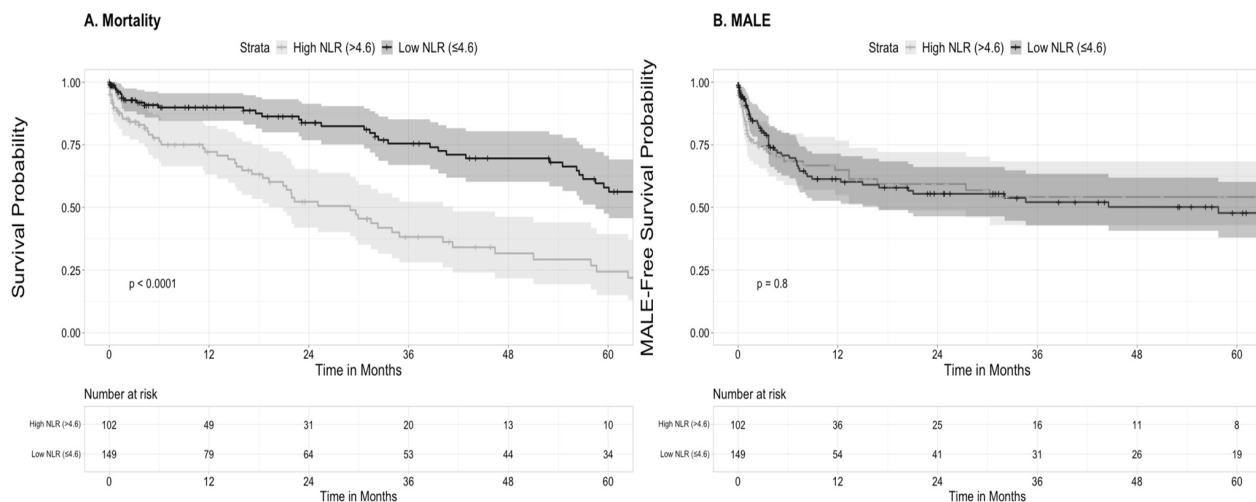
Results: 254 patients undergoing surgery from January 2011 to January 2013 were analyzed. The median NLR was 3.6 [IQR 2.5 – 6.7]. The analysis showed a negative correlation between elevated NLR and mortality ($P < 0.001$), but not MALE ($P = 0.8$). Controlling for multiple comorbidities including gender, age, smoking, BMI, diabetes, hyperlipidemia, hypertension, and infection, the NLR cut-off point was a significant independent predictor of mortality ($P < 0.0001$), but not MALE ($P = 0.551$). Elevated NLR was also correlated with statistically and clinically significant longer hospital stays (6.5 [IQR 3.0 – 12.8] days vs. 4.0 [IQR 2.0 – 8.0] days, $P = 0.027$).

Conclusion:

This study suggests that NLR is an independent predictor of mortality and hospital length of stay in patients undergoing open lower extremity revascularizations. Going forward, we plan to expand this study to include more patients and to compare NLR to other risk assessment tools.

Figure 1:

Kaplan-Meier Analysis of (A) mortality and (B) MALE based on the experimentally determined maximal NLR cut-off point, 4.6.



Tania Atanassova

Association Between Antihistamine Exposure and Newly Diagnosed Juvenile Idiopathic Arthritis: A Nationwide Analysis

Project Mentor: Daniel B. Horton, MD, MSCE

Background

Antibiotic exposure has been linked to incident juvenile idiopathic arthritis (JIA) through a purported mechanism of microbiome disruption. Among non-sedating H1 antagonists, loratadine, but not cetirizine, has direct antibacterial properties and may disrupt microbiota.

Objective

To test if loratadine exposure is associated with newly diagnosed JIA.

Methods

We performed a nested case-control study using data from 45-state US Medicaid claims data (2001-2013). Cases were newly diagnosed with JIA based on previously validated diagnostic algorithms. Each case was matched to up to 10 randomly selected unaffected controls by age, sex, state, and years of enrollment at the time of JIA diagnosis (index date). Subjects were excluded for non-JIA rheumatic diseases, immunodeficiencies, malignancy, prior immunosuppression, and exposure to multiple antihistamines. Loratadine and cetirizine exposure was defined by a prescription dispensed prior to a 3-month pre-index lag period and categorized by number of courses dispensed and time relative to the index date. The association between antihistamine exposure and incident JIA diagnosis was estimated using conditional logistic regression, adjusting for race, eligibility type, allergic and other comorbid conditions, antibiotics, and prior infections, and expressed as odds ratios (ORs) with 95% confidence intervals (CIs). To approximate an active-comparator study, exposed groups were compared indirectly based on the respective coefficients.

Results

We included 12,261 cases with JIA and 137,581 controls. A total of 12,172 subjects were exposed only to loratadine, 7,102 only to cetirizine, and 117,406 were unexposed to antihistamines. Compared to no antihistamine exposure, we found weak associations for loratadine exposure (OR 1.23 [95% CI 1.14, 1.33]) and cetirizine exposure (OR 1.23 [95% CI 1.11, 1.36]). However, loratadine exposure was not associated with JIA diagnosis when compared to cetirizine exposure (OR 1.00 [95% CI 0.89, 1.14]). Further, we found a dose-response relationship for loratadine use (one course versus multiple courses, OR 1.17 [95% CI 1.01, 1.34]). Similar however non-significant findings were observed for cetirizine (one course versus multiple courses, OR 1.19 [95% CI 0.98, 1.44]). The timing of loratadine exposure was also not associated with JIA diagnosis (within past year versus 1-2 years prior, OR 1.02 [95% CI 0.64, 1.62]).

Conclusion

Both loratadine exposure and cetirizine exposure were weakly associated with JIA relative to no antihistamine exposure, but no difference was found between loratadine and cetirizine exposure, with repeated loratadine courses, or based on timing of loratadine exposure, arguing against a causal association.

Sonia Bhala

Mitochondrial Dysfunction and Inflammation in Telomere Biology Disorders

Project Mentors: Sharon A. Savage, MD; National Cancer Institute

Detlev Boison, PhD; Rutgers Biomedical Health and Sciences

Victor Shengkan Jin, Ph.D.; Pharmacology Department, Rutgers Robert Wood Johnson Medical School

Authors: Sonia Bhala, BS; Gina Ney, MD, PhD; Kelvin de Andres, PhD; Steven Moore, PhD; Philip S. Rosenberg, PhD; Neelam Giri, PhD; Yie Liu, PhD; Yi Gong, PhD; Marie Migaud, PhD; Sharon A. Savage, MD

Organization: Clinical Genetics Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute, National Institutes of Health, Rockville, MD

Abstract:

Telomere biology disorders (TBDs) are a set of syndromes characterized by very short telomeres, and arise due to pathogenic germline variants in at least 18 different genes. Medical conditions associated with TBDs include bone marrow failure, cancer, and liver disease. Disease severity correlates with the affected gene and mode of inheritance. Telomeres, the nucleoprotein complex at chromosome ends essential for genomic integrity, shorten with age and when a critical length is

reached, cellular senescence or apoptosis is triggered. We hypothesize that patients with TBDs are highly susceptible to oxidative DNA damage and therefore more likely to undergo cellular senescence, both resulting in a pro-inflammatory environment. We identified mitochondrial metabolites involved in the oxidative stress pathway and pro-senescent cytokines a priori and then measured their baseline levels in patients with TBDs in comparison with controls. Further analysis was completed using patient inheritance patterns while controlling for age and gender via logistic regression modeling with Bonferroni correction. While levels of most a priori cytokines remained comparable between TBDs and controls and in case-case comparisons, there were significantly higher levels of IL-1alpha (-407.62, $p = 0.006$), IL-1beta (169.08, $p < 0.001$), SCD40L (2678.49, $p < 0.001$), and TNF-alfa (53.71, $p = 0.01$) in individuals with TBDs compared to controls, suggesting an altered inflammatory environment in patients with TBDs. These data represent a much larger study aimed at understanding the biochemical milieu in patients with TBDs, with the goal of identifying opportunities for therapeutic intervention.

Eileen Lee

Discordance between Diet Quality Score and Perceived Diet Quality: Prevalence and Risk Factors Among US Representative Adults

Project Mentors: Dr. Soko Setoguchi, Dr. Shauna Downs, Dr. Nurgül Fitzgerald

Objective:

A healthy diet is key to preventing and managing cardiometabolic disease. Despite public health efforts to improve diet quality, many adults have poor diets and may have limited knowledge on what consists of a healthy diet. Our objective was to describe prevalence of, and factors associated with poor diet quality and perceiving a poor diet as healthy.

Methods:

We identified adults aged ≥ 20 years old in the National Health and Nutrition Examination Survey (NHANES) from 2005-2018. Healthy perceived diet quality was defined as answering “excellent” or “very good” to “how healthy is your overall diet?”. We assessed objective diet quality by calculating American Heart Association (AHA) Diet Score based on a 24-hour dietary recall and scaled the raw score to 0-100%; ‘poor diet’ was defined as AHA score $\leq 40\%$. We first estimated prevalence of poor objective diet quality and perceived healthy diet. Among those with poor diet (AHA score $\leq 40\%$), we fit modified-Poisson regression models to identify factors associated with perceiving a poor diet as ‘healthy’ and reported risk ratios with 95% confidence limits.

Results:

Among 31,644 adults (51% female, mean age 48, 68% non-Hispanic White, mean BMI 29), prevalence of poor diet quality was 47%. Male sex and smoking were associated with higher risk of poor diet; older age, higher education, increased income, diabetes mellitus diagnosis, and vigorous activity levels were associated with lower risk. Among adults with poor diet quality ($n=14,952$), 23% perceived their diet as healthy. Controlling for several covariates in multivariable analysis, older age, male sex, higher education, and vigorous activity levels were independently associated with perceiving their poor diet as healthy, while Hispanic and non-Hispanic Black race/ethnicity compared with non-Hispanic White, hypertension diagnosis, high risk waist circumference, and obesity range BMI were associated with lower risk.

Conclusion:

Nearly half of US adults had poor diet quality based on dietary targets from AHA 2020 Strategic Impact Goals for cardiovascular health, yet nearly a quarter of them perceived their diet as healthy. Targeting high risk adults with focused educational interventions to calibrate their perception of a healthy diet can be effective in modifying their eating behavior and promoting cardiometabolic health.

Erica R. Levin

Variation in Urea Transporter Gene Expression in Females Across Reproductive Stages

Project Mentors: Dr. Martin Blaser and Dr. Liisa Veerus

Urea, toxic to mammals, is found in all mammalian breast milk. The reason for this apparent paradox may be that urea is one of the main nitrogen sources for the development of the gut microbiome, as urease-positive intestinal microbiota members are capable of metabolizing urea. Urea is both actively and passively transported across cell membranes. Little is currently known about how urea transporter gene expression is regulated in mammary tissue across reproductive stages. This study explored the expression patterns of two known urea transporter genes, Slc14a1, which transcribes UT-B, and Slc14a2, which transcribes UT-A, in mouse mammary tissue during pregnancy and lactation. Six lactating, six pregnant, and six non-

pregnant, non-lactating females, and four male control mice were sacrificed for study. Bilateral cervical, upper thoracic, lower thoracic, abdominal, and inguinal mammary glands were harvested, as well as the heart, kidneys, liver, breast milk, and blood for comparative analysis. RNA extraction and cDNA synthesis were performed to carry out qPCR analysis for the expression of Gapdh (housekeeping gene), Slc14a1 and Slc14a2 (genes of interest). We found that the expression levels of UT-A were highest in lactating mice, followed by pregnant mice, then non-pregnant, non-lactating mice, and the lowest expression in male controls. In contrast, the expression of UT-B in mammary tissue showed the opposite pattern. These findings suggest that UT-A could be the primary transporter in breast tissue during pregnancy and lactation.

Sarah E. McGuire Calilung

Race, Ethnicity, and Diagnostic Delays in Children with Juvenile Idiopathic Arthritis

Project Mentors: Dr. Daniel B. Horton, Dr. L. Nandini Moorthy, Dr. Cande Ananth

Objectives:

To determine if time to juvenile idiopathic arthritis (JIA) diagnosis was longer in Black and Hispanic children and helped explain higher disease activity scores in these populations.

Methods:

This retrospective cohort study used US data on children with JIA from a large North American pediatric rheumatology registry linked to local sociodemographic and geographic data. Cox proportional hazards regression was used to compare time to diagnosis among children from different racial and ethnic groups, adjusting for potential demographic, disease-related, socioeconomic, and geographic confounders. Mediation analysis was performed with respect to baseline disease activity scores.

Results:

The median time to JIA diagnosis was 46 days longer among Black children vs. White children, a difference that was not explained by other factors in adjusted models (adjusted hazard ratio 0.87, 95% CI 0.77, 0.98). Time to diagnosis partially mediated the association between Black race and baseline disease activity scores (indirect coefficient 0.08, bias-corrected 95% CI 0.02, 0.16).

Conclusions:

Black children were more likely to experience delays in JIA diagnosis independent of clinical, geographic, and socioeconomic factors. Higher disease activity scores in Black children were partly but not completely explained by longer times from symptom onset to diagnosis. Future research should examine the role of systemic racism and other factors driving racial disparities in JIA diagnosis and disease activity as well as ways to mitigate these disparities.

David Natanov

Predicting COVID-19 Prognosis in Hospitalized Patients Based on Early Status

Project Mentors: Martin J. Blaser, Payal Parikh, and Jag Sunderram

Predicting which patients are at greatest risk of severe disease from COVID-19 has the potential to improve patient outcomes and improve resource allocation. We developed machine learning models for predicting COVID-19 prognosis from a retrospective chart review of 969 hospitalized COVID-19 patients at Robert Wood Johnson University Hospital (RWJUH) during the first pandemic wave in the United States, focusing on 77 variables from patients' first day of hospital admission.

Our best 77 variable model was better able to predict mortality (AUC ROC=0.808) than CURB-65, a commonly used clinical prediction rule for pneumonia severity (AUC ROC=0.722). After identifying highly predictive variables in our full models using SHAP (Shapley Additive exPlanations) values, we generated two models, PLABAC and PRABLE, that use age and five common laboratory tests to predict mortality (PLABAC: AUC ROC=0.796; PRABLE: AUC ROC=0.793), which also outperformed CURB-65. We externally validated PLABAC using data from the National COVID Cohort Collaborative Data Enclave (NC3) from 7901 hospitalized COVID-19 patients from the pre-vaccination period and 1547 from the vaccination period, yielding AUC ROCs of 0.755 and 0.766, respectively.

This study demonstrates that our models can accurately predict COVID-19 outcomes from a small number of variables obtained early in a patient's hospital stay in patients from institutions around the US after the initial pandemic wave. These models can serve as a clinical prediction aid and accurately capture a patient's prognosis using a small number of routinely obtained laboratory values.

Anthony Yung

Anterior Scoliosis Correction

Project Mentors: Dr. Randal Betz, Dr. Andrew Bowe, Dr. Maya Ramagopal

Distinction in Service to the Community

Kemi J. Alabi, Giomilsy Ramos, and Catherine Roukhadze

Girls Exploring Medicine & STEM (GEMS): A Distinction in Service to the Community

Project Mentor: Janice Cato-Varlack

In recent years, studies have demonstrated that many students begin to make choices about their careers as early as middle school. However, at such a young age, many underrepresented minority students may lack exposure or information about career possibilities, especially in Science, Technology, Engineering, and Mathematics. As a result, there has been a decline in the number of URM students pursuing STEM careers, despite the increasing demand. In 2005, the U.S. Department of Health and Services emphasized the necessity for URM students to enter STEM careers. Though this was imperative, they stated that access and success in STEM was limited for URM due to limited access and exposure to STEM careers and lack of appropriate resources relating to mentorship and academic preparation.

To help address these barriers, the Girls Exploring Medicine & STEM (GEMS) introduces medicine and STEM education to young URM female students in an engaging, enticing, and accessible way through a combination of robust mentorship and interactive workshops at the Franklin Middle School campuses, a Title I school with at least 40% of the students from a low socioeconomic background.

The two primary objectives of this program are 1) increase representation of URM female students interested in pursuing STEM careers, and 2) provide robust academic mentorship and knowledge to help guide our students towards academic success. To gauge the effectiveness of our initiatives, we tracked attendances, conducted biannual surveys of our cohort both on their interest and overall knowledge of the STEM field, and performed routine mentorship sessions during which we discussed topics focused on knowledge checks, leadership, and teamwork.

Since the program's inception, we successfully graduated the initial cohort of 30 students in June 2023 with a demonstrated increase in both interest and knowledge of medicine and STEM, as well as increase our new cohort of students to a record 40 students across both campuses. Through these efforts, we aim to continue making a meaningful impact on the lives and aspirations of the participating students while also actively working to diversify the future of our workforce.

TJ Booth

Hypertension Education and Lifestyle Modifications (HEAL) Initiative: Supporting Chronic Disease Management in the New Jersey Hypertensive Population During COVID-19

Project Mentor: Dr. Lilian Saro-Nunez

Introduction

Hypertension, often called a “silent killer” due to its insidious nature and potentially fatal progression, affects nearly one in three New Jersey (NJ) residents. The COVID-19 pandemic has made high blood pressure control more difficult by not only limiting access to care, but also by making many of the lifestyle modifications for hypertension management far more difficult to execute. The Hypertension Education And Lifestyle Modifications (HEAL) Initiative aims to empower hypertensive New Jersey residents in meeting their health goals, improve health literacy around hypertension control, and create a platform to promote longitudinal hypertension awareness management during the era of COVID-19 and beyond.

Methods

The HEAL initiative consists of virtual and physical workshops focusing on lifestyle modifications, a longitudinal newsletter sent to recruited hypertensive patients, and the creation of online modules posted to improve health literacy around hypertension. Generally, all three aspects of our program address the importance of behavioral changes around topics such as diet, sodium intake, exercise, and stress management and present feasible strategies that can be carried out, even during the pandemic. We also discuss the significance of high blood pressure, provide education on how to use a blood pressure

cuff, and inform patients of community hypertension resources. Our workshops are based out of the East Brunswick Public Library of Middlesex County, the third most populous county in NJ.

Results

This four-year long project started in October 2021 and will be formally evaluated at a halfway point in 2023 and its conclusion in May 2025. We will accomplish this through the use of both online surveys and phone calls to best accommodate all levels of digital literacy. Specifically, we will assess program efficacy, participant perceptions on their hypertension management after taking part in the program, and barriers to hypertension control that participants face.

Conclusion

Even before the COVID-19 pandemic, NJ experienced some of the highest rates of hypertension in the nation. As COVID-19 has made high blood pressure management more challenging, using a community-level approach to ensure our participants can detect and address hypertension before it progresses to potentially fatal complications is more crucial than ever.

Michael Enich

Robert Wood Johnson AIDS Program EMPOWER 2.0

Project Mentors: Roseann Marone, maronero@rwjms.rutgers.edu. Gail Burack, burackgd@rwjms.rutgers.edu

Perinatally infected individuals with HIV are more likely to experience barriers to healthcare—especially around transition to adult care. The purpose of this project is to help the youth independently manage their care. This program developed as an extension of the EMPOWER program. Program goals were to 1) pair individuals with perinatally transmitted HIV/AIDS with a medical student mentor, and 2) develop engaging patient education modules for health promotion. Patients were paired with medical student mentors. Mentors attended clinic appointments, youth advisory board meetings, and even had virtual communications at the outbreak of the COVID-19 pandemic. Patient education modules were vetted by an advisory group of patients. Module topics included HIV/AIDS 101, social services, insurance, life skills and COVID-19. This pilot program provides a model of self-management education that may prove helpful with other chronic illness populations. This program provides an opportunity for mentorship and education for young adult patients. Patient education modules could be an effective way for providers to do engaging multimedia in-clinic education.

Michelle Jeffery, Drym Oh, Esther Kim, and Sarah Oh

The Forum for Education on Menopause (FEM): A Culmination of a Distinction in Service to the Community Initiative at Rutgers Robert Wood Johnson Medical School

Project Mentor: Betsy Mathew, MD

The Forum for Education on Menopause (FEM) is a community-based program in New Brunswick, New Jersey focused on promoting women's health literacy and self-advocacy. In conjunction with the Puerto Rican Action Board (PRAB) and Harmony Family Success Center, FEM was developed through the Distinction in Service to the Community (DISC) initiative at Rutgers Robert Wood Johnson Medical School (RWJMS). Prior to the development of FEM, there were no menopause educational programs targeted toward the LatinX population in this community. FEM incorporates interactive workshops on a variety of topics related to menopause, including physical, mental, and emotional changes during this period. Furthermore, FEM aims to provide a space for LatinX women in New Brunswick to develop a support network within their own community. Through this initiative, we aimed to educate, empower, and create a community of advocates for menopause education and women's health. Longitudinally, FEM will be incorporated into the Literacy Initiative for Students Teaching Older Spanish Speakers (LISTOS) through the Homeless and Indigent Population Health Outreach Project Community Health Initiative (HIPHOP-CHI) at RWJMS. LISTOS has developed a valuable relationship with the community over the course of many years, and whose goals directly align with the mission of FEM. The integration of FEM and LISTOS programming ensures lasting impact, continued student-led engagement, and overall empowerment of women through the education of the community and future physicians.

