RUTGERS HEALTH
Robert Wood Johnson Medical School

2025 Distinction Abstracts

Distinction in Climate Health and Environmental Sustainability

David Garyantes

Scrubbing In for Sustainability: Cutting OR Waste and Costs at RWJUH
Project Mentor: Catherine Chen, MD

This distinction project in climate health aimed to quantify operating room waste at Robert Wood Johnson University Hospital, with a focus on physical waste, energy use, and anesthesia consumption. In collaboration with the directors of Perioperative Services and Anesthesia, I obtained comprehensive 2023 data to evaluate the environmental impact of OR operations. Working closely with these teams, we identified existing energy and waste-saving initiatives, such as automatic light shut-offs and streamlined surgical packs, while also uncovering further opportunities for waste reduction.
One particularly promising area was the expansion of single-use device (SUD) reprocessing. Although RWJUH is already partnered with Stryker to reprocess items ranging from ultrasonic scalpels to fall alarms, our analysis revealed that only 20% of eligible devices were reprocessed in 2023, with some product categories as low as 8%. In collaboration with the RWJBarnabas Health Supply Chain team and Stryker, we identified additional collection opportunities that could significantly increase reprocessing rates leading to tangible cost savings for the hospital.

The ongoing phase of this project involves collecting and submitting 2024 OR waste data. Our goal is to demonstrate measurable reductions in waste generation and improvements in SUD reprocessing rates. Ultimately, we aim to position RWJUH for eligibility for a PGH award, thereby setting a benchmark for environmental stewardship in perioperative care. This project not only highlights critical areas for waste reduction in the OR but also shows how sustainable practices can be financially advantageous while contributing to broader climate health efforts.

Eric Muller and Julia Marx

A Sustainable Health Education Scoping Review
Project Mentor: Catherine Chen, MD

Background: Climate change adversely affects human health, and while the healthcare industry helps mitigate the damage, it also contributes to climate change. For example, in the United States the healthcare sector is responsible for greater than 8% of national greenhouse gas emissions. In Undergraduate, Graduate, and Continuing Medical Education there is a desire to learn how to address the healthcare's contribution to climate change while maintaining high quality patient care. In 2017 Teherani et al. created a framework with 21 core Sustainable Health Education (SHE) objectives to be incorporated into medical education. Since then, a significant body of literature has been published regarding SHE in medical education.

Objectives: Our goal was to identify gaps in the literature with regards to SHE in medical education curricula.

Methods: We conducted a systematic scoping review using the PRISMA-ScR checklist. First, we performed preliminary searches of relevant databases to determine search terms and key words. Search strings were applied across nine peer-reviewed databases from inception to present day, titles and abstracts were imported into Rayyan and were evaluated against the inclusion and exclusion criteria. Included articles were evaluated with concern for the 21 core SHE objectives.

Results: We included 149 different articles across all SHE objectives, most in the category for identifying ways to improve the environmental sustainability of health systems, and least in the category for explaining bioaccumulation and biomagnification of pollutants.

Conclusions: While a fair amount of research has been conducted on SHE, more work remains to fill out less developed areas.

Sukrut Sonty

Developing a Clinical Climate Health Elective
Project Mentor: Catherine Chen, MD

Climate change is increasingly recognized as a major determinant of health and its integration into preclinical curricula has been widespread. However, clinical integration of climate health has been limited. To address this gap, I developed a clinical elective in climate health and environmental sustainability as part of my Distinction in Climate Health and Environmental Sustainability. The elective was designed to equip medical students with foundational knowledge on climate-related health impacts, practical strategies for working with climate advocacy groups, and the skills to address these challenges in clinical practice.

The elective framework was designed to be flexible, allowing students to engage in one of three project categories: clinical adaptation for climate change, environmental justice, or healthcare sustainability. Students may view lectures from leading climate health experts, engage with climate-focused medical groups or take environmental health histories. A key component of my work was designing and writing an original final exam, which involved the development of 25 case-based multiple-choice questions grounded in clinical reasoning.

To facilitate elective approval, I then presented a proposal outlining the elective's structure, including its duration (ranging from one to four weeks), core learning objectives, required activities, scheduling options and supervisor expectations. Additionally, I defined the evaluation criteria, which included completion of assigned coursework, quality of the final deliverable, and a written reflection on the elective's relevance to future medical practice. The elective is now integrated into the medical school curriculum, providing future students with a structured opportunity to explore the intersection of climate change and medicine.

Anisha Tyagi

Creation of DiCHES
Project Mentor: Catherine Chen, MD

The Distinction in Climate Health and Environmental Sustainability (DICHES) program at Robert Wood Johnson Medical School recognizes students who demonstrate leadership and commitment to addressing climate health and sustainability. This rigorous program challenges students to design, implement, and disseminate significant climate health initiatives throughout their medical education.

The program's learning objectives include identifying climate health issues and exploring their impact on both local and broader communities. Students will collaborate with interdisciplinary teams, identify gaps in education or clinical practice, and design projects in one of three categories: Clinical Adaptation for Climate Change, Health and Environmental Justice, or Healthcare Sustainability. Projects can be pursued through patient care (clinical adaptations or counseling), health professions education (creating evidence-based deliverables for practice change), or systems-based practice (quality assurance or waste reduction initiatives).

The timeline for DICHES spans the four years of medical school, beginning with didactic training, including educational videos and participation in local conferences. As students progress, they will attend additional trainings, work with local committees, and complete a Climate Health Elective. In their final years, students will design and implement their projects, present findings at conferences, and submit manuscripts for publication. This initiative promotes active engagement with climate health issues, preparing students to lead in the evolving field of sustainable healthcare.

Distinction in Global Health

Bhargav Vemulapalli[1], Mohammad Saiful Alam Bhuiyan[2], Syeda Fardina Mehrin[2], Shamima Shiraji[2], Jena Derakhshani Hamadani[2]

The World According to Girls: Initial Reflections on a Qualitative Study of Education and Employment Among Adolescent Girls and Young Women with HIV in Kumasi, Ghana
Project Mentor: Charles Martyn-Dickens, MD

The growing population of adolescent girls and young women (AGYW) with HIV (AGYWHIV) exists at a triply vulnerable intersection of age, gender, and health status. While evidence suggests that attainment of education and economic empowerment for young people with HIV may be particularly challenging for the AGYW among this population, there is a lack of qualitative and self-reported evidence addressing the unique experiences that they live through. Our goal was to center the voices of AGYWHIV in the literature. This qualitative study consisted of approximately 24 semi-structured interviews with female-identifying patients of the Komfo Anokye Teaching Hospital Adolescent HIV clinic aged 12-25. Interviews were conducted in both English and Twi. Formal thematic analysis is ongoing, but initial reflections point to the importance of strong relationships with female family members as sources of emotional support, the prevalence of misinformation about HIV in schools and workplaces, often perpetuated by educators themselves, and the reliance on seeking out self-employment or employment with family out of fear of repercussion related to HIV status, as well as an increased interest in working in the healthcare field in response to care received while living with HIV. The goal in characterizing these experiences was to better inform educational, financial, and health interventions targeting this uniquely affected but resilient population.

Shivani Ramolia

Prevention of Oral Cancer in the South Asian Community
Project Mentor: Dr. Angela Gitau, MD

Head and neck cancer remains a significant public health concern, particularly among South Asian populations where smokeless tobacco use is highly prevalent. Despite the known risks, cultural norms, lack of awareness, and limited healthcare access have contributed to the continued use of these products. Recognizing this gap, we launched a prevention and education initiative to address the specific needs of the South Asian community in the U.S.

Our project began with the development of an educational pamphlet to provide linguistically and culturally appropriate information on the harms of smokeless tobacco. We distributed these pamphlets at health fairs and engaged directly with community members to assess their knowledge and attitudes toward tobacco use. However, we quickly realized that passive education alone was not enough to drive meaningful change. To deepen engagement, we facilitated focus groups to explore the behavioral and cultural factors influencing tobacco use and resistance to quitting. We provided oral lesion screenings at South Asian health fairs, recognizing that many in the South Asian community face barriers to accessing traditional healthcare settings. By bringing screenings and educational resources directly to trusted community spaces, we aimed to increase awareness, promote early detection of head and neck cancers, and encourage preventive healthcare behaviors. Through these efforts, we worked to bridge the gap between healthcare providers and the South Asian community, fostering dialogue and creating a sustainable framework for tobacco prevention and cancer education.

Jennifer Rha

Fulbright-Fogarty Fellowship 2023-2024: My Experience Working in Puno, Peru
Project Mentors: Dr. William Checkley and Dr. Laura Nicolaou

As a 2023-2024 Fulbright-Fogarty scholar, I was integrated into the existing field team for the NIH-funded study ANDES (Addressing Hypertension and Diabetes through Community-Engaged Systems) in Puno, Peru. This study is a two-arm, individually randomized superiority trial that investigates whether a community worker-led intervention in a high altitude, low health-resourced and indigenous population in Peru can improve hypertension over the course of 12 months. During my

time in Puno, I did not create my own project but was tasked with starting operations of the project's secondary outcomes and as a result, developing my global health research skills and experience while acting as a liaison between U.S. universities, Universidad Peruana Cayetano Heredia, and the field team in Puno. I gained experience in global research through providing comprehensive support for the daily activities of the environmental team responsible for the following additional health metrics: air quality monitoring in participant homes, twenty-four-hour blood pressure monitoring, ambulatory hemoglobin A1c measurements, and spirometry. With the environmental team, I oversaw these activities and revised protocols, supervised training sessions, performed routine field visits, and assessed data for quality control. I also had the opportunity to participate in team meetings, present initial findings to the NIH, participate in ancillary projects, and develop my analytical skills. Overall, I am extremely grateful for this opportunity to work closely with an experienced research team and learn about Puno's culture and lived experience through the guidance and generosity of the field team.

Bianca Sanabria

Treatment of Post-Burn Hypertrophic Scarring in Skin of Color with Fractional CO_2 Laser - A Prospective Cohort Study
Project Mentor: Babar Rao, MD

Background:
Hypertrophic burn scars can cause significant physical and psychological distress, particularly in patients with skin of color, who are at increased risk for pigmentary changes and scarring related complications. Fractional CO_2 laser therapy has emerged as a treatment for burn scars, improving vascularity, pigmentation, and pliability. However, there is limited data on its efficacy and safety in darker skin types.

Objective:
To evaluate the efficacy of fractional CO_2 laser therapy in improving the appearance and symptoms of mature hypertrophic burn scars in patients with Fitzpatrick skin types III–V.

Methods:
A prospective cohort study was conducted in Rawalpindi, Pakistan, of patients aged 12–80 years with post-burn hypertrophic scars. Patients underwent four sessions of fractional CO_2 laser treatment at 4–6 week intervals. Scar severity was assessed using the Vancouver Scar Scale (VSS) and the Patient and Observer Scar Assessment Scale (POSAS) before and after treatment. Statistical analysis was performed using paired t-tests to determine significant changes in scar characteristics.

Results:
Twenty-five patients were included, with significant improvements observed across multiple scar parameters. VSS scores showed reductions in vascularity (pre: 0.85±1.085, post: 0.10±0.300, p<0.001), pigmentation (pre: 2.44±0.673, post: 2.12±0.900, p=0.008), and pliability (pre: 2.29±1.078, post: 1.39±0.997, p<0.001). POSAS scores also significantly decreased (p<0.001), reflecting improvements in scar texture and overall patient satisfaction. Stratified analysis revealed that Fitzpatrick type III patients experienced the most pronounced reductions in pigmentation (p<0.001). Scars treated within five years of the burn injury showed the greatest improvements in pliability. Reported side effects included transient erythema, vesicle formation, and hyperpigmentation in two cases.

Conclusion:
Fractional CO_2 laser therapy is an effective and well-tolerated treatment for hypertrophic burn scars in patients with skin of color, improving scar texture, pliability, and pigmentation. While our study was limited by a relatively small sample size and the absence of Fitzpatrick skin types I, II, and VI, larger studies are needed. However, our results highlight how fractional CO_2 laser can be an effective treatment modality for hypertrophic scars in patients with skin of color.

Bhargav Vemulapalli

Association of Nutritional Status and Child Development in Influenza Patients in an Urban Slum of Dhaka, Bangladesh
Project Mentor: Dr. Jena Derakhshani Hamadani from the International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR,B)

Objectives: Children affected by infectious diseases may be at risk of poorer developmental milestones, while undernutrition in itself is a risk factor for poor development. We aimed to explore if the association of influenza symptoms with child development varied by children's nutritional status.

Methods: We conducted a cross-sectional study at 12 and 24 months in urban children who presented with influenza symptoms of fever, cough, chest indrawing, and diarrhea. We assessed children's cognitive, language, and motor development using Bayley Scales of Infant and Toddler Development-III and measured their nutritional status using the WHO Child Growth Standards. Children were divided into two groups: normal or mildly undernourished (weight-for-age z-score > -2, better nourished) and moderately or severely undernourished (weight-for-age z-score □ -2, undernourished). A multivariable linear regression model adjusting for 12-months score, mother's education, height-for-age z-score, asset index was used for analyses.

Results: Of 385 children, 278 (72.21%) were better nourished while 107 (27.79%) were undernourished. Fever duration was significantly associated with lower motor composite scores (β-coefficient: -1.79, 95% CI: -3.47, -0.10, p-value: 0.038) in all children. Diarrhea duration significantly affected malnourished children's language composite scores (β-coefficient: -4.733, 95% CI: -8.126, -1.34, p-value: 0.011) and motor compositive scores (β-coefficient: -4.937, 95% CI: -9.93, -0.001, p-value: 0.049).

Conclusions: In this study, language and motor development of undernourished children was significantly hindered after an episode of diarrhea. Psychosocial stimulation interventions focusing on language and motor development of children following such illnesses may be designed to prevent diarrhea effects in malnutrition.

Distinction in Inclusion and Diversity

Cristina Fernandez

Training Medical School Faculty to Address Microaggressions via an Objective Structured Teaching Exercise (OSTE)
Project Mentors: Brad Kamitaki, MD; Shilpa Pai, MD

Background:
Medical school faculty often feel ill-equipped to address microaggressions, especially when directed towards trainees from patients. Simulation exercises can improve faculty preparedness for challenging, real-world situations.

Methods:
We developed a training program for faculty members at Rutgers Robert Wood Johnson Medical School comprised of a didactic lecture followed by an objective structured teaching encounter (OSTE) in which faculty participants address a racial microaggression from a standardized patient actor directed towards a student actor in real-time. Medical school faculty participants (n = 23) completed a pre-session survey consisting of an assessment of their knowledge, attitudes, and skills towards identifying and addressing microaggressions. Faculty were randomized into two groups in which they were assigned to complete the post-session survey either (1) after the didactic session alone or (2) after the didactic+OSTE session to understand the incremental benefit of the OSTE activity. We compared post-session knowledge, attitude, and skills scores between the two groups using ANCOVA, adjusting for initial pre-test scores.

Results:
There was no significant difference in mean knowledge, attitude, or skills post-session survey scores between the didactic alone compared with the didactic+OSTE participant groups. However, faculty rated both the didactic session and OSTE activity highly in terms of relevance, usefulness, and potential for self-growth.

Conclusion:
With further development, the OSTE has the potential for developing faculty preparedness and fostering a more proactive approach towards addressing microaggressions experienced by clinical trainees.

Luis Sanchez, Tayra Keshinover, Kevin Guerrero, Charlene Fermin, Eileen Ramirez, and Kailyn Ramirez

Supporting the Next Generation of URiM Medical School Applicants Through Current Medical Student-Led Workshops
Project Mentor: Sonia Garcia Laumbach, MD

Studies have shown that increasing diversity in medicine can lead to better health outcomes for patients. Groups considered to be Underrepresented in Medicine (URM) make up about 33% of the US population, yet a 2018 AAMC study found they made up only 11.1% of all active physicians. Reasons for this discrepancy include that URM students tend to face more socioeconomic barriers, have lower parental education levels, and receive more discouragement in comparison to non-URM students. The purpose of this distinction program was to implement a series of current medical student-led workshops locally to encourage Rutgers EOF students to pursue graduate education in medicine and other allied health professions.

Distinction in Leadership in Academic Healthcare

John P. Avendano

Development and Evaluation of a High Value Care Curriculum for Pediatric Resident Physicians
Project Mentors: Siddharth Marwaha MA; Dr. Scott Moerdler, MD, Dr. Fahmida Islam, MD

Objective: Wasteful spending represents a substantial and growing problem in healthcare. This trend has led to a graduate medical education emphasis on High Value Care (HVC) ; i.e., care that maximizes outcomes given the cost of intervention.This brief report describes the creation, implementation, and evaluation of a five-lesson HVC curriculum targeted at pediatric resident physicians.

Methods: The curriculum was created in 2023 using common pedagogical concepts, namely Kern's framework for curricular development. Residents were evaluated before and after the curriculum at multiple levels to evaluate their learning at different levels on the Kirkpatrick pyramid. This included multiple choice surveys asking residents to assess their own knowledge and comfort with HVC topics, a WASTE score assessment to determine if residents are correctly able to identify wasteful interventions, and a CARES score assessment to see if residents gave better patient care after a lesson on communicating HVC to patients. Residents were also able to offer open-ended, anonymous feedback.

Results: The curriculum was implemented at one residency program, across residents (PGY1-3). Results showed the curriculum made residents more confident in their ability to discuss HVC but did not change clinical practice. Residents also responded positively to the curriculum in anonymous feedback. 33/33 (100%) of residents received the curriculum. 26/33 (79%) and 9/33 (27%) of residents did the pre- and post-curriculum WASTE score assessment.

Conclusions: This curriculum is a starting point for introducing HVC topics into resident education, but more work is needed to change residents' clinical practice.

Sivani Alla and Rahul Kukreja

Impact of Patient Portal Utilization on Patient Experience Among Hospitalized Adult Patients
Project Mentor: Dr. Minnette M. Markus-Rodden

Objective:
This project's main objective was to evaluate the effect of patient portal utilization on patient experience scores and communication with care team members among hospitalized inpatients.

Materials and Methods:
Patients (n=33) from an adult, 16-bed inpatient orthopedic/surgical floor at a large, urban, academic, level I trauma medical center, were administered a web-based survey regarding their experience with a patient portal following education provided by medical students about the application.

Results:
Survey responses indicated a favorable perception of the patient portal. Most patients reported improved communication with health care providers and enhanced understanding of medications. The majority of patients found the portal easy to navigate and expressed user satisfaction.

Discussion:
The study found that MyChart facilitated improved communication with care teams and a better understanding of medical management among patients. While training had evident benefits and MyChart was generally perceived as easy to navigate, the study also highlighted the importance of raising awareness about such platforms.

Conclusion:
This study highlights the potential of health IT, specifically patient portals, to enhance patient experience and care coordination in the inpatient setting. By empowering patients with the knowledge and tools to navigate patient portals, health providers can foster improved communication and engagement. These findings highlight the importance of promoting health IT adoption to hospitalized patients, ultimately optimizing patient care delivery.

Vineeth Amba and Taylor Glassman

Building the Next Generation of Physician Advocates through the State Health Policy Scholars Program
Project Mentors: Shilpa Pai, MD and Kristen Coppola, PhD

Introduction:
There has been an increasing emphasis on leveraging advocacy to advance patient health. Even so, current undergraduate medical education (UME) guidelines for advocacy and health policy training are limited. Medical schools across the nation have offered opportunities — many elective — that touch upon “advocacy” concepts, but few that are focused on legislative advocacy. Furthermore, there is limited curricular time devoted to health policy and advocacy education. To fill this gap, we created the State Health Policy Scholars Program (SHPSP) in collaboration with NJ’s five medical schools and the Medical Society of New Jersey.

Methods:
The SHPSP included five content-based workshops. After the first workshop, students received an online survey to establish 15 current health policy and advocacy behaviors (i.e. attending a protest, signing a petition, etc.) in three categories. This survey was given again after the completion of all five workshops and the applied learning activity (legislative meeting or letter to legislator). After the second workshop, students were given an online survey to establish baseline confidence with 20 skills and concepts taught in our program (i.e. generating evidence-based positions on health policy issues, judging the quality of health policy literature, etc.) in four categories. This survey was distributed again after the final fifth workshop. We assessed behavior change in health policy and advocacy using descriptive statistics and McNemar’s tests. We measured change in confidence in skills and concepts using descriptive statistics and Wilcoxon signed-rank tests. Study participation was optional.

Results:
In the program’s first year (2022-23), 99 students from all five NJ medical schools participated in at least one program workshop. 50 students graduated from the program, by completing all workshops and an applied learning activity (40

through legislative meetings and 10 through letters to representatives). In the second year of the program (2023-24), in which we began our evaluation, 75 students from NJ's five medical schools attended at least one program workshop, with 41 students graduating the program.

More participants (n=29) after participating in the SHPSP responded "Yes" when asked if they "Worked with fellow citizens to solve a problem in your community" (51.72% vs. 27.59% [baseline]; p < 0.05), "Attended a political meeting in local, town, or school affairs" (51.72% vs. 27.59% [baseline]; p < 0.05), "Been an active member of a group that tries to influence public policy or government, not including a political party" (44.83% vs. 20.69% [baseline]; p < 0.05), "Lobbied for a cause to a political official" (68.97% vs. 13.79% [baseline]; p <0.05), "Contacted a national, state, or local government official about an issue that is important to you" (51.72% vs. 27.59% [baseline]; p < 0.05), "Belong to a group on a social networking site that is involved in political or social issues, or that is working to advance a cause" (66.52% vs. 37.93% [baseline]; p < 0.05).

Participants who completed the five workshops (n=31) reported greater confidence with skills and core concepts in four of six measures in the category "Building relationships with state officials". In the categories of "Communicating across the aisle" and "Developing a strategy for legislative meetings", there were significantly higher scores in all four and six measures, respectively, upon program workshop completion.

Discussion:
The SHPSP was effective in promoting advocacy behaviors and confidence with key advocacy skills and concepts. Our program had a few strengths they may have increased effectiveness. First, it promoted accessibility by being free, virtual, and including asynchronous make-up options. Second, the program included multiple opportunities to practice skills during workshops, as well as apply skills during legislative meetings with state officials. Third, we discussed bills and health policy issues that were important to both students and our medical society partner, which may have strengthened program buy-in. In this coming year, we aim to grow the SHPSP cohort and bring our sustainable advocacy training model to other states.

Neha Kuderu and Natalia Kellam Sahler

Standardizing the Robert Wood Johnson Medical School Student Pediatric Clerkship Experience through Objective Standardize Teaching Experiences (OSTEs)
Project Mentor: Elizabeth Goodman, MD

Introduction

With medical schools expanding the number of clerkship sites to meet enrollment demands, a lack of assessment tools exists to ensure equitable educational experiences across sites. To address this gap, we utilized Objective Standardized Teaching Experiences (OSTEs) to assess and standardize resident teaching quality while improving resident-as-teachers education.

Methods

We implemented two OSTE workshops across two Pediatric PGY-1 classes at three clerkship sites. Our 2023 cohort went through four OSTEs (2 Feedback, 2 One-Minute Preceptor (OMP)) without a teaching lecture to establish baseline skill competence and efficacy of OSTE alone as a teaching tool. Our 2024 experimental cohort completed the same four OSTEs with an interactive lecture in between to evaluate if a workshop model improved and normalized OSTE scores. Residents received formative evaluations using standardized OSTE rubrics and completed pre- and post-workshop surveys.

Results

In 2023, there were no significant OSTE score improvements, though interns reported a 15.7% increase in teaching confidence (p<0.05). In 2024, with the addition of a teaching lecture, we saw significant score increases in our OMP OSTE (p<0.001). Our 2024 cohort did not report increased overall confidence in teaching abilities (p=0.17), however, they did report increased confidence in specific skills (p<0.01). In 2024, we noted baseline differences across clerkship sites in Feedback OSTE scores (p=0.003) that normalized post-lecture (p=0.44). We did not detect baseline OSTE score differences in other cohorts.

Discussion

The usage of an OSTE-lecture-OSTE model improves resident OMP skills as well as encourages more critical learner reflection on teaching abilities. The usage of OSTE may not be an effective way to teach general feedback skills, but it can serve as the starting point for longitudinal programming. More research is needed to improve teaching quality assessment tools to ensure equal learning opportunities across multicenter clerkships.

Distinction in Medical Education

Vasundhara Balraj, B.S. and Bhargav Vemulapalli, B.A.

Implementation of "Second Generation" Revisions to a Pre-clerkship Health Systems Sciences Curriculum
Project Mentor: Paul Weber M.D. R.Ph. M.B.A

Purpose
Health Systems Sciences (HSS) education is a critical component of medical training, equipping students with knowledge of healthcare delivery, policy, and systems-based practice. The purpose of this study was to assess knowledge gain of pre-clerkship students after implementing the "second generation" HSS curriculum at Rutgers Robert Wood Johnson Medical School. Additionally, we aimed to evaluate perceived benefits of the "second generation" HSS curriculum in the pre-clerkship phase.

Methods
A prospective cohort study was conducted with medical students from the RWJMS Class of 2026. Participants attended a two-lecture series on HSS topics and completed pre- and post-lecture assessments to evaluate knowledge gain. Pre- and post-lecture assessment scores were compared using paired t-tests. Post-lecture surveys were administered to assess student perceptions regarding the content.

Results
Of the 165 students in the Class of 2026, 69 (41.82%) completed the pre-test assessment, while 34 (20.61%) also completed the post-test. The mean pre-test score was 4.43 (SD=1.39), which significantly increased to 6.48 (SD=1.88) on the post-test, with a mean score gain of 1.85 (95% CI: 1.24–2.47; p<0.0001).

Conclusion
The "second generation" HSS curriculum significantly enhanced pre-clerkship students' knowledge of health systems sciences, as demonstrated by a statistically significant increase in post-lecture assessment scores. These findings highlight the curriculum's effectiveness in strengthening foundational healthcare systems knowledge. Future iterations should focus on expanding participation and incorporating interactive learning to enhance engagement and retention further.

Bhargav Vemulapalli BA, Vasundhara Balraj BS

Analyzing the Impact of a Revised Health Systems Science Curriculum in Undergraduate Medical Education
Project Mentor: Dr. Paul Weber, MD RPh MBA

Introduction:
The evolving complexity of the U.S. healthcare system necessitates the integration of Health Systems Science (HSS) education into undergraduate medical curricula. Rutgers Robert Wood Johnson Medical School (RWJMS) revised its longitudinal HSS curriculum within the Physicianship (PDP) I & II and Patient-Centered Medicine (PCM-3) courses to enhance student preparedness for clinical practice. This study evaluates student perceptions of the revised curriculum, focusing on instructional effectiveness, content organization, and perceived value for clerkship readiness.

Methods:
A prospective cohort study using post-lecture surveys was conducted among second-year (MS2) medical students enrolled in RWJMS's PDP I & II and PCM-3 courses. Surveys assessed student knowledge acquisition, perceived curriculum value, and applicability to clinical training. Another follow-up survey assessing the relevance of the HSS material to clerkship

experiences was administered to third-year (MS3) medical students. Survey responses were collected using a 5-point Likert scale, converted into numerical scores (0–4), and analyzed using mean and standard deviation to assess trends and variability. Open-ended feedback was thematically examined. All statistical analyses were performed using SAS 9.4.

Results:
Post-lecture surveys were completed by 41 (24.85%) MS2 students. Among respondents, 92.68% (38/41) strongly agreed that the newly incorporated HSS topics were valuable to their education and training. The mean total score on the Likert-scaled survey (maximum of 52 points) was 46.22 (SD=3.77). Additionally, 87.80% (36/41) of MS2 students rated both the instructional style and content organization as “Good” or “Very good.” In the third-year surveys, students highlighted the relevance of HSS concepts in clerkships, particularly in navigating insurance policies and patient care decision-making. They suggested more interactive learning opportunities as a part of the lecture series.

Conclusion:
The revised RWJMS HSS curriculum significantly enhanced student knowledge and preparedness for clinical practice. High student engagement and positive evaluations support the integration of structured HSS education in medical training. Future improvements should incorporate additional interactive components to strengthen engagement and knowledge retention further.

David Garyantes

Clearing the Air: Integrating Environmental Health and Climate Change into Medical Education
Project Mentors:
Catherine Chen,MD, Michael Gochfeld, MD, Kristen Coppola, PhD, Paul Weber, MD and Betsy Mathew, MD

Rising global temperatures and worsening air pollution pose immediate threats to both environmental and human health. Air pollution has risen over the last century as the western world and then China underwent industrialization1. Temperatures are projected to rise another 1.0°C (1.9°F) by century’s end². These changes have led to worsening heat waves and smog, exacerbating conditions like heart failure, myocardial infarctions, diabetes, COPD, and psychiatric disorders3, 4. Days over 32°C (90°F) are linked to a 66% higher risk of cardiovascular death5, while elevated PM2.5 levels increase emergency visits, particularly among children and asthmatics (https://pubmed.ncbi.nlm.nih.gov/26347419/).

Despite these realities, the health impact of climate change remains minimally integrated into medical education. A 2019 survey found only 18.1% of family medicine residents received training on environmental health histories, though 92% recognized its importance6 and just 15% of 2,817 global medical schools included these topics into their curricula7.

To address this gap, a segment on the respiratory health impact of ambient outdoor pollution was incorporated into a pre-existing M1 occupational health seminar delivered to students after their pulmonology block in 2023 and 2024 (and 2025). The lecture focused primarily on the respiratory health impacts of pollution in industrializing cities. Pre and post-surveys conducted demonstrated increased student knowledge about, and heightened interest in environmental health.

This project, part of the overall goal by the curriculum committee and Medical Students for a Sustainable Future (MS4SF) to have longitudinal inclusion of environmental health topics, aims to help RWJMS serve as a model for other medical schools adapting to climate-related health challenges.

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Anisha Tyagi

Healthy Benefits of Healthy Foods
Project Mentors: Dr. Catherine Chen, Dr. Kristen M. Coppola

Physicians often feel ill-equipped to provide adequate nutritional counseling due to insufficient training, with only 8% reporting confidence in their nutrition knowledge. Family medicine residents, in particular, receive minimal formal nutrition education, despite counseling patients on dietary habits. There is a growing need to incorporate nutrition education earlier in medical training, yet few medical schools meet the American Society of Clinical Nutrition's recommended 37-44 hours of nutrition instruction. Additionally, environmental health, particularly sustainable food systems, is largely absent from U.S. medical curricula.

This study aimed to assess the feasibility and effectiveness of an evidence-based nutrition module, Healthy Plate, Healthy Planet, integrated into the preclinical curriculum at Rutgers Robert Wood Johnson Medical School (RWJMS). A total of 165 first-year students completed this self-paced module, which focuses on dietary shifts for personal and planetary health. Students participated in pre- and post-surveys assessing knowledge, attitudes, and comfort discussing nutrition with patients.

Results showed a significant increase in knowledge of sustainable diets ($p = 0.042$) and comfort in discussing dietary recommendations with patients ($p = 0.038$). Additionally, 76.5% of students felt the module effectively met its learning objectives. Common barriers to incorporating environmental health into dietary recommendations included time, financial constraints, and lack of education.

This study highlights the potential for integrating nutrition and environmental health into medical curricula, enhancing students' competence and comfort in providing nutrition-related care. Longitudinal research is needed to evaluate the long-term impact on physician behavior and patient outcomes.

Distinction in Medical Humanities

Divya Anand

The Importance of Creative and Narrative Writing in Developing Clinical and Patient Care Skills
Project Mentor: Meigra M. Chin, MD

Self-reflection is critically important in the training of young physicians. Studies show that reflection enables students to learn complex subjects, deepen their professional values, and improve their attitudes and comfort when exploring difficult material [1]as well as gain better skills development, professional growth, the ability to act on change and empathic attitudes and sensitivity towards one's own and others' emotions [2]. This creative writing portfolio entitled To Be Living in a Human Body centers around the theme of recognizing the human nature of patients and medical professionals and reflecting on the role of the human body not only as a focus of medical practice but also as the core of social themes including beauty, shame, and strength. Reflection through writing is a well-studied pathway to improved learning and patient care as well as physician mental health and fortitude. By writing this portfolio, I aim to improve my own clinical skills and attitudes as well as inspire other physicians in training to reflect on both their personal and professional lives through any creative medium they find comfortable.

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Shivani Bahl

Exploring Psychiatry Through Black Mirror: A Didactic Series on Mental Health, Society, and Technology
Project Mentor: Anthony Tobia, MD

I created a didactic series which leverages episodes of the popular anthology series Black Mirror to explore key topics in psychiatry, psychology, and sociology. Episodes such as "Hang the DJ," "Nosedive," "White Christmas," and "Hated in the Nation" serve as case studies for interactive discussions on various mental health topics. For example, in "Hang the DJ," we examine depersonalization and derealization. We also discuss attachment styles, such as anxious-avoidant and secure attachment, and discuss how early childhood disorders, including disinhibited social engagement disorder and reactive attachment disorder, manifest in adulthood. "Nosedive" offers an opportunity to explore anxiety disorders, focusing on generalized anxiety disorder and social anxiety disorder, through the lens of societal pressure and social media. "White Christmas" is used to discuss psychotic disorders, as well as the ethical and psychological consequences of isolation as punishment. Each session consists of a 1-hour seminar, conducted several times a week with groups of 20-30 undergraduate students interested in mental health fields. The sessions combine interactive icebreakers, guided discussions, and polls (using platforms like PollEverywhere) with lectures. Feedback from participants has consistently been positive, highlighting the engaging and safe environment provided for exploring complex mental health topics. The curriculum will be presented at the Pop Culture Association's 2025 Conference.

Ankitha Dindigal

From Clay to Clinic: Using Sculpting to Enhance Anatomical Understanding in Medical Students
Project Mentor: Meigra Chin, MD

The use of creative outlets and humanities in the medical field has existed for many years. Narrative medicine and visual arts are both humanities disciplines shown to help practitioners have a deeper understanding of a patient's condition and experience, thus leading to improved patient care. Courses provided to medical students in the humanities have led participants to develop stronger communication skills, greater openness to diverse perspectives, and more personal growth [1]. For my DIMH final project, I wanted to combine my interests in sculpting and medical education. I decided to host a creative event for the RWJMS student body to learn how to sculpt an anatomically accurate model of the human heart. Fifteen students attended, and we used air-dry clay to sculpt the atria, ventricles, conduction system, and vessels on the outer surface of the organ. I enjoyed guiding students through the steps and understanding different teaching and learning styles. I found that building a three-dimensional model of the heart reinforced the anatomy in a unique way, even before some of these students spent time in the cadaver lab or on clinical rotations. Reasoning through the exact starting and ending points of each structure assisted students in better understanding the physiology and pathophysiology of cardiac conditions. I look forward to incorporating models in my discussions with patients to explain and visualize their diagnoses more effectively. I believe that integrating the humanities into medicine makes stronger physicians and is an integral part of the medical school experience.

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Sanjana Eranki

I Believe in Miracles
Project Mentor: Meigra Chin, MD

For the past few decades, narrative-based medicine has provided a framework for navigating the complexities of care. I centered my capstone work around palliative care as patient stories are at the forefront, forming the crux of our management plans. In "I Believe in Miracles" (Journal of Palliative Medicine), I describe an encounter during which a patient diagnosed with pancreatic cancer refuses a long, challenging surgery and instead prefers palliation for pain management and end-of-life care. Listening to his story and his values profoundly shaped the conversation of his treatment options and was integral in framing my view of cure vs. quality of life. Building off of these ideas, I detailed another patient encounter I had earlier this year in an essay called "A Journey to Peace" (Journal of Pain and Symptom Management). Here, I focus heavily on the patient's core values while exploring the dimension of surgical treatment in palliative care. I also wrote about a challenging and emotional encounter in a poem of a 4-year old patient who was found to have metastatic cancer. Adopting a narrative style allowed me to tell her story while processing the difficulty of losing a young patient. Each piece that I wrote

encouraged introspection and lent insight into my growth in the non-technical areas of medicine: empathy, compassion, and resilience. Thus, I believe the benefit of narrative experience for physicians is multidimensional, nurturing the humanity and understanding necessary for daily practice while cultivating the emotional endurance and self-awareness that is crucial to longevity.

Valerie Ricciardi

Empowering Patients: Themes in Current Children's Literature
Project Mentor: Dr. L. Nandini Moorthy

Reading to children has been shown to be instrumental for their intellectual, psychosocial, and emotional development. The importance of reading has been included in AAP guidelines and reflected through programs such as Reach Out & Read, which centers on the pediatrician's office as a site for intervention. Through my experience volunteering with Reach Out & Read via Zoom during the COVID-19 pandemic, I began to wonder how physicians are represented in recent children's literature and how this can inform the way that pediatricians interact with their patients.

I searched the Main Library database, which encompasses most libraries in Northern New Jersey, using keywords including "doctor," "physician," and "vaccine," then read available picture books published after 2020 featuring doctors as characters. I analyzed them from a literary standpoint, looking for narrative themes and approaches. My initial question was whether doctors were portrayed in a positive and negative light and how that could influence the narrative strategies that pediatricians use to connect with patients. In the end, the representation of physicians was largely neutral, but the books offered valuable tools for interacting with and empowering pediatric patients, including using games to ease anxiety and validating complex emotions.

Distinction in Medical Innovation and Entrepreneurship

Shareif A. Abdelwahab, Esq

Rencare: A Holistic Renal Support Application
Project Mentor: Paul Weber MD, RPh, MBA

Rencare is a digital startup and application that promotes using dialysis in one's home to treat End Stage Renal Disease (ESRD).

ESRD affects approximately 800,000 individuals in the US, with 20,000 new cases per year. It is treated using dialysis, which is typically administered in centers across the country. The cost of dialysis is particularly significant, accounting for 7% of Medicare's annual budget. For these reasons, the Center for Medicare and Medicaid Services (CMS) has set out to reduce costs by promoting dialysis at home.

Despite this, there has been a general reluctance amongst patients to do so. This is due to the following reasons: (1) a general apprehension about using a modality at home, particularly one that has been traditionally associated with centers; and (2) misgivings about one's ability to operate a dialysis machine at home specifically.

Rencare addresses these issues through 3 key components: (1) an online community geared towards patients with ESRD and those using dialysis at home; (2) interactive games and training modules to educate patients and caregivers about using dialysis at home; and (3) real-time assessments to stratify risk amongst patient populations.

In so doing, Rencare increases rates of dialysis at home and decreases costs accordingly. This is particularly lucrative under a new cost-sharing payment model promulgated by CMS, whereby companies that decrease such costs stand to realise these savings as profits.

Sanjana Eranki

A Novel Mitral Valve Annulus Sizing Device for Applications in Cardiothoracic Surgery
Project Mentors: Paul Weber, MD & Leonard Lee, MD

Background: Approximately 86,000 mitral valve repairs occur annually in the United States. The process of accurately sizing the mitral valve annulus is imperative as an imprecise valve measurement may lead to postoperative complications.

Design Creation: We propose a device utilizing infrared sensor technology for the accurate measurement of mitral valve annulus size. With Fusion 360 software, a model of the device was created. The components include a handle which would have fiber optic cables running inside, a curved attachment to enhance surgeon maneuverability attached to a spherical structure containing the camera, and two bars attached to the illuminating diodes for measurement of the annulus size. A force-transducing ring is attached to the device with bars that can be extended with manual pressure.

Design Explanation: A catheter-based approach into the heart will allow for manipulation of the infrared camera into the annulus. After the size is recorded, the surgeon can then expand the circumferential force-transducing ring into the annulus and adjust it as appropriate to accommodate for annulus tension. The saline test will then be conducted and the surgeon can apply the sutures into the tissue.

Future Directions: Building this device would require 316L steel, fiber optic cables, infrared laser, camera, and the force transducing ring. The sensor can be configured to display the measurements through open-source electronic prototyping. Biocompatibility testing must be conducted to confirm that it is safe to use on human tissue. Further testing will be necessary to confirm the accuracy, precision, and reliability of the device.

Robert S. Rosen

The Commercialization of JAK-STAT Therapeutics for the Prevention of CAR T-cell Toxicities
Project Mentors: Amer Assal, Martin Yarmush, Rene Schloss

Chimeric Antigen Receptor T-Cell therapy has revolutionized the treatment and management of patients with relapsing and refractory B-cell malignancies but is limited by its severe ‘black-box warning’ hyperinflammatory toxicities. We have previously published how we can effectively manage these toxicities in vitro by targeting the JAK-STAT mechanism with repurposed treatments or next-generation RNAi therapeutics, whereas the current standard of care fails. Yet there are currently no clinical investigations targeting this pathway for this indication. This distinction outlines the steps taken to launch this innovation into the industrial and clinical spaces. We detail the conversations, meetings, and applications completed for filing patents, professional networks, and venture capital meetings to make this translational project a reality. These discussions focused on potential market opportunities and the novelty of the approach, distilled into its actionable scientific discovery ready for commercialization.

Hartej Singh

The Scleral Tunneling Apparatus for the modified-Yamane Technique
Project Mentor: Dr. Howard Fine and Dr. Kush Patel

Cataract surgery involves removing the sclerotic lens and placing an intraocular lens (IOL) in the empty capsular bag. If the bag is lost, the secondary IOL is sclerally fixed using the modified-Yamane technique. This involves creating two scleral tunnels, 6 clock hours apart, through which the IOL haptics are passed. Scleral tunneling is typically done free-hand, which can lead to intraoperative and postoperative complications. The pars plana, an avascular region of the eye, is the ideal location for tunneling. However, improper tunnel creation can result in retinal detachment (2%) and vitreous hemorrhage (4-5%), as well as IOL dislocation (2-6.4%) and tilt (2%), which can cause visual issues. To support the secondary IOL, the tunnel should be 2mm in length, but achieving the correct approach angle (6-8°) is challenging. Shorter tunnels can lead to haptic erosion, potentially causing infection and endophthalmitis, which can result in ocular loss.

Our device aims to standardize scleral tunneling, ensuring tunnel creation 3.5mm from the corneal limbus to reduce the risks of retinal detachment and vitreous hemorrhage. By controlling the tunnel length and approach angle, the device can minimize complications such as IOL dislocation, tilt, and haptic erosion, ultimately improving outcomes following the modified-Yamane procedure.

Distinction in Research

Sruti Cheruvu

Post-Traumatic Epilepsy is Associated with Reduced Visuospatial Memory and Executive Function
Project Mentor: Dr. Hai Sun

Background: Cognitive impairment is a significant comorbidity in subjects with traumatic brain injury (TBI) and post-traumatic epilepsy (PTE). Current literature reviews show mixed results on the relationship between PTE and cognitive decline due to varied assessment methods among different studies. This study identifies neuropsychological tests most pertinent to PTE while considering the presence of highly epileptogenic brain contusions.

Methods: Healthy controls (HC), non-epileptic TBI (neTBI), and PTE subjects underwent MRI neuroimaging and neuropsychological tests. ANCOVA assessed differences in neurocognitive performance among subject groups, factoring in demographic and brain contusion characteristics. A Random Forest (RF) model ranked the importance of neurocognitive, demographic, and contusion features as potential PTE biomarkers. Contusion severity and location were correlated with neurocognitive outcomes.

Results: PTE subjects performed significantly worse than neTBI and HC subjects on BVMT Trials 1-3, BVMT Delayed Recall, SDMT Written, and Dots Test, identified as the four most important tests in the RF (AUC 0.84). Impairment in neuropsychological test scores was found to correlate with the size of contusion in several brain regions. These regions tend to have a higher incidence of PTE subjects than in neTBI subjects.

Conclusions: Visuospatial memory deficits (BVMT-R) and executive function deficits (TMT-B) have significantly higher sensitivity to PTE. We propose that epileptogenesis led to an additional burden on the functional network at the contusion sites and exacerbated the cognitive impairment in PTE subjected. The results of our investigations point to cognitive function monitoring as a potential biomarker for risk assessment and early identification of PTE in TBI patients

Nicholas B. Dadario

Convection-Enhanced Delivery of Dexamethasone Suppresses Tumoral Inflammation in Glioblastoma and Avoids Systemic Toxicities
Project Mentor: Dr. Jeffrey Bruce, Dr. Kiran Chada, and Dr. Hai Sun

Dexamethasone is widely used to manage cerebral edema in glioblastoma patients, but its administration is associated with significant systemic toxicities and worsened prognosis. Additionally, tumor-associated microglia and macrophages form the basis of the chronic inflammatory milieu of glioblastoma's tumor microenvironment and have been implicated in tumor progression. In this study, we evaluate convection-enhanced delivery (CED) as a strategy to locally administer dexamethasone to the tumor microenvironment. We found that 7 days of CED of dexamethasone was well tolerated and conferred a modest survival benefit in a syngeneic glioma mouse model. We used single nucleus RNA sequencing and immunohistochemical staining to evaluate the peritumoral tissue immediately following dexamethasone treatment. We found that CED of dexamethasone dramatically reduces intratumoral inflammation and was more effective at reducing intratumoral inflammation than systemic drug delivery. These anti-inflammatory effects were validated using induced human pluripotent stem cell-derived microglia. Also, we show that CED of dexamethasone allows for preferential delivery of the drug to the brain and avoids systemic side-effects in mice. We believe our work establishes CED of dexamethasone as a translatable approach to target glioma-associated inflammation while mitigating the side effects of systemic steroid therapy.

Srivarsha Kaloth

A Qualitative Study of Perspectives on South Asian Dietary Practices: Exploring a Framework for Culturally Tailored Food-is-Medicine Interventions
Project Mentor: Dr. Soko Setoguchi, Dr. Nurgul Fitzgerald, Dr. Aparna Kalbag

Introduction: South Asians (SA) have a 2-4-fold increased risk of developing cardiometabolic disease (CMD) compared to non-Hispanic Whites. Cultural dietary practices ("fried snacks, sweets, high-fat dairy,") may contribute. Addressing CMD disparity in SA through Food-is-Medicine (FIM) interventions requires culturally adapted approaches using community input.

Methods: This qualitative study aimed to understand cultural influences on SA dietary practices and identify facilitators/barriers to engagement in FIM interventions. We conducted in-depth interviews among SA adults aged 18-85 with CMD (diabetes, HTN, HLD, CAD, CVD) or their caregivers. Open-ended questions explored food choices, barriers to dietary change, and suggestions for future intervention designs. Interest in FIM program features and the importance of family involvement were rated (1: not important/open; 5: extremely important/open). Descriptive statistics summarized ratings. Template analysis using NVivo identified key themes.

Results: Among 20 SA adults with CMD, most (70%) favored South Asian (vs. American) foods in their daily diet. Rationale included: familiarity, preference, health, cultural preservation, and cooking knowledge. Social environments were seen as a major barrier to healthy eating due to tempting foods and an "eat-more" culture. The majority (75%) viewed family involvement as extremely important for long-term dietary change. Most (80%) were open to participating in FIM interventions and interested in features like written education materials (4.3/5), individualized nutritional counseling (4.15/5), and customized meal plans (4.15/5). They also preferred interventions recommended by healthcare providers (4.23/5) and delivered remotely (65%).

Conclusion: Culturally tailored FIM interventions for SA should incorporate healthy modifications to traditional foods and family involvement to enhance program acceptability/engagement.

Najm S. Khan, MBS

Chronic Rhinosinusitis and Mental Health
Project Mentors: Omar G. Ahmed, MD, Marc L. Steinberg, PhD and Reynold A. Panettieri, MD

Objective: To determine the bidirectional risk of anxiety and depression for patients with CRS.

Design, Setting, and Participants: This retrospective cohort study of the National Institutes of Health All of Us database from January 1, 2008, to December 31, 2018, included 2 cohorts of adult patients with and without CRS. The data were analyzed from July 1, 2023, through April 1, 2024. Patients were classified as having CRS if they had at least 2 diagnoses during the study period. Those with a diagnosis of CRS before the study period were excluded. Patients were propensity score matched (1:5) with patients without CRS for age, sex, race, and annual household income.

Main Outcomes and Measures: The primary outcome was the development of anxiety and depression. Patients with CRS were counted as having the primary outcome if it occurred after the criteria for CRS diagnosis were fulfilled. Multivariate logistic regression and survival analysis were performed to determine the odds ratios (ORs) and hazard ratios (HRs) of anxiety and depression. A secondary survival analysis determined the risk of developing CRS between patients with anxiety and depression and controls.

Results: Among 33 732 patients (23 382 [69.3%] female individuals; 510 [1.5%] Asian, 6002 [17.9%] Black or African American, 576 [1.7%] multiracial, and 26 036 [77.2%] White individuals), there were 28 110 controls and 5622 patients with CRS. Along with higher odds of having anxiety (OR, 4.39; 95% CI, 3.95-4.87) and depression (OR, 2.04; 95% CI, 1.86-2.24), patients with CRS were at an increased risk of developing anxiety (HR, 2.79; 95% CI, 2.47-3.15) and depression (HR, 1.40; 95% CI, 1.27-1.55) compared with controls. Additionally, patients with anxiety (HR, 2.37; 95% CI, 2.18-2.57) and depression (HR, 1.59; 95% CI, 1.46-1.72) were at an increased risk of developing chronic rhinosinusitis compared with controls.

Conclusions and Relevance: In this population-based cohort study of adults with and without CRS, a bidirectional association between common psychiatric disorders and CRS was observed. Physicians and health care clinicians who treat patients with anxiety, depression, and CRS should be vigilant regarding these risks and screen patients appropriately.

Kyle Moore

Comparative Outcomes of Radical Nephroureterectomy and Kidney-Sparing Surgery in the Treatment of High-Grade Upper Tract Urothelial Carcinoma
Project Mentor: Dr. Saum Ghodoussipour and Dr. Vignesh Packiam

Introduction and Objective: Patients with upper tract urothelial carcinoma (UTUC) may undergo radical nephroureterectomy (RNU) or kidney-sparing surgery (KSS) based on clinical characteristics. This study compares outcomes of RNU to KSS for high-grade (HG) UTUC.

Methods: We retrospectively reviewed all patients with >1-year follow-up treated for HG UTUC at our institution from 2015-2021. Oncologic and clinical outcomes were recorded. Procedure burden was analyzed as total procedures under anesthesia, anesthesia time, days hospitalized, and cost of care.

Results: We identified 47 patients treated with RNU and 16 with KSS. There was no significant difference in 5-year overall survival, 3-year metastasis-free survival, or 3-year recurrence-free survival. Renal function was preserved (GFR decline <10 mL/min/1.73 m²) two years after surgery in 97.1% of patients treated with RNU and 100.0% with KSS (p=0.12). Patients with RNU experienced fewer procedures but more severe perioperative complications than KSS at 2.1 ± 1.7 vs 3.3 ± 1.8 procedures (p=0.037) and 0.4 ± 0.6 vs 0 severe complications per patient, respectively (p=0.047). Total anesthesia time and days hospitalized for RNU and KSS were similar at 477 ± 184 vs 377 ± 216 minutes (p=0.13) and 6.7 ± 4.5 vs 5.5 ± 4.6 days, respectively (p=0.36). Patients treated with RNU experienced a greater in-network cost than KSS at $9257 (IQR $7386–12550) vs $5789 (IQR $4833–7069) (p=0.009).

Conclusion: Oncologic and clinical outcomes were similar between cohorts. Patients treated with KSS endured a greater procedural load than those with RNU but at reduced in-network cost and fewer complications.

Sorasicha Nithikasem

Demographic, Physical, and Recreational Determinants of Novice Robotic Simulation Performance in Medical Students and First-Year Surgical Interns
Project Mentor: Nell Maloney Patel, MD

Introduction:
Prior studies have identified factors, such as proficiency with video games or musical instruments, that predict baseline aptitude on laparoscopic and endoscopic skills; few, however, have elucidated predictors for novice success on robotic assessments. The current study investigated physical and recreational determinants that may correlate with baseline aptitude on the da Vinci Surgical Skills Simulator amongst medical students.

Methods:
Medical students were included, as well as July first-year general surgery interns, at a large academic institution were consented to participate in the study. After instruction on basic operational skills of the da Vinci Surgical Skills Simulator, they completed two attempts of the SeaSpikes Skills Test, which assigns proficiency scores to the placement of rings on cones based on time and accuracy. Performance parameters measured included total scores, score change between attempts, economy of motion, completion time, number of items dropped, and use of excessive force. Participants completed a survey querying baseline demographics, physical factors (e.g. handedness, hand size), and prior experiences including video games usage, knitting, chopsticks usage, musical instrument proficiency, and sports participation. Data were analyzed using Chi-squared and Mann-Whitney U tests, with significance set to p < 0.05.

Results:
80 medical students and 23 July surgical first-year interns participated in the study. Demographic and physical characteristics such as gender, medical school year, handedness, and hand size did not correlate with surgical simulator success. Frequent video game usage either weekly or daily within the past 6 months was associated with higher total scores compared to infrequent or never players (81 [n=12] vs. 67 [n=68]; p=0.04). Prior virtual reality experience was strongly associated with higher total scores [79 [n=23] vs. 63 [n=57]; p=0.02], amongst other parameters. Active musicians demonstrated improved economy of motion (403 [n=19] vs. 350 cm [n=61]; p=0.041), but not higher scores. Prior childhood experience with video games, chopsticks proficiency, knitting experience, and playing sports were not associated with higher total score.

Conclusion:
Frequent use of video games within the past 6 months and prior virtual reality experience were factors correlated with improved total scores on the da Vinci Surgical Skills Simulator. These findings suggest a potential role for digital training platforms in surgical education.

Kush H. Patel

Risk of Sexual Dysfunction in Men Treated with Pelvic Radiation Therapy for Locally Advanced Rectal Cancer
Project Mentors: Carla Hajj, MD, Anna Petrova, MD, PhD, MPH and Ambarina Faiz, MD, PhD, MPH

Purpose: As the incidence of stage II-III locally advanced rectal cancer (LARC) rises in younger patients, we sought to investigate the risk of sexual dysfunction following radiation therapy (RT) in younger men.

Methods: Men ≤50 years old diagnosed with LARC between 1995-2019 at a single institution were retrospectively evaluated. Primary outcomes of erectile dysfunction (ED) and ejaculatory dysfunction (EjD) were defined via ICD codes. Cumulative incidences were calculated with death as a competing risk. Subdistribution hazard ratios from competing risk regression models were used.

Results: The study included 429 men: 350 received concurrent chemoradiation therapy (CXRT) as part of their treatment, and 79 did not receive RT. The two groups were similar with respect to age at diagnosis, stage, and medical comorbidities associated with sexual dysfunction (p>0.05). With a median follow-up of 6.3 years, the 5-year cumulative incidence of ED in the CXRT group was 25% (95%CI 20-30%) compared to 3.9% (95%CI 1.0-10%) in the no RT group (p<0.001) but no difference was found in EjD between the 2 groups. On multivariable analysis, CXRT maintained statistical significance as an independent risk factor for ED (HR 3.55, 95% CI 1.34-9.44, p=0.011). Within the CXRT group, inguinal coverage in the treatment fields was an independent risk factor for ED (HR 2.38, 95% CI 1.30-4.34, p=0.005).

Conclusion: CXRT independently increases risk of ED but not EjD in patients treated for rectal cancer. Technique and target volumes may impact sexual dysfunction, possibly due to greater radiation dose to the genitalia. These findings may aid in the counseling of young male patients on risks of sexual dysfunction.

Mann Patel

Modern Tolerability and Efficacy of Induction BCG for Non-muscle Invasive Bladder Cancer
Project Mentors: Dr. Saum Ghodoussipour and Dr. Vignesh Packiam

Objectives: Intravesical Bacille Calmette-Guerin (BCG) is the standard treatment for intermediate risk high-grade and high-risk non-muscle invasive bladder cancer (NMIBC). However, it is associated with adverse effects, potentially causing treatment interruptions or discontinuation. This study provides a contemporary analysis of the tolerability and efficacy of induction BCG alongside associated patient and disease-related factors.

Methods: A retrospective analysis of BCG-naive patients diagnosed with high-grade NMIBC and receiving induction BCG at our institution from 2011-2021 was performed. Tolerability was defined as completion of a six-week induction course of BCG without interruption or discontinuation. Multivariable logistic regression was performed to determine risk factors associated with inability to tolerate treatment.

Results: BCG induction was given to 203 patients with NMIBC and tolerated in 147 (72%) patients. Treatment interruption occurred in 44 (22%) patients and 12 (5.9%) discontinued BCG. Median length of interruption was 1 week, most commonly

for concern for urinary tract infection (n=18, 41%) or gross hematuria (n=5, 11%). Between those who tolerated or did not tolerate BCG, there was no significant difference in one-year recurrence (50% vs. 48%). Risk factors associated with inability to tolerate induction BCG included male sex (OR 5.76, p<0.01), hypertension (OR=3.47, p=0.02), and lower pre-treatment hemoglobin (OR=0.73, p=0.03).

Conclusions: Inability to tolerate BCG occurred in 28% of patients, with 5.9% experiencing discontinuation. Interruptions were short, mostly for concern of UTI, and rarely led to discontinuation. Poor tolerability was associated with male sex, hypertension, and lower pre-treatment hemoglobin, providing important targets for reducing risk of BCG interruption or discontinuation.

Samantha Marie Shave

Comparison of Speech Perception Outcomes in Auditory Brainstem Implant Users with Pre- and Peri-lingually Deafened Adult Cochlear Implant Users

Project Mentors: Dr. Scott Shapiro (Rutgers Robert Wood Johnson Medical School), Dr. Maya Ramagopal (Rutgers Robert Wood Johnson Medical School), Dr. Daniel Lee (Massachusetts Eye & Ear Harvard Medical School)

Background: Auditory brainstem implant (ABI) users have modest speech perception outcomes compared to post-lingually deafened users of the cochlear implant (CI). Poor speech intelligibility is also seen in pre- and peri-lingually deafened CI users who are implanted as adults. The ABI bypasses the auditory periphery and electrically stimulates second-order neurons of the cochlear nucleus. Long-term pre- and peri-lingually deafened CI users have absent or limited downstream development of speech centers in the brain. We hypothesize that the differential auditory processing occurring in both implant cohorts (unlike that observed with late-deafened adult CI patients) limits open-set speech perception skills. The aim of this study is to compare longitudinal speech perception outcomes of ABI users with pre- and peri-lingually deafened CI users.

Methods: Retrospective study analyzing data from the Massachusetts Eye and Ear Audiology database (IRB Protocol 2019P000979). We analyzed post-activation speech recognition scores from adult CI patients with pre- or peri-lingual severe to profound hearing loss (diagnosed between 0 and 6 years old) who underwent implant surgery as adults (>20 years old) and adult ABI users. Speech perception tests included the Consonant-Nucleus-Consonant (CNC) and Early Speech Perception (ESP) tests, and speech score rankings were created to account for the variability of different test types based on test difficulty.

Results: We identified 82 pre- and peri-lingually deafened adult CI users and 24 ABI patients from our audiology database. A total of 45 CI users and 8 ABI users met the inclusion criteria for analysis. The ABI group had a lower average speech perception rank (3.00) at peak perception performance compared to the CI group when adjusting for age at onset of hearing loss. Slope and time-to-peak performance show no difference between the two groups (Mean time 41 months-ABI, 31 months-CI).

Conclusion: Both ABI and CI cohorts showed similar trends in longitudinal speech perception scores and took longer to achieve peak perception performance. Although patients from these two implant groups process electrical stimuli at unique locations along the auditory pathways, it is possible that they rely on similar cortical signal processing to enable long-term perceptual saliency.

Distinction in Service to the Community

Sanjana Eranki, Chandravathi Sayani, Leah Cherukara, Aleef Mannan

Improving Health Literacy in Children Aged 5-7 through Interactive Workshops
Project Mentor: Dr. Lakshmi Moorthy

Early childhood is a critical period in which children develop the cognitive skills to be actively involved in making decisions relevant to various aspects of their health. Studies have shown that health literacy in early childhood significantly impacts children's approach to healthcare and awareness of healthy habits. With targeted interventions for health education in early childhood, children can begin to translate this knowledge and adopt habits that have lasting impacts into their adulthood.

The landscape of health literacy shows that it can serve as a major social determinant of health that disproportionately affects people of lower socioeconomic status, ethnic minorities, limited English proficiency, and low education level. With these populations being the most vulnerable to developing chronic disease, it brings about an even greater need to tailor efforts to ameliorate its incidence through early introduction of health topics.

A childrens' health literacy workshop series was developed in partnership with the Greater Brunswick Charter School for students aged 5-7 years old. On average 3 interactive workshops were held each year, addressing topics such as nutrition, sleep and screen time, hygiene, exercise, and an overview of a general doctor's visit. These sessions integrated engaging activities to ensure that students were easily synthesizing the information.

Following the workshops, the team met with the community liaison to integrate feedback and propose improvements for the sessions moving forward. In an effort to create sustainability, a curriculum was created based on these workshops for teachers to further enhance this education for students on a more regular basis.

Cristina Fernandez, Srivarsha Kaloth, Dawn Arumemi, Patrick Lin

Adult Life Learning for Youth (ALLY): Impactful Medical Trainee Mentorship for Youth with Intellectual and Developmental Disabilities
Project Mentor: Dr. Caroline Coffield, Maria Pellerano, Susan Giordano

Background:
Despite concerted adult-life transition planning efforts for graduating teens with intellectual and developmental disability (IDD), adults with IDD are at increased risk of experiencing negative social and health outcomes. Higher rates of poverty, unemployment, and food insecurity contribute to widened healthcare gaps, exacerbated by healthcare providers' implicit bias and lack of experience with the population. Mentorship programs for students with IDD can help students prepare for post-graduation while offering healthcare trainees additional opportunities for engagement.

Methods:
Adult-Life Learning for Youth (ALLY) is a medical-student led mentorship program that prepares students (aged 13-21) with IDD for their transition into adult life, founded in partnership with Piscataway Regional Day School and The Boggs Center on Developmental Disabilities. ALLY offers interactive workshops focused on building self-advocacy, fostering peer-to-peer relationships, and bridging healthcare gaps by exposing medical students to the IDD community.

Results:
Since implementation, medical student mentors have led 1-hour workshops every 3 months, followed by discussion questions to reinforce learning goals for real-life application. Program efficacy and in-person student and faculty feedback garnered high praise in terms of engagement and relevance. Currently, ALLY is expanding its team of mentors to welcome RWJUH pediatric residents.

Conclusions:
Ultimately, ALLY underscores the potential benefits of peer-based mentorship for the IDD community. Interactive workshops empower IDD students with vital life skills for success post-graduation, while granting medical trainees' invaluable insight into specific needs of this community. Integrating such programming early into medical training allows future healthcare providers to better advocate for individuals with IDD.

Taylor Glassman, Praneet Kang, Kevin Fredericks, Sruti Pari

Project REACH: Resilience Education in Adolescents and Children
Project Mentor: Shilpa Pai, MD

Program: Project REACH is a student-led initiative partnering with the United Methodist Church in New Brunswick, NJ, to provide resilience-building workshops for youth (grades 2-12). Medical students design and facilitate interactive sessions twice per semester, equipping participants with skills to navigate life's challenges.
Program Evolution: Despite the COVID-19 pandemic, Project REACH remained in person with minimal disruptions. The program expanded to serve two age cohorts (grades 2-5 and 6-12) and enhanced interactive learning and peer bonding.
Sustainability: Graduating students recruit and mentor new medical student volunteers while maintaining a shared repository of workshop materials. Youth feedback informs curriculum adjustments to meet evolving community needs.
Community Impact: Project REACH has strengthened connections within the church community, providing youth with coping strategies and a sense of belonging. Through ongoing collaboration with our community partner, the program continues to empower participants and create a lasting impact.

Labeeqa Khizir, Lohit Sodagum, Emily Marun, Anirudh Krishnan

Child and Adolescent Mindfulness Project (ChAMP)
Project Mentor: Dr. Sarah Yavelberg

The Child and Adolescent Mindfulness Project (ChAMP) is a student-led initiative that seeks to empower patients of the General Pediatrics department at the Rutgers Health Somerset practice struggling with stress and anxiety. Following isolation ensued by the COVID-19 pandemic, a community-level approach provided a forum for patients referred to our program to learn about healthy coping strategies that promote mindfulness. In a close partnership with Dr. Sarah Yavelberg, a general pediatrician and hospitalist, and Ms. Natalie Chinchar, a licensed clinical social worker with the General Pediatrics department, ChAMP was launched as a sustainable initiative through the creation of mindfulness workshops and a virtual resource guide. The first component of our workshop is aimed at helping participants identify the differences and manifestations of stress and anxiety. The second component of the workshop provides healthy coping strategies that promote mindfulness such as deep breathing, progressive muscle relaxation, and guided imagery. Outcomes of the project include improved participant knowledge of stress and anxiety coping mechanisms, which were evaluated through debrief sessions at the conclusion of our workshop. In combination with the virtual resource guide, ChAMP will be integrated into the Mind, Body, Medicine interest group at Rutgers Robert Wood Johnson Medical School, as part of a volunteering opportunity for their non-credit elective to ensure its sustainability.

Sharwani Kota, Trisha Sindhu, Kush Patel, Radhika Kadakia

Wellness Buddies: Empowering New Brunswick Youth through Interactive Nutrition and Physical Activity Workshops
Project Mentors: Malvika Kaul, PhD and Susan Giordano

Background: In New Brunswick, 49% of boys and 44% of girls are overweight or obese, while nationally, the figures are 32% for boys and 31% for girls. This increased prevalence of obesity can be tied to eating and physical activity habits, as 88% of New Brunswick youth do not eat 3 vegetables a day and 55% have 2 or fewer days of some form of physical activity at school. Therefore, "Wellness Buddies" is a series of interactive workshops aimed at middle and high school students at the Hub City Teen Center in New Brunswick, focused on teaching nutrition and physical activity.

Objective/Methods: Our workshops aim to provide youth with interactive, sustainable, and non-traditional exercises that offer practical knowledge and small, realistic changes for healthier eating, while considering challenges like cost, access, and cultural preferences. The workshops feature engaging activities like portion control demonstrations, nutritional label reading, healthier alternatives to traditional cultural dishes, along with physical activity options such as yoga and Zumba.The project aims to help students make sustainable lifestyle changes by offering affordable, practical nutrition tips and fostering peer relationships.

Conclusion: With over 10 workshops conducted with an average of 15 participants in attendance, the sessions have remained flexible, with content adapted based on student feedback. The program will now be incorporated into HIPHOP as an initiative to promote medical student participation in preventive medicine education for local youth in New Brunswick and to support sustainability within our community.

Sarah Oh and Esther Kim

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 (HFSC), 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 Latine 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 Latine 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.

Shivani Ramolia

Virtual Health Outreach for South Asians
Project Mentors: Maria Pellerano, Susan Giordano, Dr. Gaur

Our project aimed to address health education gaps in the South Asian community by providing sustainable and culturally competent health resources. Our team—Sharanya Bhatheja, Vineeta Maddali, Charmi Rana, and Shivani Ramolia—recognized the unique challenges South Asian Americans face in accessing healthcare, particularly in the wake of the COVID-19 pandemic and the rise of telehealth. As South Asian Americans ourselves, we have witnessed firsthand the communication barriers between healthcare professionals and patients, which can lead to misinformation and limited access to preventive care.

In collaboration with the Sai Datta Peetham Temple in South Plainfield, our initiative sought to empower the South Asian community through video podcasts and interactive discussions tailored to their specific health concerns. These podcasts now serve as an easily accessible, linguistically appropriate, and culturally sensitive medium for disseminating critical health information. By addressing prevalent health issues in this population and fostering an ongoing dialogue, we aimed to improve health literacy and encourage preventive healthcare practices. Our goal was to establish a sustainable platform that bridges the gap between patients and healthcare providers while fostering trust within the community. Through continued outreach, evaluation, and collaboration, we aim to expand this initiative to ensure a lasting impact and greater accessibility for South Asians seeking reliable health information.

Namita Thomas, Athmika Vaseeharan, Chase Hintelmann, Rachel Lamptey

Adult Advocates for Healthier Lives
Project Mentor: Sonia Laumbach, MD

Improving health literacy for male and female older adults in the New Brunswick/Middlesex County area will enable community members to build on their medical communication skills and confidence when advocating for their healthcare needs. Individuals within the older adult population with limited health literacy are associated with greater use of emergency department visits, increased rates of hospitalization, and failure to take important diagnostic tests. We believe that through conducting interactive health literacy workshops at Parker Assisted Living Facility (Parker), community members can learn

from each other's healthcare experiences and make well-informed decisions throughout their medical journeys. Participants will also have access to a health literacy booklet that we will create, providing access to all of our workshops and education materials. By leaving the materials, participants will be encouraged to review the topics they have previously seen and research areas of interest themselves that the workshops touched upon. Through this initiative, we plan to expand patient education and enhance health literacy in order to empower patients to become advocates for their own health and to improve patient understanding when they are faced with medical decision-making.

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