



# RUTGERS

Robert Wood Johnson  
Medical School

## 2023 Distinction Symposium Abstracts

### Distinction in Bioethics

**Michelle Yi**

#### **Ethical Considerations in Brand vs. Generic Antiepileptic Drugs**

*Project Mentors: Dr. Ram Mani and Dr. Eric Singer*

Brand-name drugs and their generic counterparts exist as closely similar but not identical medications. This can be seen in the Food and Drug Administration guidelines for clinical trials establishing bioequivalence and clinical equivalence for generic drugs. The generic equivalent must contain the same active ingredient, strength, dosage, and route of administration as the brand drug according to these guidelines. However, the bioequivalence standard is based on average differences of two pharmacokinetic parameters between the brand and generic formulations. The pharmacokinetic parameters of average peak plasma concentration and area under the curve must fall within a 90% confidence interval. In other words, the pharmacokinetic properties of the generic drug are 80%-120% similar to the brand-name. The similar but non-identical properties of brand and generic drugs become a unique ethical problem in the epilepsy population because some anti-epileptics are considered to have a narrow therapeutic index. This has caused brand vs. generic anti-epileptic drugs to be a topic of debate among epileptologists and a source of hesitancy from patient perspectives. The four prima facie principles of bioethics - patient autonomy, beneficence, non-malevolence, and justice - should be considered in this debate of clinical decision-making and quelling patient misconceptions of generic drugs. However, conflict arises in balancing these four principles against one another. This discussion focuses on the specific ethical issues that arise in consideration of the four prima facie principles of bioethics in brand vs. generic anti-epileptic drugs in epilepsy patients.

### Distinction in Global Health

**Niharika Bhatia**

#### **The U.S. Initiative to Eliminate Racial and Ethnic Disparities in Health: The Impact on the Outcomes of STEMI in New Jersey**

*Project Mentor: Dr. Abel Moreyra*

##### Background

In 1998, President Clinton launched a Federal initiative to eliminate racial and ethnic health disparities. The impact on the outcomes of ST-segment elevation myocardial infarction (STEMI) has not been well studied.

##### Methods-Results

STEMI outcomes from 1994 to 2015 were studied in 7,942 Black, 27,665 Hispanic, and 88,727 White patients with first admission of STEMI using the Myocardial Infarction Data Acquisition System (MIDAS). Logistic regressions were used to assess mortality adjusting for demographics, comorbidities, and interventional procedures. There was an overall rise from 1994-2015 in the use of percutaneous coronary interventions (PCI) in all three groups. Before 1998, White patients received more PCIs compared to Black and Hispanic patients ( $p < 0.05$ ). After 1998, the disparity in use of PCI in Black and Hispanic patients was greatly reduced compared to White patients, and the difference reversed in favor of Hispanic patients after 2005 ( $p < 0.05$ ). There was an overall downward trend of in-hospital mortality without evidence of disparity among Black, Hispanic, and White patients. A linear regression model was used with a change point in 1998. Before 1998, the slope of one-year all-cause and cardiovascular mortality was not statistically significant. After 1998, the mortality showed

negative slopes for all three groups, however, with lower overall crude mortality for Hispanic patients compared to Black and White patients ( $p < 0.0001$ ).

#### Conclusions

The initiative launched in 1998 may have contributed to a reduction in PCI utilization disparity in STEMI patients. Short and long-term mortality decreased in all three groups, but more in the Hispanic population.

#### **Rachel Patel**

##### **Telemedicine**

*Project Mentors: Dr. Javier Escobar, Dr. Andres Rangel, Dr. Juan Fernando Mesa*

Telemedicine is defined as the delivery of health care and the exchange of health-care information across distances. In many areas of the world, especially low-middle income countries, telemedicine can be a valuable resource to address healthcare disparities such as geographical barriers, specialist scarcity, contact precautions, and transportation hurdles.

Antioquia, Colombia is located in the northwestern part of the country, it crosses two mountains and there are 125 municipalities in the 63,000 km of territory. Due to the geographical climate, it is difficult for patients to continue transport from the municipalities to Medellín because of the cost and distance. In addition, specialists are concentrated in Medellín and the 10 surrounding municipalities, leading to a lack of access to medical services in the other 115 municipalities. In Colombia, telehealth is governed by Law 1419 of 2010, which allows the provision of health services in this manner, and Resolutions 2654 and 3100 of 2019, issued by the Ministry of Health. These rules set out specific requirements and standards to be fulfilled in order to provide telehealth.

The University of Antioquia Faculty of Medicine has created a service-delivery model based on telehealth, called Living Lab or Digital Hospital. The four branches of the telemedicine program include telemedicine, teleassistance, teleeducation, and healthcare analytics. Teledermatology includes store-and-forward telemedicine using WhatsApp to message photos of skin lesions to staffing dermatologists. Remote patient monitoring for diabetes management involves calling patients and soliciting reports of glucose measurements and adjusting medical management accordingly. Overall, the University of Antioquia has a robust telemedicine program suited for the unique needs of the patient population in the region.

#### **Alexandra Fiina Schmidt**

##### **Finnish Maternity Care as a Potential Model for the USA: Preliminary Results, Limitations, and Future Directions**

*Project Mentors: Dr. Reija Klemetti, PhD (Finnish Institute for Health and Welfare) and*

*Dr. Gloria Bachmann, MD (Women's Health Institute, Rutgers Robert Wood Johnson Medical School)*

The USA ranks poorly when compared to other developed nations regarding its maternal mortality ratio. Meanwhile, Finland consistently ranks as one of the safest places to be pregnant and give birth. The Finnish maternal healthcare system (MHS) is structurally different from that of the USA, consisting of a decentralized, community-based network of primary health facilities in which patients receive their care most often from nurses and midwives. Literature review demonstrates similar trends in maternal risk factors in both countries, suggesting that structural differences between the two MHS may explain discrepancies in maternal outcomes rather than differences in overall patient health. However, limitations exist in comparing these two countries, most notably the vast disparities in maternal outcomes by race/ethnicity in the USA. Due to a lack of data on differences specifically in maternal health outcomes based on race/ethnicity in Finland, the MOM survey investigated the experiences of women of foreign origin (WFO) in the Finnish MHS. Data show that WFO report receiving inadequate levels of support more often than their native Finnish counterparts in multiple aspects of pregnancy care. Additional, preliminary data demonstrate that many WFO felt discriminated against, with the most common reasons related to their race, ethnicity, and culture; native language; and/or citizenship. These results suggest that Finland's MHS may still provide a good framework for that of the USA, as Finland continues to produce better maternal health outcomes despite presumably grappling with similar issues as the USA regarding care based on demographic differences such as race.

**Kelsey Thompson, Jessica Occhiogrosso, Marissa Carranza, Juline Hanna, Jake Schade**

## **Creation of the RWJMS HIPHOP-Asylum Clinic, a Medical Student-Led Asylum Clinic for Central and Northern New Jersey**

*Project Mentor: Karen Lin, MD*

Asylum seekers are those who come to the United States to claim protection from a threat to their human rights and are seeking protective status within the country. Complete physical and mental examinations can be an important part in verifying the harm done to individuals that have caused them to seek asylum. 89% of asylum applicants with legal representation and a forensic medical examination were granted protective status, compared to 37.5% with or without legal representation and no forensic medical examination. There is a current asylum case backlog of 667, 229 cases. While the number of individuals seeking asylum in New Jersey itself is not documented, 29 per 100,000 of those granted asylum live in New Jersey. At the time of the program planning, there were no clinics in New Jersey. A medical student team worked with RWJMS faculty and staff to create the Robert Wood Johnson Medical School (RWJMS) Homeless and Indigent Population Health Outreach Project (HIPHOP)-Asylum Clinic to address the gap between needs and services. We have created a student-led volunteer faculty physician and staff supervised medicolegal clinic to accept referrals from an attorney whose client needs a forensic evaluation but cannot afford it. Training is available for interested faculty attendings, resident physicians, and medical students for physical and psychological forensic examination. Attorneys from community legal organizations refer clients as cases require. The team of trained licensed physicians and medical student scribes provide evaluation and an affidavit of examined findings for submission to the court. We accepted our first client in May 2022. We plan to expand the program by encouraging more trained physicians and medical students to meet the demand seen in our community.

### **Distinction in Medical Education**

**Ellen M. Cahill**

## **The Effectiveness of a Journal Club for Improving Evidence-based Medicine Skills and Confidence in Pre-clerkship Medical Students**

*Project Mentor: Dr. Diana Glendinning*

**Introduction:** Evidence-based medicine (EBM) refers to medical practice that uses current best evidence to inform decision-making. This requires several skills including (1) creating an answerable question, (2) searching literature, (3) critically appraising evidence, and (4) applying results. Journal clubs are known to be effective in improving searching and critical appraisal skills in graduate medical education. In pre-clerkship medical education, journal clubs are used less often and students often do not have the opportunity to engage in all of the steps above.

**Methods:** We developed a journal club for pre-clerkship students and measured its effectiveness using a pre-test, post-test design. Students attended 5 journal club sessions run by rotating student leaders and facilitated by faculty. Student groups developed searchable questions from clinical cases, searched the literature, located and critically appraised an article, and applied results to the case. We measured EBM skills and confidence using the Test of EBM Knowledge and Skills and a modified EPIC test.

**Results:** 29 students (MS-1 and MS-2) completed the study. EBM confidence significantly improved at post-test with greatest improvements in the MS-1 student cohort. Confidence in developing a searchable question from a patient case significantly improved in both cohorts. There were no changes measured on the Test of EBM Knowledge and Skills.

**Discussion:** Participation in a faculty-mentored, student-led journal club improved confidence across all domains of EBM, primarily in MS-1 students. Journal clubs are positively received by pre-clerkship medical students and provide effective mechanisms to teach and promote all steps of EBM in pre-clerkship curricula.

**Alisa O. Girard, MBS**

### **Teaching the DSM-V Diagnostic Criteria for Substance Use Disorders Through an Illustrated Narrative**

*Project Mentor: Anthony Tobia, MD*

**Background:** Gaps in substance use disorder (SUD) medical school education limit graduate preparedness for clinical application. Despite growing efforts to improve SUD education, a reliable resource for learning the DSM-V diagnostic criteria for SUD has yet to be seen. In this prospective study, a novel creative educational initiative is evaluated.

**Methods:** An 8-minute narrated, illustrated film was created using mnemonics, homophones, symbolism, and themes designed to encourage memory retention. Surveys were distributed to medical and master's degree students to evaluate baseline knowledge, date of film viewing, and end-of-study knowledge. Half of students received film access (film group). Statistical significance was set at  $p < 0.05$ .

**Results:** A total of 304 students participated in the study. At baseline, only 4.3% correctly identified that there are 11 criteria, and students identified a median of 2 criteria (IQR 0,3). At study endpoint, the film group demonstrated better knowledge of the total number of criteria (76.2% vs. 13.4%,  $p < 0.001$ ) and listed a greater number of criteria (median 6, IQR 4,8) than the control group (median 4, IQR 2,6,  $p < 0.001$ ). These trends were also seen in a subset of medical students. Time since film view did not impact recall of the total number of criteria ( $p = 0.0793$ ) but correlated negatively with the number of listed criteria ( $p < 0.05$ ). Most viewers felt the film was enjoyable (77.3%), helpful (61.9%), organized (86.6%), and offered clear visual aids (88.7%).

**Conclusions:** The outcomes of this study highlight the benefits and enthusiasm for diverse and creative learning tools in an evolving medical education landscape.

**Saloni Jain**

### **In Case of Emergency: Assessing the Effectiveness of a Hands-On Suturing Session in Pre-Clinical Medical Students**

*Project Mentors: Dr. Laryssa Patti & Dr. Kristen Coppola*

**Background:** During medical school, pre-clinical students have limited exposure to training in clinical skills until they enter clinical years, resulting in anxiety for students faced with a test of their procedural skills in clinical settings (13). Wound management, in particular, is a difficult skill to learn without a patient present. This presents the challenge of including clinical immersion experiences into the curriculum early in medical school to increase exposure. This pilot study evaluates students' changes in suturing knowledge, comfort with procedural skills, and perceived ability to teach following a classroom-based suturing workshop taught by Rutgers Robert Wood Johnson Medical School (RWJMS) Emergency Medicine faculty/staff along with the school's Emergency Medicine Interest Group.

**Methods:** 36 first and second-year Rutgers RWJMS medical students participated in the study. Response rate was 53%. Students participated in a workshop that included a didactic component, expert demonstration, and hands-on practice. Students completed a pre and post-test before and after the workshop, respectively. Data analysis was done on IBM SPSS.

**Results:** There was a statistically significant increase in comfort, confidence, perceived ability to teach, and didactic knowledge related to suturing. There was no change in anxiety levels. Reported motivations for participation include increasing hands-on skills and learning suturing.

**Conclusion:** This suturing workshop improved comfort levels, confidence levels, perceived ability to teach, and didactic knowledge related to suturing. The increased perceived ability to teach may increase peer-teaching, which has helped students grow in their knowledge and further improve their skills (15). Next steps include expanding this study to more clinical skills and increasing the number of participants.

**Sarah Tian**

### **Assessing the Effectiveness of Early Childhood Literacy Promotion Education in Medical Students**

*Project Mentors: Dr. Kristen Coppola, Dr. Usha Ramachandran*

**Background:** Early childhood literacy promotion (ECLP) is an essential component of pediatric primary care. Medical students understand the importance of ECLP and previously expressed interest in learning about Reach Out and Read (ROR) and early childhood literacy. This pilot study aims to assess the effectiveness of ROR training as a brief educational intervention to increase student knowledge and provide practical tools for ECLP.

**Methods:** 25 students participated in a brief ROR training session with information on the importance of early childhood literacy and tools for incorporating ECLP and ROR during well-child visits. Scores on the pre- and post-training assessments were used to compare student knowledge. Students also completed an evaluation assessing the training, attitudes towards ROR, and self-confidence in ECLP skills.

**Results:** Knowledge was initially low (40% correct) and increased significantly after the session (70% correct;  $p < .001$ ). The training was well received, with 88% of participants agreeing that the training was useful. Most students felt that ROR training should be incorporated into the clinical curriculum.

**Conclusion:** The short training session was well received by students and increased their knowledge. Participation in ROR can have a positive impact on students' development as future physicians and bolster confidence in their ability to discuss the importance of shared reading and to model reading with children. ROR training in medical school has the potential to widen the reach of ECLP. Further study is needed to evaluate different methods of ROR training and to identify the appropriate timing for ECLP training and education.

## **Distinction in Medical Innovation and Entrepreneurship**

**Sahil Amin and Dhiraj Peddu**

### **Rencare: A Holistic Renal Support Application**

*Project Mentor: Paul Weber, MD*

End-Stage Renal Disease (ESRD) is a condition characterized by a complete loss of kidney function. It affects approximately 800,000 individuals in the US with an incidence of 20,000 new cases per year and a mortality rate of 16%. There is currently no cure for ESRD and patients must either undergo dialysis or receive a kidney transplant to survive. ESRD continues to impose a disproportionate burden on Medicare and federal health services. This is because it is the only chronic condition specifically required to be covered by Medicare and accounts for ~7% of the Medicare annual budget. Accordingly, reducing costs and improving outcomes in the ESRD patient population has become a top priority for the federal government, including a focus on transitioning the care from in-center to home-based dialysis. Our company Rencare seeks to address this issue through a holistic renal support application that helps transition patients with ESRD to home-based dialysis. Rencare consists of three components: an online community to help patients and caregivers navigate their journeys with ESRD, dialysis skills training to ensure caregivers and patients use best practices to prevent adverse events throughout the dialysis process, and real-time assessment and benchmarking to stratify risk amongst patient populations. We believe that Rencare's product will enable home-modality retention, leading to decreased costs in the system for both providers and payers by decreasing hospitalizations, mental health burden, adverse events, and ER visits.

**Anna Obee Giarratana**

### **CancerClique: Anything You Need, Just One Click Away**

*Project Mentors: Dr. Sabin Motwani, Department of Radiation Oncology Cancer Institute of New Jersey, Rutgers Cancer Institute of New Jersey and Susan Engelhardt, Executive Director, Biomedical Engineering*

For cancer patients, navigating the healthcare system can be difficult. The added stress and logistical concerns that a cancer diagnosis brings can make navigating the journey feel overwhelming, and increased stress has been shown to worsen outcomes in cancer patients. Naturally, patients go to the internet for solutions to their problems; however, the internet is full of pseudo-science and scams and it can be difficult for patients to ascertain which resources are actually veritable. This lack of helpful information and support can be frustrating, and importantly, can contribute to unfavorable health outcomes. These

are real and significant problems that face cancer patients and their caregivers, who need verified support they can rely on as they traverse their cancer journey.

We developed the idea for the mobile app CancerClique based on our interactions with patients within the Radiation Oncology Department at the Rutgers Cancer Institute of New Jersey. We developed a business pitch and mobile app prototype in order to help provide connected care for patients. Our mobile app, CancerClique, would be a trusted portal for all the needs of cancer patients and their caregivers. From diagnosis to remission, we would offer a roadmap with all the linkages that patients would need on their healthcare journey. We would offer valuable information on the path ahead, specialized nutritional diet plans, links to transport options, and more, in one simple-to-use mobile and desktop application. With the logistical issues out of the way, patients will be able to focus on what really matters, their health.

## **Erin P. McDonnell**

### **Using Quantitative Fit Testing to Compare Safety of Half-Mask Respirators with Various Skin Barriers: A Pilot Study (Project 1)**

### **Connecting Older Adults and Medical Students During the COVID-19 Pandemic (Project 2)**

*Project Mentors:*

*Project 1: Dr. Jonathan McCoy, Dr. Colleen Donovan, Dr. Daniel Morrison, and Dr. Paul Weber*

*Project 2: Dr. Kristen Coppola, Dr. Carmen Shulman, and Dr. Zahava Nilly Brodt-Ciner*

The COVID-19 pandemic highlighted various needs within our healthcare systems. Two innovative projects were created at the onset of the pandemic: 1) to increase clinicians' comfort with prolonged N95 respirator use, and 2) to ameliorate the consequences of isolation among older adults.

The first Rutgers eIRB approved project compared the quantitative fit-testing results of half-mask respirators with various skin barriers. We enrolled nine clinicians who had had their own 3M™ 6000 series or 3M™ 7000 series half-face mask respirator. Using a cross-over study design, participants were randomized between wearing their 3M™ half-face mask respirator with no barrier, Cavilon™, Tegaderm™, and silicone scar sheet. The silicone scar sheet resulted in the lowest adequate fit while Cavilon™ provided the highest fit factor when compared to other skin barriers ( $p < 0.05$ ). Whether providers are wearing surgical masks, N95 masks or 3M™ half-masks, it is imperative to discover ways to reduce their occupational skin disease and physical discomfort without compromising mask function.

The second project led to "Caring Companions," a program now integrated into our Physicianship I course within the new Curriculum, which connects medical students with New Jersey's community-dwelling older adults through monthly phone calls. We found that medical students with a variety of professional interests volunteered to connect with older adults during the pandemic and were primarily motivated by personal values. This program can serve as a model for other institutions to provide longitudinal, meaningful clinical experiences for students to connect with older adults using a highly cost-effective and intrinsic values-based approach.

## **Distinction in Research**

## **Aishee Bag**

### **Genomics and Epigenetics Guided Identification of Tissue-Specific Genomic Safe Harbors**

*Project Mentors: Dr. Jinchuan Xing, Dr. Detlev Boison, and Dr. Christina Bergey*

**Background:** Genomic safe harbors are regions of the genome that can maintain transgene expression without disrupting the function of host cells. Genomic safe harbors play an increasingly important role in improving the efficiency and safety of genome engineering. However, limited safe harbors have been identified.

**Results:** Here, we develop a framework to facilitate searches for genomic safe harbors by integrating information from polymorphic mobile element insertions that naturally occur in human populations, epigenomic signatures, and 3D chromatin organization. By applying our framework to polymorphic mobile element insertions identified in the 1000 Genomes project and the Genotype-Tissue Expression (GTEx) project, we identify 19 candidate safe harbors in blood cells and 5 in brain cells. For three candidate sites in blood, we demonstrate the stable expression of transgene without disrupting nearby genes

in host erythroid cells. We also develop a computer program, Genomics and Epigenetic Guided Safe Harbor mapper (GEG-SH mapper), for knowledge-based tissue-specific genomic safe harbor selection.

Conclusions: Our study provides a new knowledge-based framework to identify tissue-specific genomic safe harbors. In combination with the fast-growing genome engineering technologies, our approach has the potential to improve the overall safety and efficiency of gene and cell-based therapy in the near future.

Keywords: Chromatin organization; Epigenome; Gene therapy; Genetic engineering; Genomic safe harbor; Mobile genetic elements.

**Matthew Beier**

### **Prenatal and Early Childhood Antibiotics and Chronic Pediatric Conditions**

*Project Mentors: Daniel B. Horton, M.D., M.S.C.E and Martin J. Blaser, M.D.*

#### Background

Antibiotic-mediated microbiome disruption has been implicated in chronic childhood conditions, but prior studies have been limited by bias from confounding. We hypothesized that early receipt of antibiotics would be positively associated with multiple pediatric conditions in a dose-related manner.

#### Methods

We conducted a retrospective cohort study within a population-representative database, Clinical Practice Research Datalink (CPRD, United Kingdom). Prenatal and early childhood antibiotic exposure through age two was characterized by number of courses. We used Cox regression adjusted for material and childhood covariates to estimate adjusted hazard ratios for thirteen outcomes across three categories: allergic, autoimmune, and neurodevelopmental/psychiatric. Additionally, sibling-matched analyses, stratified on household, were performed to control for unmeasured genetic and environmental confounding.

#### Results

Of 1,091,449 children studied, 69% had exposure to antibiotics. Antibiotic exposure in early childhood was positively, dose-dependently associated with asthma and other allergic outcomes, celiac disease, and learning disorders. Prenatal antibiotic exposure was associated with attention-deficit/hyperactivity disorder and autism spectrum disorders in full-cohort analyses, but associations for these outcomes were null after sibling-matching. Residual confounding was a potential limitation, but a negative control outcome suggested minimal confounding bias.

#### Conclusion

Children who received multiple antibiotic courses between birth and age 2 were more likely to develop asthma and multiple allergic outcomes, celiac disease, and learning disorders. These results underscore the importance of judicious antibiotic use in infancy and early childhood.

**Daniel I. Bisno**

### **Virtual Peer Groups Reduce HbA1c and Increase Continuous Glucose Monitor Use in Adolescents and Young Adults with Type 1 Diabetes**

*Project Mentors: Jennifer K. Raymond, MD, MCR, Ian Marshall, MD, and Gloria Bachmann, MD, MMS*

Background: Adolescents and young adults (AYA) from diverse and marginalized backgrounds with type 1 diabetes (T1D) generally have higher HbA1c levels and less frequent continuous glucose monitor (CGM) use than AYA from more privileged backgrounds. Further, scant data address the impact of virtual peer groups (VPG) on health-related outcomes for ethnically and racially diverse AYA with T1D.

Methods: CoYoT1 to California was a 15-month randomized controlled trial for AYA ages 16-25. In this study, AYA were randomized to receive Standard Care (n=28), or CoYoT1 Care (n=40), which consisted of person-centered provider visits and bimonthly VPG. VPG were AYA-driven discussions. AYA completed the Diabetes Distress Scale (DDS), Center for Epidemiologic Studies Depression (CES-D), and Diabetes Empowerment Scale-Short Form (DES-SF) scales at baseline and all study visits.

Results: Participants were 50% Latinx and 75% publicly insured. Among CoYoT1 Care participants, 19 attended at least one VPG session (VPG Attendees) and 21 did not attend any VPG sessions. VPG attendees participated in 4.1 VPG sessions on average. VPG Attendees had a relative reduction in HbA1C ( $p=0.03$ ) and increase in CGM use ( $p=0.007$ ) compared to Standard Care. VPG participation was not associated with statistically significant changes in DDS, CES-D, and DES-SF scores.

Conclusions: In a 15-month randomized controlled trial, AYA with T1D who participated in VPG reported significant improvements in HbA1c and CGM use. Peer interactions may support unmet needs of AYA with T1D from diverse and marginalized backgrounds.

**Daniel S Yoon**

### **Antigen Specific Profiling of CD8 T Cells in Human Melanoma Identifies Markers that Predict Response to PD-1 Blockade**

*Project Mentors: Dr. Alexander C. Huang, University of Pennsylvania; Dr. Peter Yurchenco, RWJMS, Dr. Peter Cole, Rutgers Cancer Institute of NJ, RWJMS*

Background.

Anti-PD-1 therapy (aPD-1) has had significant clinical success in extending survivability of melanoma patients. However, two-third of the patients do not achieve long-lasting benefits and currently, there is no way to predict clinical response. We test whether monitoring melanoma-specific CD8 T cells enables us to gain insights into the mechanism of clinical resistance, and identify potential predictive biomarkers.

Methods. We leveraged a phase 2 clinical trial of neoadjuvant PD-1 blockade at University of Pennsylvania where patients with stage III melanoma patients receive a pre-treatment biopsy, treatment with a single dose of the aPD-1 therapy, followed by tumor resection 4 weeks later, allowing for access to paired blood and tumor samples. We identified melanoma-specific and viral-specific CD8 T cells using MHC-1-peptide tetramers and assessed the phenotypes of these cells using high dimensional flow cytometry.

Results. 12 of 28 patients experienced complete or partial pathological response after a single dose of anti-PD-1 therapy. 75% of patients had detectable melanoma-specific CD8 T cells, demonstrating the feasibility of antigen-specific profiling. Melanoma-specific CD8 T cells in the tumor exhibited features of exhaustion like PD-1 and CD39, in comparison to viral-specific T cells, which had more memory-like phenotypes such as TCF-1 and CD127. Random forest analysis identified that the presence of melanoma-specific CD8 T cells was the strongest predictor of clinical response.

Conclusions. Melanoma-specific CD8 T cells were predictive of clinical response. However, the exact phenotype of melanoma-specific CD8s associated with clinical response needs to be further investigated.

## **Distinction in Service to the Community**

**Kellianne Costello, Gabriela-Portilla Maldona, Raaga Rambhatla, Nishali Shah**

### **Wellness Around the World: Promoting Life-Long Healthy Habits in a Population of Diverse Elementary School Age Children**

*Project Mentors: Dr. Soula Koniaris, MD (Pediatric Gastroenterologist) and Melanie Lee (Registered Dietician)*

Many Middlesex County residents do not receive the recommended daily amounts of nutrients or physical activity, resulting in an increased incidence of chronic health conditions. Thus, there is a significant need for programming that promotes healthy lifestyle choices in the children (ages 6-10) of this community, so that they can develop habits which will improve their future health outcomes. "Wellness Around the World" is a multicultural education program that aims to address this gap in education. Through partnering with the East Brunswick Public Library we have been able to develop an online video series that highlights the healthy food and lifestyle choices that are present in various cultures. By emphasizing healthy practices that are present in each culture, this program educates children on the unique lifestyles of their peers, as well as introduces them to healthy habits that they will carry with them into adulthood.



**Divya Krishna, Jennifer Rha, Jerry So, Kelsey Thompson**

**Patient Liaison Advocacy and Navigation**

*Project Mentors: Dr. Shilpa Pai*

PLAN (Patient Liaison Advocacy and Navigation) works alongside Interfaith Refugee and Immigration Services and Empowerment (I-RISE) to provide navigation services to families newly arrived in the USA. Case managers of IRISE identifies families with medical needs and refers them to the student board. The student board then pairs RWJMS student teams (consisting of one under and one upperclassman volunteer) with families. Student teams serve as medical and cultural liaisons. They assist with understanding medical paperwork, appointment scheduling, referrals, and offer to serve as digital accompaniments to visits. The goal is to help families access care immediately and long-term gain fluency with the American healthcare system. Long term, this offers the chance to also develop educational outreach on health topics for recently arrived families and on immigration health for medical students.

**Sharanya Bhatheja, Vineeta Maddali, Shivani Ramolia, Charmi Rana,**

**Virtual Health Outreach for South Asians**

*Project Mentor: Dr. Sunanda Gaur*

Our DISC team is composed of M4 students, Sharanya Bhatheja and Vineeta Maddali, and M3 students, Charmi Rana and Shivani Ramolia. The idea for this DISC originated in a goal to bridge the gap between health education and diseases highly prevalent in the South Asian community. As South Asian Americans ourselves, we have experienced examples of communication gaps between health care professionals and patients. Specifically in the era of the pandemic and telehealth, we noted that patients are further disconnected from their healthcare providers. In collaboration with Sai Datta Peetham Temple of South Plainfield, we planned to bridge this gap by providing a sustainable and culturally competent health resource in the form of video podcasts and interactive targeted towards this population's needs. In this endeavor, we accurately surveyed our population's needs and hosted informational Zoom sessions on a variety of topics including a COVID informational series and nutrition series. Our program has been successful in establishing a partnership with this community, recreating a sense of community in a time of social isolation, and making healthcare more accessible. Further, we have created a sustainable platform to continue our community outreach by integrating our project with the AAPI student interest group. We are proud to have formed a strong relationship with Sai Datta Peetham temple and have direct conversations with and access to our community.

**Amy Matthews, Alexa Altchek, Raadhika Kher, Tania Atanassova**

**Wellness Warrior Workshop**

*Project Mentor: Dr. Jason Mintz*

Suicide, especially in the adolescent population, is a public health crisis. According to the CDC, suicide is the second leading cause of death amongst 10-14-year-old individuals in the United States, and the rates of depression and anxiety have been increasing among children. Teen mental health is an issue that is at the foreground of our minds, especially with the COVID-19 pandemic contributing to worsening mental health across the board. Through our interactive Wellness Warriors Workshop, we aimed to provide the tenth-grade health classes at Piscataway High School with the tools to engage in their mental health and seek support for themselves and their peers. Wellness Warriors Workshop is structured as an hour-long presentation that starts with a candid discussion about the students' common stressors along with guided relaxation techniques to combat everyday stress. The program then switches gears to inform students about signs and symptoms of Major Depressive Disorder and Generalized Anxiety Disorder in the adolescent population. We use popular TV and movie clips to guide the discussion about the identification of these signs. The program finishes with when and how to ask for help, as well as information about confidential and free resources for support. Through pre- and post-workshop surveys, we assess the effectiveness of the workshop and the confidence level of students in engaging in their mental health and asking for help. It continues to serve as a positive intervention for increasing mental health awareness and education amongst the adolescent population.

