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**GEORGIA**  
College of Public Health

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Join us as we showcase and celebrate the impactful research underway at CPH.

# RESEARCH DAY 2024

Friday, February 9  
The Classic Center  
9:00 AM to 6:30 PM

**PROGRAM**



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# Research Day

## AGENDA

9:00am-9:10am: Welcome - Chas Easley, Ph.D. - Parthenon

### **Health Promotion & Behavior - Parthenon**

9:10am-9:40am: Symposium talk, Lucy Ingram, Ph.D.

9:45am-10:00am: 3-minute Lightning Talks: Tamora Callands, Fiyinfolu Atanda, Lucy Ingram, Christina Proctor, Emily Townsend Vinson

### **Coffee Break**

### **Health Policy & Management - Parthenon**

10:10am-10:40am: Symposium talk, Janani Rajbhandari-Thapa, Ph.D.

10:45am-11:00am: 3-minute HPAM Lightning Talks: Adam Chen, Daniel Jung, Mohammed Rifat Haider, Janani Thapa & Dee Warmath

### **Coffee Break**

### **Environmental Health Science - Parthenon**

11:10am-11:40am- Symposium talk, Wentao Li, Ph.D.

11:45am-12:00pm- 3-minute EHS Lightening Talks: Chas Easley, Leah Lariscy, Erick Mollenido, Lizzy Riegelman

### **Lunch On Your Own**

### **1:30pm-2:30pm: Keynote Address - Parthenon**

**Adam Woods, Ph.D., University of Florida College of Public Health and Health Professions**

### **Epidemiology & Biostatistics - Parthenon**

2:40pm-3:10pm- Symposium talk , Danielle Lambert, Ph.D.

3:15pm-3:30pm- 3-minute EpiBio Lightning Talks: Xianyan Chen, Tzu-Chun Chu, Patrick Kaggwa, Fangzhi Luo, Adenike McDonald

### **Institute Talks - Parthenon**

3:40pm-4:05pm: Institute of Gerontology, Lisa Renzi-Hammond, Ph.D. & Jenay Beer, Ph.D.

4:10pm-4:35pm- Institute of Disaster Management, Morgan Taylor, Ph.D.

4:40pm-5:05pm- Global Health Institute, Juliet Sekandi, Ph.D.

**5:05pm-6:30pm, Poster Session and Closing Reception - Atrium**



# KEYNOTE SPEAKER



**Adam J. Woods, PhD**, is the Associate Dean for Research in the College of Public Health and Health Professions. He is also Director of the Center for Cognitive Aging and Memory (CAM) in the McKnight Brain Institute and a Professor in the Department of Clinical and Health Psychology at the University of Florida.

Dr. Woods' overall research program focuses on discovery and application of novel non-invasive interventions for enhancing cognitive function in adults with and without neurodegenerative disease: with an overarching goal of altering trajectories of decline towards dementia. Dr. Woods' research is currently supported by 4 NIH R01-level grants aimed at altering trajectories toward dementia through novel non-invasive interventions, in addition to a NIH T32 aimed at training pre-doctoral fellows in these methods. He is a national leader in the field of neuromodulation, leading the largest transcranial electrical stimulation (tES) and near infrared photobiomodulation trials to date, multiple cognitive training trials, publishing the first comprehensive textbook in the field of tES, and multiple field standards papers.

Dr. Woods completed a post-doctoral fellowship in Clinical and Cognitive Neuroscience at the University of Pennsylvania after completing his PhD in Cognitive Neuroscience at George Washington University. His undergraduate training in Psychology was completed at the University of Alabama at Birmingham.

## TODAY'S PRESENTATION:

*Combining Artificial Intelligence, Computational Neuroimaging and Brain Stimulation to Discover New Pathways for Primary Dementia Prevention*

## DEPARTMENT PRESENTATIONS

### *Environmental Health Science*

#### *Symposium Talk*

**Wentao Li**, Ph.D., Assistant Professor

#### **Genome-wide Analysis of the Formation and Repair of DNA Damage Caused by Environmental Carcinogens**

Aflatoxin B<sub>1</sub> (AFB<sub>1</sub>) is a potent carcinogen that is responsible for the development of hepatocellular carcinoma (HCC), which is the fourth most common cause of cancer-related deaths worldwide. AFB<sub>1</sub> exerts its genotoxic effects through the formation of AFB<sub>1</sub>-DNA adducts and the subsequent mutagenesis of genes involved in HCC. Nucleotide excision repair is the primary mechanism for removing AFB<sub>1</sub>-DNA adducts. Despite the identification of many DNA damage and repair factors, the regulatory mechanisms underlying DNA damage formation and repair remain incompletely understood. Leveraging the innovative tXR-seq method adapted for AFB<sub>1</sub>, we delve into the repair dynamics of AFB<sub>1</sub>-induced DNA damage, extending our investigation to the 3D genome structure. We generated a single-nucleotide resolution repair map of AFB<sub>1</sub>-DNA adducts in the human genome and identified a unique dual incision pattern for AFB<sub>1</sub>-induced DNA damage. We investigated the role of 3D genome structure in the repair of AFB<sub>1</sub>-induced DNA damage and found heterogeneous repair at different genome organization levels. Our exploration extends beyond the molecular level to assess the heterogeneous repair dynamics at different levels of genome organization. This nuanced understanding sheds light on the complex relationships between DNA repair efficiency, chromatin structure, spatial genome organization, and mutagenesis. Overall, our findings provide insights into the mechanisms underlying the repair of AFB<sub>1</sub>-induced DNA damage and shed light on the complex relationships between DNA repair efficiency, chromatin structure, spatial genome organization, and mutagenesis. These results have significant implications for understanding the development of HCC in individuals exposed to AFB<sub>1</sub> and may inform the development of new therapeutic strategies for the prevention and treatment of HCC.

#### *Lightening Talks*

**Chas Easley**, Ph.D., Associate Professor

#### **Easley Lab: Addressing the Global Decline in Male Fertility**

Recent studies have highlighted the concerning and growing global trends in decreased male fertility. In certain countries, semen parameters in men have declined by over 50%, contributing to global declines in couples' fertility. While these published studies have brought worldwide attention to this trend, dubbed by the media as the "Global Sperm Crisis, the actual causes of this global decline in semen parameters is unknown. Additionally, options to treat male factor infertility are very limited and require the production of functional sperm within the testis to treat patients. Those patients with incomplete spermatogenesis or those patients with azoospermia have no treatment options, despite growing number of patients under these two categories. Work in the Easley Lab focuses on two major fronts: 1) examining how environmental and lifestyle exposures impact spermatogenesis and 2) developing novel, stem cell-based therapies to treat male factor infertility. The Easley Lab examines how alcohol, fentanyl, marijuana, tobacco, PFAS compounds, and SARS-CoV-2 all impact male fertility. Additionally, the Easley Lab utilizes patient-specific pluripotent stem cells to develop two potential treatment options to treat infertility using an animal model. Please come visit our posters to learn more.

**Leah Lariscy**, Doctoral student

### **Comparison of SARS-CoV-2 Wastewater Surveillance Metrics for Predicting COVID-19 Community Burden**

SARS-CoV-2 wastewater-based detection methods are used as indicators of COVID-19 prevalence and can serve as a tool in understanding transmission dynamics as clinical infections are less often reported. Many groups have shown wastewater viral load to be predictive of clinical trends when clinical reporting efforts are strong, but few have examined the predictive power of wastewater detection frequency, which may be an easier end point. This study aims to compare two RT-qPCR-based wastewater metrics, viral load and detection frequency, for their power to predict caseloads, and to explore the utility of wastewater-based surveillance for predicting prevalence in the absence of robust clinical surveillance. Samples were collected between June 2020 and December 2022 from three treatment facilities. Six replicate nucleic acid extractions were performed for each sample and SARS-CoV-2 specific RT-qPCR assays were used (in triplicate) to amplify targets on the N-gene (N1 and N2). Quantification cycle (Cq) values and wastewater flow data were used to estimate viral loads. Assay detection frequency was determined by totaling the positive reactions for each date. Clinical data were obtained from the Georgia DPH. Data were averaged by week and linear regression analyses were performed to predict clinical metrics: positive test count, symptom onset count, and test positivity rate. Test administration declined considerably after early 2022. Due to this, dates after the first week of March 2022 were excluded from model training. Of the metrics evaluated, case positivity rate models on average had higher R-

square values (0.53) than positive test count (0.44) and symptom onset count (0.38). When predicting positivity rate, the detection frequency model had a higher mean R-square value (0.62) than the viral load model (0.43). The process of estimating SARS-CoV-2 wastewater viral load requires time and expertise to develop a standard curve and wastewater flow data from each location. This may be an ideal choice for certain situations, but may not always be the most feasible. Detection frequency could be utilized as an alternative, given its predictive power and simplified approach. This could also allow more laboratories to do surveillance work without needing expensive quantitative equipment, as this could be calculated through non-quantitative means.

**Erick Mollinedo**, Doctoral student

### **Comparisons of the Enhanced Children's MicroPEM® (ECM) gravimetric and nephelometric PM<sub>2.5</sub> personal exposure samples in Guatemala for the Household Air Pollution Intervention Network (HAPIN) trial**

The Enhanced Children's MicroPEM® (ECM) was the main instrument for measuring fine particulate matter (PM<sub>2.5</sub>) exposures in the multi-country Household Air Pollution Intervention Network (HAPIN) trial. Instruments previously used for personal exposure measurements, although accurate, have often been heavy and noisy. The ECM is lightweight, quiet, and captures both an integrated gravimetric sample and real-time (nephelometric) PM<sub>2.5</sub> concentrations. Validation of the ECM to date is limited. The objective of this study was to assess the correlation, agreement and reliability of the gravimetric and nephelometric data between two collocated ECMs in biomass and liquefied petroleum gas stove users. We conducted personal exposure measurements with two collocated ECMs (worn by the same person at the same time) in a subset of pregnant women from the HAPIN trial in Guatemala. Average daily (24 Hr.) PM<sub>2.5</sub> concentrations for the paired gravimetric (n=219) and paired adjusted nephelometric (n=221) samples were compared from collocated devices. We estimated correlation, assessed agreement using Bland-Altman method and calculated the intraclass correlation coefficient (ICC) between collocated ECMs for both gravimetric and nephelometric comparisons. Median PM<sub>2.5</sub> gravimetric concentrations were 93.5 µg/m<sup>3</sup> (IQR=52.6-160.5) and 21.4 µg/m<sup>3</sup> (IQR=12.0-32.0) in the control and intervention groups, respectively. The median nephelometric concentrations were 83.7 µg/m<sup>3</sup> (IQR=47.6-148.9) and 22.6 µg/m<sup>3</sup> (IQR=17.5-29.7) in the control and intervention groups, respectively. Spearman correlations were higher in the biomass group (0.91) than the LPG intervention arm (0.67) in the gravimetric comparisons. The same trend was observed in nephelometric comparisons when contrasting the biomass (0.92) and LPG groups (0.75). ICC values were high in both gravimetric (0.93) and nephelometric (0.95) collocations. The comparisons demonstrate high reliability between collocated ECMs for both gravimetric and adjusted nephelometric PM<sub>2.5</sub> personal exposure

samples in the Guatemala site.

**Elizabeth Riegelman**, Doctoral student

### **Effects of Tea Catechins on the Gut Microbiome and Neurobehavioral Responses in a Transgenic Mouse Model of Parkinson's Disease**

Parkinson's Disease (PD) is the second most common neurodegenerative disease, affecting approximately 2% of the population over 60 years of age. The molecular mechanisms behind PD are poorly understood, however, the misfolding and aggregation of  $\alpha$ -synuclein protein is an important pathological hallmark of PD. Recent studies have emphasized the critical impact of gut microbiome on the progression of PD and its influence on  $\alpha$ -synuclein misfolding. Evidence has demonstrated that the gut microbial profile of PD patients varies compared to healthy controls, with an elevated abundance of bacteria that are associated with increased intestinal permeability, inflammation, and the production of certain neurotoxic substances. Tea catechins (TCs) are a group of dietary flavonoids that have been recognized for their health-promoting attributes that encompass a wide range of physiological functions. Evidence has demonstrated that TCs can act against neurodegeneration by modulating the gut microbiome. To determine the effects of TCs on the gut microbiome, a transgenic A53T mouse model was used to assess neurobehavioral and microbial responses to TC treatment. 6th-month-old A53T male mice were divided into three groups: control, low-dose (0.5%), and high-dose (1.5%), and followed through 90 days as TC was administered through drinking water. Data on water consumption, food intake, and weight were gathered daily, while neurobehavioral data from an open field and rotarod assessment were collected on days 0, 45, and 90 in conjunction with feces and urine collected at days 0, 30, 60, and 90. On day 90 of the open field assessment, high-dose mice spent significantly less time in the center of the field, demonstrated increased thigmotaxis, had fewer line crossings, and had more recorded grooming behavior compared to control mice. On day 90 of the rotarod assessment, high-dose and low-dose mice demonstrated an increased latency to fall compared to control mice. Additionally, results demonstrate the notable impact of TCs on the composition and metabolic profile of the gut microbiome in the mouse PD model. The observed outcomes contribute valuable insights into the interplay between the gut microbiome and PD progression, paving the way for further exploration of TCs as potential therapeutic agents for PD.

## *Epidemiology & Biostatistics*

*Symposium Talk*

**Danielle Lambert**, Ph.D., Assistant Professor

## **Experiences of Digital Violence Victimization and Associated Sexual and Mental Health Outcomes Among Adolescents in the South**

With the rapid and ongoing proliferation of digital technologies, the prevalence and perpetration of digital violence continues to increase at an alarming rate, with minimal research to-date focused on the potential public health implications. To better understand experiences of digital violence among minoritized adolescents in the southern United States, this research used new expanded measures of digital violence exposure to assess the frequency, severity, and typologies of behaviors experienced. Innovative digital methodologies were used to recruit and enroll adolescents across eight states, with key lessons learned around feasibility, fraud detection, and cost-effectiveness.

### *Lightening Talks*

**Xianyan Chen**, Senior Academic Professional

## **Ultra-Sensitive Detection of PFASs using Surface Enhanced Raman Scattering and Machine Learning: A Promising Approach for Environmental Analysis**

Presently, the contamination of per- and polyfluoroalkyl substances (PFAS) in drinking water is a significant concern, but a straightforward and portable detection method is lacking. This study aims to demonstrate the effectiveness of Raman and surface-enhanced Raman scattering (SERS) spectroscopies for detecting, distinguishing, and quantifying various PFASs in water. Experimental Raman spectra of different PFASs reveal unique characteristic peaks that enable the differentiation of these molecules. While direct SERS measurements from Silver nanorod (AgNR) substrates may not exhibit distinct PFAS characteristic peaks, the presence of PFAS on SERS substrates induces noticeable spectral changes. By integration with machine learning techniques, these SERS spectra can be used to successfully differentiate and quantify PFOA in water, achieving a limit of detection (LOD) as low as 1 ppt. Modifying the AgNR substrates with cysteine and 6-mercapto-1-hexanol enhances the differentiation and quantification capabilities of SERS-ML. Although the spectral features are influenced by Alkanethiol molecules, discernible changes due to different concentrations of PFAS and PFOS molecules are observed. Using a support vector machine (SVM) model, an 81% accuracy in differentiating PFOA, PFOS, and the reference is achieved, regardless of their concentrations. Furthermore, employing an SVM regression model, the LODs of 1 ppt for PFOA and 4.28 ppt for PFOS are determined. By removing spectra with concentrations lower than LODs, the classification accuracy is improved to 89%.

**Tzu-Chun Chu**, Doctoral student



## **Integrating Machine Learning in Pre-Fontan Hemodynamic Studies for Enhanced Cardiovascular Outcome Prediction**

Single ventricle congenital heart disease is a severe birth defect with significant attrition after the initial surgical repair. In advancing personalized care, assessing the impact of hemodynamics and patient characteristics on long-term outcomes is essential. Our study aims to identify key determinants of long-term survival after the Fontan procedure, the final stage of single ventricle palliation, while navigating the complexities of high dimensionality, non-linearity, heterogeneity, and issues with censored and missing data by utilizing survival machine learning (ML) models. We queried the Pediatric Cardiac Care Consortium (PCCC), a large US-based multicenter registry of congenital heart interventions for patients undergoing the Fontan procedure from 1982-2011. Post-discharge deaths were assessed by matching with the National Death Index through 2022. Missing data were inputted using a tree-based method before model training. We fitted a random survival forest (RSF) model comprising 1000 survival trees, constructed through log-rank splitting. A permutation importance measure was used to identify the top 20 most important variables associated with long-term survival post Fontan hospital discharge. The study involved 1,366 patients who underwent Fontan procedure (median age at Fontan = 3.1 years) and survived to hospital discharge of whom 172 of them died (median time to event=12.3 years). The out-of-bag (OOB) performance error was 0.334, and OOB ensemble mortality yielded a c-index of 0.666. The figure shows that patient baseline characteristics were predominantly chosen as important features. Through advanced techniques, including a RSF model and permutation importance measure, we identified key determinants of late mortality post-Fontan. Further research will focus on comparing advanced survival ML models, like boosted Cox regression and support vector machines, to identify the most effective approach in predicting Fontan long-term survival in rich and complex data.

**Patrick Kaggwa**, Doctoral student

## **Annual incidence infection with M. tuberculosis in an African City with Endemic Tuberculosis**

The incidence of infection with *M. tuberculosis* (Mtb) in the community is a useful metric of tuberculosis burden since it depicts transmission from undetected infectious persons. In a prospective study, we estimated the annual incidence of Mtb infection among HIV infected and uninfected adults in Kampala City, Uganda. Study design and between April 2019 - December 2022, 994 adults (18 – 65 years) without evidence of current Mtb infection were enrolled in a prospective cohort study in Kampala, Uganda. Participants were evaluated quarterly to identify new infections. New infections were defined as conversion of the interferon-gamma release assay (IGRA, criterion for

conversion - test  $\geq 0.35$  IU/ml) or culture-confirmed tuberculosis. Incidence rates were estimated for overall follow-up and at quarterly intervals; incidence rates were stratified by sex and HIV serostatus. Of the 994 participants, 86 incident infections occurred over 6965 person-months of observation (pmo), giving an overall incidence rate of 1.23/100 pmo (95% CI: 1, 1.52), equivalent to an annual incidence of 13.8% (95% CI: 11.3%, 16.7%). Over the quarterly intervals, the incidence rate varied slightly from a low of 1.06/100 pmo at month 6 to a high of 1.56/100 pmo at 12 months; across all follow up visits, the confidence intervals of visit specific incidence rates overlapped. The incidence rate was 1.33 /100 pmo (95%CI: 0.82%, 2.13%) among HIV seropositive persons and 1.24/100 pmo (95%CI: 0.98%, 1.57%) among HIV seronegative persons; the incidence rate was 1.3/100 pmo (95%CI:0.93%, 1.82%) in males and 1.26/100 pmo (95%CI: 0.97%, 1.63%) in females. In an African city with endemic TB disease, we found a high and stable occurrence of new infections among adults. These findings suggest that the residents of the city encounter undetected infectious cases of TB in the community

**Adenike McDonald**, Doctoral student

### **Prevalence of TB-related symptoms and self-reported disability among adults post-TB treatment in Kampala, Uganda: A retrospective study**

Background: Growing evidence suggests that post-TB related morbidity occurs, however, limited epidemiological data exists on the burden of symptoms and disability post TB treatment. Our study evaluated the prevalence of TB-symptoms, self-reported disability and factors associated among individuals who recently completed TB treatment in Uganda. Methods: Between January 2022 and October 2023, we conducted a retrospective cohort study of adults  $\geq 18$  years who had successfully completed treatment for drug-sensitive TB in Kampala, Uganda. We collected data on current TB-related symptoms, and we measured disability using 12 items adopted from the World Health Organization Disability Assessment Schedule (WHODAS 2.0). Results: Of the 200 participants, the median age (IQR) was 33.0 (26- 44.5), 105 (52.5%) were male, and 46 (23%) were HIV-infected. The prevalence of any TB-related symptoms was 58%. The proportion of persons self-reporting any disability was 83.5%. The median (IQR) disability score was 16 (13-21), and the mobility and participation domains contributed 52.3% of the cumulative disability score. Being female, completing treatment 6-8 months prior to interview, and having TB-related symptoms were significantly associated with self-reporting a disability in any of the domains with the AOR being 2.37 ( $p=0.04$ ), 2.87 ( $p=0.04$ ) and 2.51 ( $p=0.03$ ) respectively after adjusting for age, and HIV status. Conclusions: TB-related symptoms and self-reported disability were highly prevalent in the study setting suggesting that the health and wellbeing for persons who complete TB treatment remain compromised. Further evaluation and

interventions to address the quality of life for survivors during the post TB period should be considered as part of the continuum of care.

**Fangzhi Luo**, Doctoral student

### **Functional Clustering for Longitudinal Associations between Social Determinants of Health and Stroke Mortality in the US**

Understanding longitudinally changing associations between social determinants of health (SDOH) and stroke mortality is crucial for timely control of stroke disease. Previous studies have revealed a significant regional disparity in the SDOH -- stroke mortality associations. However, they do not develop a data-driven method based on these longitudinal associations for regional division in stroke management. To address this issue, we propose a novel clustering method for SDOH -- stroke mortality associations in the US counties. To enhance interpretability and statistical efficiency of the clustering outcomes, we introduce a new class of smoothness-sparsity pursued penalties for simultaneous clustering and variable selection in the longitudinal associations. As a result, we can identify important SDOH that contribute to longitudinal changes in the stroke mortality, enabling the clustering of US counties into several regions based on how these SDOH relate to stroke mortality. The effectiveness of our proposed method is demonstrated through extensive numerical studies compared with several competing approaches. By applying our method to county-level SDOH and stroke mortality data, we identify 18 important SDOH for stroke mortality and divide the US counties into two clusters based on these selected SDOH. Our findings unveil complex regional heterogeneity in the longitudinal associations between SDOH and stroke mortality, providing valuable insights for more effective region-specific SDOH adjustments in stroke control.

## *Health Policy & Management*

### *Symposium Talk*

**Janani Rajbhandari-Thapa**, Ph.D., Associate Professor

### **Recent projects at the Economic Evaluation Research Group.**

The Economic Evaluation Research Group in the Department of Health Policy and Management provides policy and program evaluation and research expertise to non-profits and state governments. This talk will provide a summary of ongoing projects. The projects span in their scope and significance; for example, in one project we are assessing healthcare cost among child patients with mental health using data from one

of the largest care management organizations serving the state; in another we are using state inpatient and emergency department data to study patient transfer pattern and associated health outcomes. This talk will also provide a summary of the researchers ongoing work on prevention and treatment of obesity and ongoing collaboration with colleagues in the field of consumer economies where researchers integrate supportive accountability theory with principals of self-determination theory to investigate women's perceived goal success in the domain of physical activity.

### *Lightening Talks*

**Adam Chen, Associate Professor**

#### **Local Health Department Leadership and COVID-19 Prevention and Control in the US**

Abstract: Although the federal Centers for Disease Control and Prevention is considered the world's premier public health agency, the bulk of public health activities are conducted at the state and local levels. Analyzing how local health department governance and leadership structure might affect COVID-19 prevention and control will offer insights into public health leadership development and funding priorities. This paper uses a national survey of local health departments linked with county-level COVID-19 outcomes to examine how local health department leadership might affect COVID-19 outcomes or intermediary measures. County-level demographics and socioeconomic indicators are used as control variables. Empirical analyses suggest that having a local health department leader with a medical or nursing degree is associated with better COVID-19 vaccine take-up rates but not COVID-19 infection rates. Robust analyses are used to test the pathways and potential selection biases associated with public health leadership selection. We conclude that public health leadership may lead to improved policy outcomes but not direct improvements in infection rates, potentially due to multiple confounding factors.

**Daniel Jung, Ph.D., Assistant Professor**

#### **Successfully Remaining in Community for Home Health Care Patients with Alzheimer's Disease and Related Dementia: The Role of Living Arrangements and Rural Living**

Given the unique characteristics of home health care, the role of living arrangements on health outcomes for patients with Alzheimer's Disease and Related Dementia (ADRD) could be different by geographic characteristics of the patient's residence location. Thus, this study explores the relationship between living arrangements and health outcomes,

and the potential variation in this relationship based on the rural or urban characteristics of the patient's residence within the context of home health care for ADRD patients. Our study results show that patients with ADRD who receive home health care were less likely to be discharged to the community when they lived at home and alone compared to those who lived in a congregate setting. Furthermore, patients living in rural areas and at home alone faced further challenges in remaining in their homes and communities while receiving home health care. Our study results suggest that a multidimensional approach considering living arrangements to support home health care patients with ADRD could be important to achieving better health outcomes. Furthermore, area-specific target interventions should be considered, aiming to improve care and health outcomes of patients with ADRD as well as reducing health disparities.

**Mohammad Rifat Haider**, Ph.D., Assistant Professor

### **Psychosocial Correlates of Awareness Pre-Exposure Prophylaxis (PrEP) for HIV among Persons Who Inject Drugs in Northeast Georgia.**

Pre-exposure prophylaxis (PrEP) is an effective biomedical prevention method for reducing HIV transmission among persons who inject drugs (PWID). Georgia, a deep southern state, has one of the highest rates of new HIV diagnoses in the United States, but with very low PrEP uptake. This study aims to determine the psychosocial correlates associated with PrEP awareness among PWID living in northeast Georgia.

**Janani Thapa & Dee Warmath**, Ph.D., Associate Professor in the College of Family & Consumer Sciences

### **The Role of Virtual Others in Motivating Women to Adopt and Attain Health Goals**

While numerous reports document the importance of physical activity as a fundamental aspect of promoting overall health and well-being with numerous benefits ranging from reduced risks of chronic diseases to improved longevity (Elgaddal et al., 2022; Guthold et al., 2018; Luque-Casado et al., 2021), women often exhibit lower levels of physical activity compared to men, leading to a persistent gender gap in physical activity participation, at national and global levels (CDC 2020; WHO 2022a). Women of all ages face unique challenges and considerations related to physiological, social, and cultural factors that influence their participation in physical activity (Caperchione et al., 2011; Hamer & Chida 2008; Rajbhandari-Thapa et al., 2022; Vrazel et al., 2008) and are in need of safe and culturally acceptable opportunities that empower them to engage in physical activity (Ding, 2018). In this paper, we argue that fostering a supportive accountability structure has the potential to promote increased physical activity among

women because it satisfies their need for relatedness and is associated with higher levels of autonomous motivation for the physical activity (Lepore et al., 2021; Meyerhoff et al., 2021; Werntz et al., 2022). Integrating supportive accountability theory (Mohr et al., 2011) with the principles of self-determination theory, we investigate the impact of supportive accountability from virtual others on women's perceived goal success in the domain of physical activity. Across three studies, we found a positive effect of supportive accountability in a digital community on women's perceived success in their fitness goals; however, this effect existed only when such supportive accountability satisfies the basic psychological need for relatedness, which, in turn, facilitates autonomous motivation. These findings suggest that digital interventions have the potential to reduce the gender-based physical activity gap. Our research highlights the promising role of supportive accountability mechanisms in motivating women to achieve their health goals. Both social support and accountability should be considered in the design of programs and policies to promote physical activity among women.

## *Health Promotion & Behavior*

### *Symposium Talk*

**Lucy Annang Ingram, Ph.D., Professor**

### **Showcasing the Research Areas and Accomplishments of Health Promotion & Behavior Faculty**

In the department of Health Promotion & Behavior, there are over 20 faculty members with interests ranging from racial and ethnic health disparities, sexual and reproductive health, substance use prevention, worksite health, and aging. Highlights and accomplishments from these varied areas of research expertise will be presented.

### *Lightening Talks*

**Tamora A. Callands, Ph.D., Associate Professor**

### **MAMA's Watch: Assessing the Impact of Race-Related Stress on Maternal Mental Health with Smartwatches**

African American (AA) women experience racial/ethnic health disparities in maternal mortality rates, poor birth outcomes, and pregnancy-related complications. Maternal mental health problems are a contributing factor to these health disparities, and AAs who encounter **racism and discrimination** report higher rates of maternal mental health problems (i.e., depression, anxiety, and prenatal distress). Efforts to understand the mechanisms underlying maternal health disparities and efforts to intervene have

been a national priority for decades, yet there have only been small decreases in existing health disparities. This study will use ecological momentary assessment (EMA) and wearable wrist devices monitoring heart rate variability (HRV) to assess the effects of perceived interpersonal racism and discrimination (IRD) on biopsychosocial factors and their influence on maternal mental health among pregnant AA women. We aim to: (1) examine the feasibility of implementing a study that combines wearable devices that capture HRV as a measure of physiological arousal resulting from experiencing a discriminatory event using EMA; and (2) assess the frequency of and degree to which discriminatory events are captured at times of physiological arousal. We will recruit pregnant AA women. We will assess perceived racism and discrimination, perceived stress, coping skills, and prenatal mental, as well as use calibrated Garmin watches to measure momentary physiological arousal via HRV. EMAs will be completed during the 30-day study interval. The results of this study will inform future research on the effect of IRD on health outcomes among AA pregnant women using EMA and wearable physiological mobile technology.

**Lucy Ingram**, PhD, MPH, Professor

### **Training and Mentorship as a Call to Action: Highlighting the Aims of a Research Center to Diversify the Academy in Alzheimer's Disease Research**

Alzheimer's disease and related dementias (ADRD) are at the forefront of the United States (US) public health agenda due to their tremendous human and financial burden. Further, disproportionately high ADRD rates among racially and ethnically minoritized groups require incorporating the unique perspectives of racially and ethnically diverse scientists, which will necessitate diversifying the scientific workforce that investigates disparities in aging. Research has shown that prioritizing the study of racial and ethnic disparities is essential for achieving equity in healthy aging and dementia care. Additionally, addressing the systems and infrastructure that foster research in aging disparities are important steps toward achieving this equity. This has been long viewed as a call to action for funders and researchers to consider as we pursue opportunities to reduce disparities in this area. The purpose of this talk is to describe the training and mentorship initiatives of a National Institute on Aging (NIA)-funded Research Center focused on elevating the work of scholars who conduct Alzheimer's Disease research. I will highlight three aims of the Center's training and mentorship components: (1) Funding pilot projects for underrepresented minority and minoritized (URM) Scientists conducting research on sociocultural, behavioral, and environmental factors that influence ADRD-related health disparities; (2) Providing mentorship to build the research capacity of Center Scientists; and (3) Offering research education in Health Disparities and Minority Aging. The lessons learned from the development and implementation of the Center may be a practical resource for others developing

interdisciplinary training programs to increase the pipeline of URM Scientists conducting ADRD research.

**Fiyinfolu Atanda**, BSW, MSW/MPH student

### **Lessons learned from a service-learning partnership between a public health social work class and a rural community**

Rural-urban health disparities in the United States have been well documented (CDC, 2017). Despite the many strengths inherent to rural communities, they still face challenges related to social determinants of health, including reduced access to high-speed internet, lack of public transportation, and often inadequate health and social service infrastructure compared to their urban and suburban counterparts. In the spring of 2023, students in a graduate-level public health social work course partnered with the University of Georgia's Archway Partnership to support the city of Thomaston, GA, in an asset mapping project. Archway is a trusted university entity that supports communities as they seek to improve areas like health and wellness by connecting communities to university resources. Three student groups focused on three community-identified priority areas: physical health and wellness, mental health and substance use, and youth leadership and development. In consultation with community leaders, students completed three tasks as part of their service-learning project. They assessed the state of community-based resources in the area through internet research and by conducting focus groups with residents. From this research, they created a list of assets and resources to be shared with the community. Then students recommended additional actions the community can pursue to build capacity and alleviate identified resource gaps. This poster will present lessons learned by both the instructor and the students. These lessons included the importance of 1) close communication with community partners and seeking clarification often, 2) setting boundaries and expectations for the scope of work, 3) knowing and following university policies and procedures, 4) patience and flexibility throughout the process, and 5) setting appropriate timelines. These lessons and others will be explored in this presentation.

**Emily Townsend Vinson**, MPH, Doctoral student

### **Project RENEW: Tracking Recovery**

Project RENEW is a prospective study interested in analyzing how social networks and built environments influence the recovery of individuals in treatment for substance use. Participants were recruited from partnering treatment facilities. Those who met the eligibility were consented into the 6-month long study. Throughout the 6 months,



participants were interviewed 3 times: at baseline, 3-months in, and 6-months in. During the first interview, participants are asked to create a list of significant people in their lives (both positive and negative influences) as well as significant locations they either visit frequently or have had a significant impact on their lives. Once the lists are created, a survey is given for each of them. The social network assessment asks questions to gauge what kind of relationship they have with each person, while the activity space assessment asks questions to gauge what they do at each location and how the space makes them feel. The subsequent interviews ask the same questions about each of the lists, with an opportunity to add new people or locations, to see what has changed in their responses. Prior to each of the three interviews, participants are given a survey to fill out on their own. The survey contains a myriad of measures aimed at measuring demographic variables, substance use, alcohol consumption, mental health, physical health, etc. Between each of the three interviews, two qualitative interviews were conducted on various topics, such as the impact of COVID-19 on treatment engagement, experiences with housing instability, family history of substance use, etc. Overall, the goal of this study is to determine what profiles of people and places are supportive of an individual's recovery and what profiles have the potential to be harmful to their recovery.

**Christina Proctor**, MPH, Ph.D., Clinical Assistant Professor

### **The intersection of gender and occupational role in agriculture: stress, resilience, and alcohol behaviors of US Farmers**

Stress associated with nonconformity and traditional stressors associated with farming may contribute to higher rates of stress and mental health disorders in farm women. The purpose of this study is to compare stress, resilience, and alcohol consumption of male and female farmers (N=987). An online cross-sectional survey was distributed to farmers by researchers, farming consultants, and community partners. Chi-Square and ANOVA analyses were used to explore relationships between variables of interest. Female respondents reported significantly higher scores on the perceived stress scale (PSS) than their male counterparts ( $t=4.498$ ,  $df=985$ ,  $P<.001$ ) and significantly lower resilience scores than male respondents ( $t=2.925$ ,  $df=985$ ,  $P=.002$ ). When assessing the impact of gender and farm roles on perceived stress, a significant interaction effect was observed. Women working as farm owners and farm managers were more likely to report higher PSS scores, while male farm owners and managers reported the lowest PSS scores ( $F= 2.979$ ,  $p= .031$ ,  $r^2 =.038$ ). There were significant differences in patterns of binge drinking behavior based on the interaction of farm role and gender, with female farm owners and managers reporting binge drinking the most frequently. Discussion: Workplace cultural factors in the farming industry may adversely affect female drinking patterns. Gender inequalities in domestic labor and financial earnings increase PSS

scores. Women working in high-risk, male-dominated occupations face job insecurity, low levels of supervisory support, workplace harassment which leads to higher rates of stress and maladaptive coping strategies.

## **INSTITUTE PRESENTATIONS**

### ***Global Health Institute***

#### *Institute Talk*

**Juliet Sekandi**, Ph.D., Associate Professor & Associate Director

#### **The determinants and outcomes of lung health in low- and middle-income countries around the world**

The Global Health Institute at the University of Georgia focuses its research on diseases and conditions that disproportionately affect people living in low- and middle-income countries around the world. The overarching theme of the current research portfolio is lung health that includes specific projects on air pollution and on tuberculosis. The research on air pollution is done in Guatemala and focuses on the effects of indoor air pollution through wood or coal burning stoves on the health outcomes of children. This research is part of a larger consortium that investigates indoor air pollution in multiple countries around the world. The research on tuberculosis is done in Uganda in collaboration with Makerere University College of Health Sciences. This long-standing collaboration studies treatment of tuberculosis and its persistence in the region. As for treatment of tuberculosis, ongoing studies are using digital mobile technologies to monitor and improve adherence to treatment and assess the long-term health consequences of tuberculosis, such as cardiovascular disease and disabling lung disease. As for the persistence of tuberculosis, ongoing studies use network methods to study the transmission dynamics of *M. tuberculosis* in the African urban setting. All studies have relevant global public health implications.

### ***Institute for Disaster Management***

#### *Institute Talk*

**Morgan Taylor**, PhD, MPH, AEMT, Assistant Research Scientist

#### **From Theory to Action: Current Insights and Initiatives at the Institute for Disaster Management**

Every year, thousands of people are impacted by disasters across the world, often receiving aid only after considerable delay and suffering. The leading researchers and subject matter experts at the Institute for Disaster Management at the University of Georgia (UGA IDM) work to reduce the casualties and disruption from all types of hazards through engagement in planning, mitigation, risk analysis, professional training, and the development of response capabilities and infrastructure. We work with local, state, federal, and international partners to host a coordinated research, service, and training program to affect meaningful improvement in the global response to disasters and human suffering that disasters entail. At UGA IDM, research and service projects are intertwined, as research informs practice and practice informs research. Our research focuses on conceptual frameworks to combat new and emerging threats along with disaster policy, modeling, education, and training. Our teams work on multiple projects throughout the year with different groups and organizations in the public health and emergency management fields. On these projects, we develop, implement, and deliver customized disaster education, training, and planning. Our projects have ranged from helping long term care facilities, healthcare preparedness, and even Ebola training. These outreach projects help to prepare communities around the State of Georgia, the United States, and the globe.

## ***Institute of Gerontology***

### *Institute Talk*

**Lisa Renzi-Hammond, Ph.D. & Jenay Beer, Ph.D.,** Director and Associate Director

### **Building a translation science network for Alzheimer's disease, a major Georgia public health problem: The UGA CARE Center**

Background: Georgia is ranked 50th in the U.S. for older adult health. One major reason for this low ranking is Georgia's morbidity and mortality from Alzheimer's disease. In Georgia, 80% of patients over age 45 years who experience symptoms of cognitive decline do not speak for a healthcare provider. For those who do receive a diagnosis, most evidence-based treatments for Alzheimer's disease are not developed for or with Georgians in medically underserved communities. For example, less than 1% of clinical trials on Alzheimer's disease drugs contain even a single rural site. In this presentation, we will introduce the UGA Cognitive Aging Research and Education (CARE) Center, an integrated care medical clinic in the College of Public Health, which also seeks to serve Georgia's rural and medically underserved communities. CARE focused on providing access to education, diagnosis, support, and inclusion in translation science.

# POSTER PRESENTATIONS

## *Environmental Health Science*

**Ian Bachli**, Doctoral student

### **Fentanyl Disrupts Blood-Testis Barrier Function in a Novel *in vitro* Model**

Worldwide, approximately 60 million people used opioids in 2021. Among them, around 40 million people lived with drug use disorders. Opioid use and overdoses have increased in recent years in several countries, in part due to the increased availability of opioids used in the management of chronic pain, and due to increasing use of highly potent opioids appearing on the illicit drug market. Given the prevalence of male opioid users combined with its addictive properties, and the known detrimental health effects, there is a need to understand the potential consequences of opioid effects on male reproductive health. In men, endogenous opioids play a role in sperm production within the blood-testis barrier. Recent studies suggest exogenous opioids in men reduce semen quality, including increased DNA fragmentation, and hypogonadism, however there is little known on the direct effects on critical cells within the blood-testis barrier. To assess the effects of exogenous opioids on male reproductive health, we exposed human Sertoli cells to pharmacologically relevant doses of Fentanyl using a novel, *in vitro* blood-testis barrier model. Our preliminary results revealed significant changes in barrier resistance and ion flow, warranting further investigation.

**Arina Chernikova**, Doctoral student

### **Impact of SARS-CoV-2 Infection on The Blood-Testis Barrier in Humans and Nonhuman Primates**

SARS-CoV-2 has affected more than 320 million individuals. As strains like Omicron undergo changes to enhance infectivity at the expense of pathogenicity, the number of affected individuals is expected to increase significantly. The impact of SARS-CoV-2 on male fertility is not thoroughly understood; however, there is clinical and experimental evidence suggesting that SARS-CoV-2 infection can have adverse effects on male reproductive health. Additional evidence indicates that the blood-testis barrier may be vulnerable to infection. To investigate this, we established a blood-testis-like barrier using primary human and nonhuman cells and tested various SARS-CoV-2 variants, including WA1/2020, BA.1.1.529, BA.4.6, and XBB. The assessment of barrier infection was conducted through transepithelial electrical resistance and Dye Flux assays. Regardless of the variant or species, SARS-CoV-2 infection resulted in barrier disruption. Intriguingly, variants that exhibited better adaptation to human viral entry proteins caused more significant barrier disruption in humans compared to nonhuman

primates. Furthermore, variants that were better suited for immune evasion caused the least amount of barrier disruption in both humans and nonhuman primates. These findings suggest that SARS-Cov-2 infection disrupts the blood-testis barrier, potentially impacting male fertility, and the range of impact is dependent on the adaptations the emerging variant has developed.

**In Ki Cho**, Assistant Research Scientist

### **Improving *in vitro* haploid spermatid production from nonhuman primate pluripotent stem cells by stepwise coculture and blastocyst development**

Male Factor infertility affects about 7% of the male population globally, with 10% of these infertile men being azoospermic. In North America, 4.5% to 6% of males are being reported infertile. These numbers are increasing globally, and as such, novel treatments are needed to address this growing patient population. *In vitro* spermatogenesis is a promising technique in regenerative medicine for treating male factor infertility. Spermatogenesis involves complex spatiotemporal signaling to coordinate the differentiation process of self-renewing spermatogonia stem cells through various stages, eventually resulting in haploid cells with a unique genetic makeup. Building upon our previous success in producing haploid spermatid-like cells (SPDLC) from both primate and human pluripotent stem cells (PSCs) with a spermatogonial stem cell (SSC) method, we developed a stepwise co-culture nutrition restriction with retinoic acid stimulation method (SWCC), which mimics *in vivo* spatiotemporal aspects of spermatogenesis by incorporating Sertoli cells and stepwise addition of growth factors and hormones to improve efficiency generating more advanced spermatids for future clinical applications. Our new method resulted in a higher percentage of haploid cells, 5.33%, compared to 19.7% ( $P = 0.0206$ ). Also, qRT-PCR results showed increased spermatid-specific gene expression after SWCC differentiation. Immunocytochemistry (ICC) showed expression of spermatocyte-specific (gH2A.X, SYCP3, DMC1, and MLH1) and spermatid-specific markers (ACR and PRM1) after the differentiation. Additionally, rhesus monkey SPDLCs from SWCC were able to fertilize monkey oocytes, which developed into blastocysts. One of these blastocysts was implanted into a surrogate rhesus macaque to assess embryonic and fetal development. These results, taken together, suggest that our new protocol is an important step towards utilizing *in vitro* spermatogenesis to treat severe male factor infertility.

**Elisabeth Drake**, Doctoral student

### **Assessment of Microbial Quality in Water Bottle Filling Stations**

Microbial growth in drinking water is an important indicator of water quality after treatment. The microbial level of drinking water before leaving the treatment plant is typically within limits set by water authorities; however, once it reaches the consumer, water quality may differ drastically from the treatment facility. Biofilm production is a common problem caused by microbes that remain viable after disinfection and build up along pipe walls in water distribution systems. The microorganisms found in biofilms tend to be more resistant to antibiotics and disinfectants, becoming a reservoir for pathogenic microorganisms. Biofilm production in drinking water can also accelerate antibiotic resistant bacteria (ARB) and their associated antibiotic resistance genes (ARGs). Although water bottle filling stations are becoming more common, factors like temporary stagnation, biofilm formation, and inconsistent changing of filters can influence heterotrophic plate counts (HPC), which is a standard method for evaluating the microbial quality of potable water. This work was done in a project-based class (EHSC 8310) and its goal was to determine the microbial quality at bottle-filling stations at UGA. Heterotrophic counts differed between sample types, but differences were not significant at  $\alpha=0.05$ . This finding is due to low sampling size and variability between sites. Higher HPCs were consistently observed in drain and spout biofilm samples, followed by first flush samples, and then bulk water samples. These results suggest that stagnation may play a role in increasing the abundance of culturable heterotrophic bacteria found in water at the point-of-use, due to sustained contact with the biofilm. No significant differences in HPCs were found between high-use indoor, low-use indoor, and outdoor samples at  $\alpha=0.05$ . Significant differences were observed between outdoor water samples when comparing Downtown to Intramural Fields 1 and 2. Both ErmB and TetB genes were found in samples pertaining to the selected sites and are known to contribute to biofilm production in drinking water systems. Overall, the targets were more frequently detected in biofilm samples, highlighting the role of biofilm in the proliferation of resistance genes. These results emphasize the importance of establishing drinking water hygiene protocols and building-level targeted interventions to mitigate bacterial proliferation at point-of-use stations. Users of water bottle filling stations are encouraged to flush water before collecting it for consumption to prevent ingesting water with levels of heterotrophic bacteria that exceed recommended limits.

**Erick Emanuel Mollinedo**, Doctoral student

### **Comparisons of the Enhanced Children's MicroPEM® (ECM) gravimetric and nephelometric PM<sub>2.5</sub> personal exposure samples in Guatemala for the Household Air Pollution Intervention Network (HAPIN) trial**

The Enhanced Children's MicroPEM® (ECM) was the main instrument for measuring fine particulate matter (PM<sub>2.5</sub>) exposures in the multi-country Household Air Pollution Intervention Network (HAPIN) trial. Instruments previously used for personal exposure

measurements, although accurate, have often been heavy and noisy. The ECM is lightweight, quiet, and captures both an integrated gravimetric sample and real-time (nephelometric) PM<sub>2.5</sub> concentrations. Validation of the ECM to date is limited. The objective of this study was to assess the correlation, agreement and reliability of the gravimetric and nephelometric data between two collocated ECMs in biomass and liquefied petroleum gas stove users. We conducted personal exposure measurements with two collocated ECMs (worn by the same person at the same time) in a subset of pregnant women from the HAPIN trial in Guatemala. Average daily (24 Hr.) PM<sub>2.5</sub> concentrations for the paired gravimetric (n=219) and paired adjusted nephelometric (n=221) samples were compared from collocated devices. We estimated correlation, assessed agreement using Bland-Altman method and calculated the intraclass correlation coefficient (ICC) between collocated ECMs for both gravimetric and nephelometric comparisons. Median PM<sub>2.5</sub> gravimetric concentrations were 93.5 µg/m<sup>3</sup> (IQR=52.6-160.5) and 21.4 µg/m<sup>3</sup> (IQR=12.0-32.0) in the control and intervention groups, respectively. The median nephelometric concentrations were 83.7 µg/m<sup>3</sup> (IQR=47.6-148.9) and 22.6 µg/m<sup>3</sup> (IQR=17.5-29.7) in the control and intervention groups, respectively. Spearman correlations were higher in the biomass group (0.91) than the LPG intervention arm (0.67) in the gravimetric comparisons. The same trend was observed in nephelometric comparisons when contrasting the biomass (0.92) and LPG groups (0.75). ICC values were high in both gravimetric (0.93) and nephelometric (0.95) collocations. The comparisons demonstrate high reliability between collocated ECMs for both gravimetric and adjusted nephelometric PM<sub>2.5</sub> personal exposure samples in the Guatemala site.

**Kyle Jones**, Doctoral student

### **Nucleotide Excision Repair in *Tadarida brasiliensis***

Bats have a documented history of serving as a reservoir for zoonotic pathogens that can spill over to humans. Viruses, including SARS-CoV, MERS-CoV, Ebola, and SARS-CoV2, have been identified as diseases that originated in bats. In addition, bats have long lifespans and low cancer incidence. However, the underlying mechanisms remain unclear. One theory suggests that the high metabolic rates and positive selection of DNA repair genes in bats afford them a greater degree of tolerance to pathogens than humans. Nucleotide excision repair is a versatile repair pathway that can remove a variety of DNA bulky adducts caused by UV, cisplatin, aflatoxin, and benzo[a]pyrene. Investigating NER in bats can provide insights into how these animals can harbor and survive numerous zoonotic diseases. Here we compared the nucleotide excision repair capacity between bats and humans by using the immuno-slot blot. We also utilized the XR-seq method to generate genome-wide repair maps of UV-induced DNA damage at different time points after UV treatment and analyzed the excision product length as

well as the nucleotide frequency distribution for the NER excised products. Our analysis revealed that bat cells repair both types of UV-induced DNA damage ((6-4)PPS and CPDs) slower than human cells. Specifically, bat lung cells repaired UV-induced DNA damage at a slower rate than human lung cells. Our results suggest that bats, similar to rodents, have lower efficiency in nucleotide excision repair pathway than humans.

**Kimberly Perez**, Doctoral student

### **Preliminary Salmonella Surveillance of Eastern Gray Squirrel (*Sciurus caolinensis*): A Pilot Study**

The feeding of wild birds is a common practice in the United States that serves as a rewarding activity for enthusiasts and provides birds with a food source when natural food supplies are low. The 2016 National Survey of Fishing, Hunting and Wildlife-Associated Recreation conducted by the U.S Department of the Interior and the Fish and Wildlife Service found that 57 million households fed backyard birds and spent over \$4 billion annually on bird food and 39 million people watched birds “at home”. Backyard bird feeding offers people an easy and, sometimes their only, connection with nature. While backyard bird feeders provide enjoyment, they also increase the probability of avian pathogen transmission through artificial aggregation and promoting contact with contaminated surfaces. Salmonella is a bacterium that makes both people and wild birds' sick. People typically get infected by eating contaminated food, but an increasing number of cases is attributed to environmental exposure, like handling wild bird feeders. Birds typically get sick and die of salmonellosis in the winter months, when they come together in groups to feed on bird feeders, especially when other food sources are unavailable. In the past two decades, the frequency of outbreaks and the number of birds that die due to Salmonella infection have increased dramatically. In 2021, at least 30 people got sick from handling sick birds or bird feeders in several states. Although this may seem like a small number, most people who develop illness from Salmonella like diarrhea, vomiting, and stomach pain often go uncounted and only serious illnesses are ever reported. We know that Salmonella outbreaks occur in the winter and with higher frequency in some bird species, but we do not know why. Nor do we know if there are animals (e.g., rodents) that are carriers of Salmonella thus contributing to the contamination of feeders. Of thirty squirrels sampled, Salmonella was isolated from two. Our trial found that Squirrels are carriers of Salmonella, however, they do not shed the serovar that typically causes human and avian salmonellosis (*S. Typhimurium*).

**Kylie Tager**, Doctoral student

### **Impact of Tobacco Smoke Extract on *in vitro* Spermatogenesis**



Tobacco, the second most used psychoactive substance worldwide, is used by 24% of all adults, with an estimated 21% in 2025. The World Health Organization reports that 80% of tobacco users primarily smoke cigarettes, exposing themselves to more than 7,000 identified chemicals, including nicotine. Given the prevalence of male smokers, the addictive nature of nicotine, and the adverse effects of cigarettes, public health specialists are increasingly interested in how tobacco smoke affects male reproductive health and subsequent offspring health and development. Recent studies suggest cigarette smoke induces significant changes in semen parameters, such as significant reductions in sperm density, total sperm counts, and reduced sperm motility in addition to significant changes in axoneme structure. Smoking may also increase levels of seminal oxidative stress, and impact fertilization through various mechanisms including changes in acrosin activity, mitochondrial membrane potential, glutathione levels, apoptosis, posttranslational modifications, and DNA fragmentation. To assess the effects of tobacco smoke on human spermatogenesis, we exposed differentiating spermatogenic-like cells to environmentally relevant levels of tobacco smoke extract using *in vitro* spermatogenesis models. A series of assays revealed notable changes among the differentiation protocols but not individual cell lines or tobacco smoke extract doses, prompting further investigation.

**Breanna Timani**, MS student

### **Mosquito cell adaptation enables Zika virus replication across an expanded temperature range**

Increasing global temperatures due to anthropogenic climate change is projected to increase the range of insect vectors that spread disease. Mosquito borne viral diseases such as West Nile, Chikungunya, Dengue, and Zika will likely begin spreading in higher latitudes that were previously considered more temperate. Higher average temperatures allow for increased mosquito breeding and reduces the areas that are inhospitable for mosquitoes over the winter, expanding the time frame of transmission from mosquitoes to humans. Previous data in the lab suggest Zika virus transmission optimally occurs between 22-35°C because Zika replication is limited at cooler temperature. Expanded optimal conditions for viral infection and replication in turn means increased viral genetic diversity. While higher temperatures pose an obvious problem due to increased vector range, there is also the potential for emergence of viral variants that are more tolerant to temperate temperatures because of this increase in genetic diversity. Our data shows that continuous passaging at a suboptimal temperature allows for the selection of Zika virus that is capable of efficient replication at 20°C. We serially passaged ZIKV in C6/36 mosquito cells at both optimal and suboptimal temperatures (28°C and 20°C respectively) and compared their replication kinetics to the parental

ZIKV strain produced in Vero cells. We observed that the 20°C adapted ZIKV replicated more efficiently at 20°C than the parental strain. Surprisingly, 28°C adapted ZIKV also displayed increased efficiency at 20°C, replicating faster than both the parental and 20°C-adapted ZIKV strain. Each temperature adapted virus stock was sequenced and mutations that arose with the new phenotype were individually cloned into the Pariba molecular clone. We plan on rescuing viruses using these clones to test for their individual ability to replicate in various temperature conditions.

**Elizabeth Riegelman**, Doctoral student

### **Effects of Tea Catechins on the Gut Microbiome and Neurobehavioral Responses in a Transgenic Mouse Model of Parkinson's Disease**

Parkinson's Disease (PD) is the second most common neurodegenerative disease, affecting approximately 2% of the population over 60 years of age. The molecular mechanisms behind PD are poorly understood, however, the misfolding and aggregation of  $\alpha$ -synuclein protein is an important pathological hallmark of PD. Recent studies have emphasized the critical impact of gut microbiome on the progression of PD and its influence on  $\alpha$ -synuclein misfolding. Evidence has demonstrated that the gut microbial profile of PD patients varies compared to healthy controls, with an elevated abundance of bacteria that are associated with increased intestinal permeability, inflammation, and the production of certain neurotoxic substances. Tea catechins (TCs) are a group of dietary flavonoids that have been recognized for their health-promoting attributes that encompass a wide range of physiological functions. Evidence has demonstrated that TCs can act against neurodegeneration by modulating the gut microbiome. To determine the effects of TCs on the gut microbiome, a transgenic A53T mouse model was used to assess neurobehavioral and microbial responses to TC treatment. 6th-month-old A53T male mice were divided into three groups: control, low-dose (0.5%), and high-dose (1.5%), and followed through 90 days as TC was administered through drinking water. Data on water consumption, food intake, and weight were gathered daily, while neurobehavioral data from an open field and rotarod assessment were collected on days 0, 45, and 90 in conjunction with feces and urine collected at days 0, 30, 60, and 90. On day 90 of the open field assessment, high-dose mice spent significantly less time in the center of the field, demonstrated increased thigmotaxis, had fewer line crossings, and had more recorded grooming behavior compared to control mice. On day 90 of the rotarod assessment, high-dose and low-dose mice demonstrated an increased latency to fall compared to control mice. Additionally, results demonstrate the notable impact of TCs on the composition and metabolic profile of the gut microbiome in the mouse PD model. The observed outcomes contribute valuable insights into the interplay between the gut microbiome and PD progression, paving the way for further exploration of TCs as potential therapeutic agents for PD.

**Elizabeth S. Waters**, Doctoral student

### **Assessing the Impact of PFAS Exposures on Blood-Testis Barrier Function and DNA Methylation in spermatid-like cells**

Few chemicals are as universally found in the environment, humans, and animals as per- and polyfluoroalkyl substances (PFAS), which have been produced and used since the 1940s. These chemicals have a number of benefits, including providing stain- and water-repellency to fabrics, nonstick properties to cookware, and the ability to put out solvent-based fires. However, the strength of the carbon-fluorine bonds in these chemicals inhibit them from breaking down in nature, and the widespread usage and long history of improper disposal have caused PFAS to be found as a contaminant in bodies of water around the world as well as in soil, air, and food sources. In humans, PFAS have been associated with high cholesterol, altered liver enzymes, risk of pre-eclampsia, kidney and testicular cancer risk, decreased response to vaccines in children, and decreased birth weight. Utilizing non-human primate primary Sertoli cells, we show how different doses of perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), and a mix of all three chemicals could result in a disruption of Sertoli cell function and therefore blood-testis barrier function. Additionally, we show how PFAS exposure results in DNA methylation differences in spermatid-like cells. The lack of a clear dose- or chemical-response relationship further explains challenges in associating PFAS exposures with different health outcomes. However, a common thread in the genes mapped to differentially methylated regions (DMRs) in PFAS-treated cells compared to control is enriched pathways affecting growth, development, and neurodevelopment. Further, overlap was found in the differentially methylated genes associated with PFAS exposure and autism candidate genes and genes previously found to be differentially methylated in the sperm of fathers of children with autism. These results provide a compelling relationship between paternal PFAS exposure and offspring neurodevelopment. Further studies should explore genes related to these pathways in the sperm of men exposed and consider paternal exposure in epidemiological studies relating PFAS and child neurodevelopment.

**Dian Xia**, Doctoral student

### **Hepatitis B virus impacts nucleotide excision repair**

Hepatitis B is a liver infection caused by the Hepatitis B virus (HBV). It has emerged as a significant global health concern due to its association with an increased risk of developing hepatocyte carcinoma (HCC). Nucleotide Excision Repair (NER) is the major

DNA repair mechanism that removes bulky DNA adducts induced by environmental exposures, such as UV radiation, cisplatin, aflatoxin, and benzo[a]pyrene. Despite numerous articles reporting on the relationship between HBV and NER, inconsistencies in the results persist due to experimental methodological limitations. In this study, we utilized slot blots using HepG2 (without HBV virus), HepG2/2.2.15 (with HBV virus), and HepAD38 cells (HBV infection by tetracycline removal) to assess the residual levels of DNA adducts at different repair time points following UV damage, thereby evaluating NER efficiency. Our results demonstrate that HBV infection significantly impacts NER, confirming the effect of HBV on NER. These findings contribute to a better understanding of the relationship between HBV infection and NER.

### ***Epidemiology & Biostatistics***

Xianyan Chen, Senior Academic Professional

### **Decoding Viral Mixtures: SERS and Deep Learning Unraveling Complex Pathogens**

Multiple respiratory viruses could cause influenza-like illness and result in overlapping disease. For example, in the COVID-19 pandemic, it was shown that SARS-CoV-2 infection occurred with influenza, RSV, and adenoviruses. The probability of patients with respiratory tract illness of more than one virus can be as high as 35%. Herein, a large-area and label-free testing platform has been developed combining SERS and deep learning for the rapid and accurate detection of virus mixtures. As a proof-of-concept, SERS spectra from thirteen respiratory virus species has been collected from single viruses, two-virus mixtures, and three-virus mixtures in buffer, using highly reproducible and sensitive silica coated silver nanorod array SERS substrates and a portable Raman system, allowing for identification of their characteristic SERS peaks and construction of virus SERS spectra database. With an appropriate spectral pre-processing procedure, a CNN-based deep learning model “MixNet” for multi-tasks is developed to predict both the virus species and concentrations in the mixture. The proposed method can predict the kinds of viruses in the mixtures with > 97% accuracy and the absolute concentration of each virus in the mixture with a relative accuracy of  $\pm 2.61\%$ . These results further demonstrate the powerfulness of the SERS+DLA strategy in diagnosing complex infectious specimens. which has the great potential for rapid detection of virus co-infection and potentially point-of-care diagnostic platforms.

Tzu-Chun Chu, Doctoral student

### **Integrating Machine Learning in Pre-Fontan Hemodynamic Studies for Enhanced Cardiovascular Outcome Prediction**

Single ventricle congenital heart disease is a severe birth defect with significant attrition after the initial surgical repair. In advancing personalized care, assessing the impact of hemodynamics and patient characteristics on long-term outcomes is essential. Our study aims to identify key determinants of long-term survival after the Fontan procedure, the final stage of single ventricle palliation, while navigating the complexities of high dimensionality, non-linearity, heterogeneity, and issues with censored and missing data by utilizing survival machine learning (ML) models. We queried the Pediatric Cardiac Care Consortium (PCCC), a large US-based multicenter registry of congenital heart interventions for patients undergoing the Fontan procedure from 1982-2011. Post-discharge deaths were assessed by matching with the National Death Index through 2022. Missing data were inputted using a tree-based method before model training. We fitted a random survival forest (RSF) model comprising 1000 survival trees, constructed through log-rank splitting. A permutation importance measure was used to identify the top 20 most important variables associated with long-term survival post Fontan hospital discharge. The study involved 1,366 patients who underwent Fontan procedure (median age at Fontan = 3.1 years) and survived to hospital discharge of whom 172 of them died (median time to event=12.3 years). The out-of-bag (OOB) performance error was 0.334, and OOB ensemble mortality yielded a c-index of 0.666. The figure shows that patient baseline characteristics were predominantly chosen as important features. Through advanced techniques, including a RSF model and permutation importance measure, we identified key determinants of late mortality post-Fontan. Further research will focus on comparing advanced survival ML models, like boosted Cox regression and support vector machines, to identify the most effective approach in predicting Fontan long-term survival in rich and complex data.

**Aaron Dino**, Double Dawg, Health Promotion - MPH

### **A Theoretical Evaluation of Measles-Unvaccinated Children Threshold for Targeted Interventions**

Despite being a vaccine-preventable disease, measles directly results in over 200,000 annual deaths. Identifying and vaccinating measles zero-dose children, children who have not received any routine measles-containing immunization, is a leading priority to control measles transmission. The focus of this research is to determine the threshold of measles zero-dose children that requires vaccine-targeted intervention to prevent an outbreak for 52 Gavi, the Vaccine Alliance-eligible countries. Prior work has examined the influence of age contact mixing patterns on the probability of measles elimination and potential outbreak risk. This project leverages age contact mixing matrices to investigate country-specific thresholds of measles zero-dose children. To estimate these thresholds, we simulate all possible age immunity profiles that would result in contact- and age-adjusted population-level immunity of at least 93%. Empirical analyses estimate that 93% population immunity is sufficient to prevent measles outbreaks. The

simulation framework combines matrices of monotonically increasing immunity profiles for children aged 1-14 years, transformed country-specific age-contact matrices, and age-specific measles vaccine effectiveness rates to calculate the range of vaccine coverage profiles for children aged 1-14 years that will prevent an outbreak. We conduct data analysis to examine global and regional trends among these vaccine coverage profiles. Across all countries, median required vaccination coverage drops between age groups 1 and 2 years but increases from age groups 2 to 14 years to prevent measles outbreaks. However, uncertainty in required vaccination coverage decreases from age groups 2 to 14 years. Countries in sub-Saharan Africa require the highest age-specific median vaccination coverage to prevent outbreaks. Countries in the Middle East and North Africa demand the lowest age-specific median vaccination coverage. Overall, countries with higher age contact rates need higher vaccination coverage to prevent outbreaks. This study's findings may be used by international organizations to inform targeted immunization strategies and resource allocation.

**Laura María Grajeda Díaz**, Doctoral student

### **Pulmonary function in 3-year-old children from the Household Air Pollution Intervention Network (HAPIN) trial: a validation study of respiratory oscillometry in rural Guatemala**

Suboptimal pulmonary function during childhood predicts chronic lung disease and mortality throughout life. The Household Air Pollution Intervention Network longitudinal respiratory study in Guatemala aims to assess the effect of an early-life randomized intervention and exposure to household air pollution on pulmonary function in children. However, measuring pulmonary function in preschoolers in rural settings has challenges. We aim to assess the reliability of respiratory oscillometry (OSM) in three-year-olds in rural Guatemala and determine whether alternative quality control procedures or the number of measures improve reliability. We measured resistance and reactance at 7 hertz (R7 and X7), the difference in the resistance at 7 and 19 hertz (R7-R19), and the area under the reactance curve (AX) using the Tremoflo C-100 Airwave Oscillometry System. We conducted two tests per day at the child's home for two consecutive days. We collected between 4 and 8 20-second measures per test. Artifacts were removed using the manufacturers's filtering algorithm. Per European Respiratory Society technical standards, test indices were the mean of the first 3 measures with an R7 coefficient of variation  $\leq 15\%$ . We calculated intraclass correlation coefficients (ICC) using linear mixed-effects models. To assess whether reliability improves, we examined  $\geq 14$ ,  $\geq 16$ , or  $\geq 18$  seconds test duration; 2, 3, or 4 measures per test; and 1 or 2 tests per day. Overall, 86 children attempted OSM, among which 82 (95%) had  $\geq 2$  standard tests (n=312). The ICC for R7, R7-R19, X7, and AX among tests within child on the same day (between days) was 0.81 (0.70), 0.68 (0.53), 0.63 (0.60), and 0.78 (0.71), respectively. When we used 4 measures per test and the average of 2

tests on the same day, the ICCs for R7, R7-R19, X7, and AX among tests within child on the same day (between days) increased to 0.84 (0.73), 0.74 (0.61), 0.69 (0.73), and 0.82 (0.76), respectively. Test duration didn't change ICCs. We demonstrated high reliability of OSM within the same day and between consecutive days in 3-year-old children in Guatemala. The range in reliability across different OSM parameters should be considered when selecting endpoints for epidemiological studies.

**Karen Raymond**, MPH student

### **Characterizing the Use of Artificial Intelligence in Medicine and Public Health: A Scoping Review**

**Background:** Artificial intelligence (AI) presents unique opportunities for optimizing routine workflows and increasing productivity the healthcare field. However, little is known about the overall impact of using AI in specific healthcare settings. **Objective:** This scoping review characterizes the use of AI within healthcare settings and explores its benefits. **Methods:** We searched PubMed and Engineering Village for studies focusing on AI in healthcare and impact on routine workflow or others areas. Search terms included “artificial intelligence”, “machine learning”, “deep learning”, “workflow”, “workload”, “productivity”, “efficiency” or “healthcare”. Two independent reviewers screened titles, abstracts and full-text articles. Studies were included if they related to AI use in healthcare, stated the impacts of AI in healthcare workflow or productivity, were published between 2010-2022, were available in full-text, and were published in English. We excluded articles that were abstracts only, involved animal subjects, and were research protocols. We followed the five stages of a published framework for scoping reviews recommended by Arksey and O'Malley, and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses framework to organize the flow of the scoping review process. Further analysis is still in progress. **Results:** Out of 92 articles retrieved, 58 met the inclusion criteria. Most of the studies showed beneficial effects of AI on workflows and productivity in general healthcare and specialized areas such as imaging, nursing, medication adherence, diagnostics, decision support and, delivery of preventive and therapeutic interventions. **Conclusions:** Our preliminary findings suggest a positive trend towards increased benefits of AI in medicine and public health.

**Connor Ross**, MPH student

### **Tetanus Seroprevalence among children in Zambia, 2020**

Tetanus is an acute infectious disease caused by the bacterium *Clostridium tetani* that can be prevented via vaccination with tetanus-toxoid containing vaccine (TTCV). Serology measuring tetanus-specific immunoglobulin G (IgG) antibodies can provide

direct estimates of tetanus seroprevalence, and in particular protection derived from vaccination. We conducted a tetanus serological survey in two districts in Zambia (Choma and Ndola). The serological survey sampled from residual diagnostic specimens from two district hospitals among children 1 year through 14 years old. We use a commercial Enzyme Immunoassay kit (VaccZyme) to test for tetanus-specific Immunoglobulin G (IgG) antibody concentrations. There was no statistically significant difference in tetanus seroprevalence among children in Ndola (88%, 95% CI 81% - 93%) and in Choma (85%, 95% CI 77% - 90%). This is consistent with similar tetanus vaccination coverage in the two districts. Age was a significant predictor of seroprevalence in both districts. Gender was statistically significant in Choma as males were positively associated with seropositivity. Hospital ward was statistically significant in Ndola as specimens collected from outpatient wards were positively associated with seropositivity as compared to inpatient wards. Residual specimens can be leveraged to understand drivers and determinants of seroprotection to tetanus in addition to overall district level seroprevalence and identify gaps in vaccination coverage to inform vaccination strategies.

### ***Health Policy & Management***

**Farah Chowdhury**, DrPH student

#### **Determinants of Tele Visits During the COVID-19 Pandemic: A Cross-Sectional Secondary Data Analysis Among US Adults with Disabilities**

Achieving health equity must consider the special needs of adults with disabilities (AWDs) due to challenges they face in accessing healthcare. During the COVID-19 pandemic, the challenges became even more severe. One option for improving access to care is to use Tele visits. Analysis of telehealth utilization rate during the COVID-19 pandemic would be important for designing telehealth-associated public health programs for AWDs. **Research Question:** What are the individual-related factors that affected the use of video or phone tele visits in the USA during the COVID-19 pandemic among AWDs? **Methods:** Using Anderson Behavioral Model for Healthcare Utilization, potential factors affecting tele visit use were identified. 2021\_National Health Interview Survey (NHIS) data were used. Tele visits were defined as having an appointment with a doctor, nurse, or other health professionals by video or telephone. Disabilities are defined as any difficulty in vision, hearing, mobility, self-care, communication using usual language, remembering or concentrating, doing errands alone, or participating in social activities. **Results:** Out of 14,097 adults with at least one disability in the survey, 6,255 (43.53%) used tele visits during the COVID-19 pandemic. Among AWDs using tele visits, the likelihood of visits was higher for age group 55-64 years than 18-24 years (46.06% vs. 35.99%), in women than men (47.93% vs. 38.22%), in non-Hispanic AIAN and other groups than Blacks (49.22% vs. 39.62%), in income group above 400% of Federal Poverty



Line (FPL) than 100-200% of FPL (47.95% vs. 38.70%). A higher level of educational attainment is associated with higher telehealth use. AWDs living in Western USA are more likely to use telehealth than those living in Midwest (49.28% vs. 39.26%). Among AWDs, compared to 'some difficulty,' in vision, 'a lot of difficulty' used telehealth at a higher rate (53.35% vs. 42.58%). Patterns were similar for other disabilities such as hearing, mobility, communication using usual language, remembering or concentrating. Highest severity AWDs used telehealth at a lower rate than group reporting 'a lot of difficulty' for the disability types. **Conclusion:** AWDs require regular access to healthcare providers and only about 44% of them using tele visits during COVID-19 is a concern. Those with visual and auditory limitations probably face a higher degree of disadvantage in using tele visits and to improve overall use of tele visits, policymakers should identify approaches to improve access to healthcare services by disability type.

**Salma Sultana Resma & Biplav Babu Tiwari**, MHA Student & Doctoral student

### **Sleep Inadequacy and Its Impact on Chronic Conditions Among Young Adults in the United States**

In recent years, the prevalence of sleep inadequacy among young adults in the US and a surge in chronic conditions among this age group have raised questions about the potential link between insufficient sleep and its association with early onset of chronic conditions. This study aims to investigate the association between sleep duration and chronic conditions among young adults in a cross-section design. We used The Behavioral Risk Factor Surveillance System (BRFSS) 2022 data based on a national survey self-reported sleep duration and chronic health. We used the recommended 8-10 hours of sleep as the normal average range of sleep for young adults, and coded sleep duration as normal, less than normal for less than 8 hours of sleep. The sample was restricted to young adulthood age range 18-24 years. The outcome measure was number of chronic conditions which was calculated from self reported presence of any of the following health conditions heart attack, stroke, asthma, skin cancer, melanoma, chronic obstructive pulmonary disease (C.O.P.D), depressive disorder, kidney stones, fibromyalgia. We performed descriptive analysis and chi squared  $\chi^2$  test to study association of sleep duration with choric condition by gender and race. Simple linear regression analysis with the average number of hours of sleep as the independent variable and number of chronic conditions as the dependent variable were developed to study association. There were 26941 young adults in the sample, the majority (63.6%) reported less than normal sleep hours indicating the prevalence of sleep inadequacy among this age group. The difference is prevalent in the average number of hours of sleep among gender, race, income level, physically and mentally healthy days, health insurance, housing status and disability status. Among the sample reporting less than normal sleep hours, on an average men (6.5) reported to have half an hour less sleep than women (7.0). African American (5.5) and Hawaiian ((5.8) reported the lowest

amount of sleep compared to 7 hours of sleep among White. Young adults with normal sleeping duration had a higher likelihood of an increased number of chronic conditions [adjusted  $\beta = 1.21$ ; p-value  $<0.001$ ] compared to young adults with less than normal sleep duration. This research aims to contribute valuable insights into the relationship between sleep inadequacy and the rising prevalence of chronic conditions among young adults in the United States. Understanding these connections is crucial for developing targeted interventions and public health strategies.

**Salma Sultana Resma & Biplav Babu Tiwari**, MHA Student & Doctoral student

### **Cultural Acceptance and Mental Health Among High School Students in Georgia**

Georgian adolescents have poor accessibility to mental health services. Schools could play a significant role in filling this gap. Thus, this study assesses the association between the cultural acceptance (CA) perception of high school students in Georgia and their mental health (MH) status. Cross-sectional study design was followed using Georgia Student Health Survey (GSHS) 2.0 data, 2019-2020. The main outcome of interest was self-reported days of poor mental health (MH) status, and the main predictor was self-reported cultural acceptance (CA) perception, assessed using a 4-point Likert scale. Differences in self-reported MH days and CA perception were tested using ANOVA, and multivariable regression models to assess the association between CA and the number of days with poor MH status, adjusted for gender, grade, race/ethnicity, year as a fixed effect, and standard errors were clustered at the school district level. Asian/pacific islanders [CA:2.655 $\pm$ 0.709; MH:4.005 $\pm$ 5.993] and males [CA:2.541 $\pm$ 0.762; MH:4.337 $\pm$ 6.458] had the highest CA perception but the lowest number of days with poor MH status, whereas Native Americans [CA:2.362 $\pm$ 0.812; MH:7.830 $\pm$ 8.600] and females [CA:2.502 $\pm$ 0.735; MH:4.726 $\pm$ 5.954] were polar opposite. Further, the CA perception increased with grade, but so did the number of days with poor MH status. Moreover, the improvement in cultural acceptance perception among high school students was negatively associated with the number of days with poor MH status [for example, inclusivity: somewhat disagree = -1.2; somewhat agree = -1.4; strongly agree = -1.3; p $<0.001$ ; ref. = strongly disagree]. The significant negative association implies that the improvement in the perception of CA practices would increase the likelihood of decreased number of days with poor MH status among high school students in Georgia. The findings underscore the importance of addressing cultural acceptance in promoting positive mental health outcomes among high school students.

**Mersiha Torlak**, MPH, DrPH student

## **Understanding the prevalence, trends, and implications of urologic procedure cancellations at Grady Memorial Hospital**

**Background:** Frequent last-minute cancellations for surgical procedures cause significant logistic and financial strain on the healthcare system, particularly on hospitals that are dependent on public funding. These cancellations consume limited resources in public safety net systems and impact access to care by others who need it.

**Objective:** This quality improvement project aimed to analyze trends and reasons for surgical procedure cancellations in a urology clinic at Grady Memorial Hospital, a large, public safety net hospital in Atlanta, GA. **Methods:** All canceled inpatient, outpatient, and ambulatory service urologic procedures data from 03/01/2022 to 03/01/2023 were reviewed and a subset of patients (n=24) were randomly selected for an interview, which included the completion of the BRIEF health literacy questionnaire. Aggregate costs of canceled surgical procedures were estimated using the existing patient-facing Grady web-based tool and financial records review. **Results:** During the one-year period, 1,436 urologic procedures were scheduled, 1,260 (86.4%) were completed, and 176 (13.6%) were canceled. Aggregate canceled procedure costs ranged from \$2,456 to \$259,991. A positive correlation was observed between patients' increasing age and increasing procedure costs. Most (n=19/24, 79%) patients who canceled their procedures had limited or marginal health literacy levels. Transportation was identified as a top (20%) influencing patient factor for procedure cancellations. **Conclusions:** One in ten procedure cancellations occur in one year in this cohort assessment, involving an extensive range of procedure-associated opportunity costs. Development, implementation, and increased awareness of health literacy intervention and transportation assistance programs could potentially alleviate the issue.

### ***Health Promotion & Behavior***

**Noah Hopkins**, Doctoral student

### **Healthcare Utilization and Attitudes Towards Mental Health in the Farming Community**

Farming is a high-risk occupation, and individuals involved in this industry are at risk of physical injury from working with heavy machinery and livestock and through exposure to potentially hazardous chemicals in the form of fertilizers or pesticides. This risk is compounded by the fact that many farmers live in rural areas where healthcare resources may be sparse or under-equipped. The purpose of this study was to examine farmers' engagement with resources for physical healthcare and how this informed intentions to engage with mental healthcare. An online survey was completed by 892

farm owners (47.3%), farm managers (26.3%), farm workers (15%), farm spouses (4.3%), and others in the farm industry (7.1%). Most of the respondents identified as male (69.5%) and were between the ages of 35-39 (35%) or 40-44 years old (14.3%). The online survey was shared through extension agents, farming consultants, and on farming social media sites from November 2022-January 2023. The majority of respondents had seen a healthcare provider within the last year (59.2%), with 31% of those respondents engaging with a healthcare provider within the last 6 months. Just under half of survey respondents reported not having a personal physician (44.2%). Of those respondents who reported seeking resources for mental healthcare, 28.2% had engaged with a mental healthcare provider within the last 6 months. Respondents who reported having a personal physician were more likely to express intentions to engage with a mental health professional if they had a personal mental health concern ( $p=.000$ ). While research indicates that rural areas face a deficit of both physical and mental health care providers, little is known about the healthcare utilization patterns of rural farming populations. This study found farmers who did have a point of contact with the healthcare system through a personal physician were more likely to seek out resources for mental health care, indicating these healthcare providers are essential in connecting rural populations to resources for mental health support. Future studies should seek to examine the role general practitioners in rural areas play in connecting the individuals in their care to more specialized services

**Chase Reece**, Undergraduate student

### **Characterizing Physical Health and Injuries of Rural Farmers: A Qualitative Study**

Farming is a dangerous occupation that presents many health risks which lead to higher rates of work-related injuries. In addition to physical hazards, farmers face unique work-related stressors. These stressors lead to worse mental health outcomes and a higher prevalence of stress, which can further affect one's physical health and risk for chronic conditions. Furthermore, injuries among farmers can lead to disability, thereby causing additional stress and negatively impacting mental health. Overall, the purpose of this study is to characterize the physical health and injuries among the farming population so that prevention and treatment strategies can be tailored to maximize effectiveness. Structured interviews (30-45 minutes) were conducted with full-time rural Georgia farmers ( $n=15$ ) in eleven counties throughout the state. Using qualitative software, inductive coding was used to identify themes and patterns among transcribed interview recordings. Analysis of in-depth interviews most frequently identified the following themes related to physical health problems in the farming population: 1) repetitive strain injuries, 2) physical manifestations of stress, 3) heart attacks. Other work-related health issues were reported to a lesser extent, including signs of physical

exhaustion, chronic pain, burns, respiratory irritation, and lacerations. A large proportion (40%) of farmers reported repetitive strain injuries stemming from the recurrent motions involved in farming. One-third (33%) of the participants reported physical symptoms of stress, including ulcers, chest pain, weight changes, and sleep disturbances. Almost half (46.7%) of the farmers stated they knew another farmer who had previously experienced a heart attack. The interviews successfully identified physical health issues and injuries among farmers. Because the results revealed that repetitive strain injuries, physical symptoms of stress, and heart attacks are some of the most prevalent physical health conditions among the farming population, rural healthcare professionals should educate themselves on these issues and their underlying causes to ensure that well-rounded, culturally relevant treatment is provided. Additionally, this study found many of the health issues reported were physical presentations of stress, and because farmers are at higher risk for work-related stress, more research should be conducted to understand the relationship between physical and mental health within this population.

**Sloane Sengson**, MPH student

### **A Grassroots Approach to Building a Social Media Presence to Engage Key Stakeholders in the Field of Traffic Safety**

The road to achieving Vision Zero, a traffic safety campaign aimed at eliminating traffic crash fatalities, must include a social media presence and strategy. The Traffic Safety Research and Evaluation Group (TSREG) at the University of Georgia uses a low-cost approach to building a social media following across multiple platforms and engaging key constituents about important traffic safety topics. In an effort to elevate our social media reach and to advance the conversation of traffic safety, a multi-step communication audit was conducted to evaluate the purpose of our messaging for a focused audience, redefine our brand personality and voice, and identify new initiatives. With structured discussions among team members and strategic planning, TSREG coordinates national safety efforts, state mobilizations, and local notices to produce the most current and socially relevant messages for our audiences. An outcome of the audit is that TSREG's social media pages have grown in engagement, reach, and visibility. This ongoing effort has produced lessons learned and helpful tips that could enhance other traffic safety messaging campaigns for organizations with low marketing budgets. Throughout this period, our goal has been to improve science communication in the traffic safety realm and to show dedication to improving our roadways and reducing serious injuries and fatalities. TSREG hopes to share its grassroots approach to building a social media presence from the ground up.

***Global Health Institute***

**Patrick Kaggwa**, Doctoral student

### **Annual incidence infection with *M. tuberculosis* in an African City with Endemic Tuberculosis**

Background: The incidence of infection with *M. tuberculosis* (Mtb) in the community is a useful metric of tuberculosis burden since it depicts transmission from undetected infectious persons. In a prospective study, we estimated the annual incidence of Mtb infection among HIV infected and uninfected adults in Kampala City, Uganda. Study design and methods: Between April 2019 - December 2022, 994 adults (18 – 65 years) without evidence of current Mtb infection were enrolled in a prospective cohort study in Kampala, Uganda. Participants were evaluated quarterly to identify new infections. New infections were defined as conversion of the interferon-gamma release assay (IGRA, criterion for conversion - test  $\geq 0.35$  IU/ml) or culture-confirmed tuberculosis. Incidence rates were estimated for overall follow-up and at quarterly intervals; incidence rates were stratified by sex and HIV serostatus. Results: Of the 994 participants, 86 incident infections occurred over 6965 person-months of observation (pmo), giving an overall incidence rate of 1.23/100 pmo (95% CI: 1, 1.52), equivalent to an annual incidence of 13.8% (95% CI: 11.3%, 16.7%). Over the quarterly intervals, the incidence rate varied slightly from a low of 1.06/100 pmo at month 6 to a high of 1.56/100 pmo at 12 months; across all follow up visits, the confidence intervals of visit specific incidence rates overlapped. The incidence rate was 1.33 /100 pmo (95%CI: 0.82%, 2.13%) among HIV seropositive persons and 1.24/100 pmo (95%CI: 0.98%, 1.57%) among HIV seronegative persons; the incidence rate was 1.3/100 pmo (95%CI: 0.93%, 1.82%) in males and 1.26/100 pmo (95%CI: 0.97%, 1.63%) in females. Conclusion: In an African city with endemic TB disease, we found a high and stable occurrence of new infections among adults. These findings suggest that the residents of the city encounter undetected infectious cases of TB in the community

### ***Institute for Disaster Management***

**Emma DiPuma**, MPH student

### **Community Disaster Preparedness – How Education Changes Household Preparedness**

The Athens Community Climate Resilience Project is a community-based climate resilience intervention study that leverages the deployment of disaster exercises to prevent community harm caused by extreme weather events. This project is a collaboration between the Athens-Clarke County local government and researchers from the University of Georgia, Kennesaw State University, and Augusta University, sponsored by the Partnership for Inclusive Innovation (PIN) at Georgia Tech. The

The project goal is to reimagine how leveraging neighborhood disaster preparedness can improve the lives of residents in a community experiencing rapid economic development and population growth. As part of this study, Athens-Clarke County residents took an online questionnaire and were invited to attend a disaster exercise at the University of Georgia. Residents were given hands-on instruction on how to prepare for natural disasters. During this exercise, community members created two maps with UGA faculty supervision. The first mapped their community's perceptions of flood risk and subsequent emergency evacuation routes. The second again mapped their emergency evacuation routes, this time based on the FEMA Flood Risk Map and local emergency shelters. The goal of these maps is to identify and inform risk perception. This exercise has been done four times so far with four different groups of residents. The data added to these maps creates a better understanding of how these disaster exercises impact local community preparedness. The differences between these two maps exhibit the improvement of community understanding of flood risk and show increased preparedness following disaster education.

**Kelli McCarthy**, Clinical Assistant Professor

### **Riding the Wave of Preparedness: Navigating Drills, Embracing Thrills, and Unveiling the Secrets of Emergency Preparedness Exercises**

This poster presentation explores a pioneering research project aimed at enhancing the resilience of healthcare coalitions in Georgia through the development and implementation of two comprehensive exercises. Focused on evaluating the efficacy of the Highly Infectious Disease (HID) plan and the Crisis Care Plan, our study delves into the foundational aspects of these exercises. The first exercise scrutinized the HID plan, evaluating its responsiveness to potential health crises. The second exercise centered on testing the Crisis Care Plan, assessing its adaptability in times of increased healthcare demand. Both exercises were meticulously designed to simulate real-world scenarios, providing a robust platform for healthcare coalitions to identify strengths and areas for improvement in their emergency response mechanisms. The poster will not only showcase the intricate details of the exercise structures but will also highlight invaluable lessons learned from their implementation. Insights gained from these exercises offer a roadmap for healthcare coalitions to refine and optimize their preparedness strategies. Join us in uncovering the key findings that contribute to the continual evolution of healthcare coalition preparedness in the face of emerging public health challenges.

**Pooja Patel**, MPH Student

### **Breaking Barriers: Pushing for an Increase in Language Inclusion in Emergency Notification Plans**

Although emergency communication efforts have increased over time, there is still a disconnect between emergency management agencies (EMAs) and the public. This is especially true when it comes to reaching racial and ethnic minority populations or populations with limited English proficiency (LEP). This study was conducted to understand what current capabilities EMAs across the United States have when it comes to reaching their LEP populations. Using a survey, 30 EMAs were contacted to answer general questions regarding their jurisdiction, current capabilities, and what solutions they have or resources they may need. Out of the 30 EMAs contacted, 18 participated and shared their information. The results showed that many EMAs did not include enough languages in their emergency notification plans to reach their LEP populations. Out of six jurisdictions that reported having more than 30 languages spoken in their area, only 16.7% (n = 1) reported including more than 30 languages in their emergency notification plans. This may be due to a lack of resources, as many jurisdictions indicated needing additional assistance. There has been a push by many public officials to expand the number of languages through the Federal Communications Commission (FCC). The FCC has adopted a plan to include 13 additional languages, but further expansions are imperative to bridge the gap that LEP populations face.

**Makayla Peebles**, MPH Student

### **Considerations of Moral Injury in Health Care Providers Treating Patients with Acute Radiation Syndrome in the Aftermath of a Nuclear Disaster**

This study delves into the heightened risk of moral injury among healthcare providers, particularly when treating patients with Acute Radiation Syndrome in the aftermath of a nuclear incident. Drawing on extensive literature reviews encompassing moral injury in various contexts, three pivotal categories were identified: past nuclear disasters, emerging infectious diseases, and other catastrophic events. Case studies, including Hiroshima/Nagasaki, Chernobyl, Fukushima, the HIV/AIDS epidemic, the Ebola epidemic, COVID-19 pandemic, September 11, 2001, and the 2009 Haitian earthquake, were scrutinized to inform the creation of a robust framework. This framework, designed for healthcare workers, includes a decision matrix and an ethics committee, offering practical strategies to proactively address moral injury and mitigate its impact during nuclear incidents.

**Michelle Ritchie**, Assistant Professor

### **Disaster Resilience Amid a Changing Climate in Alaska**

This collaborative project aims to investigate the seismic resilience of Arctic infrastructure and social systems in the face of a changing climate. The research team,



working closely with Arctic residents and stakeholders, will develop adaptation strategies that address the interconnection of built and natural environments, as well as social systems. The study is crucial for advancing fundamental science and engineering to tackle challenges specific to the evolving Arctic, particularly in the context of social-ecological-technological systems that need to withstand seismic events. Employing a cross-disciplinary approach, the research team will holistically engage with local communities in the Copper River Valley area. The investigation will encompass the study of the natural environment, including regional seismicity and permafrost changes, the built environment through seismic designs and infrastructure performance, and social systems through community engagement. This approach leverages traditional knowledge, enhances social preparedness and training, and involves a review of adaptation policies at various governance levels.

**Morgan Taylor**, Ph.D., Assistant Research Scientist

### **Redefining Resilience: Strategies to Address the Long-Term Care Staffing Crisis**

Long-term care is an integral part of the American healthcare system, offering critical services to thousands of families throughout Georgia. Unfortunately, the ability to provide this care is being impacted by a staffing shortage that is nothing short of a crisis. This shortage is nothing new but, like so much else, it was exacerbated by the COVID-19 Pandemic. This has led to calls for action and recommended interventions emerging from seemingly everywhere. Following an in-depth analysis of some of the problems driving the staffing crisis, two programs were developed to address these challenges: the Georgia CNA Career Pathway Initiative and Georgia CNA Virtual Skills Evaluation Program. Both interdisciplinary efforts, these programs are exploring how innovative strategies can be partnered with emerging technological capabilities to offer new solutions to the staffing crisis. This poster will highlight the successes of these two programs thus far and next steps identified in supporting Georgia's long-term care facilities.

### ***Institute of Gerontology***

**Lydia M. Burton**, MPH Student

### **Meet Me at the Gardens – Lessons learned from a Public Health - Botanical Garden collaboration designed for caregiver-patient dyads living with dementias**

Family caregivers of persons living with dementia experience high mental and physical demand, often creating imbalance and strain within their familial relationships. Research shows exposure to nature (e.g., indoor/outdoor gardens) reduces stress and

improves quality of life. Meet Me at the Garden (MMATG), a 4-month proof of concept pilot program, provides tailored programming for caregiver-patient dyads in a public garden setting. The purpose of this roundtable is to disseminate lessons learned and best practices for ADRD-specific public health programming in natural settings. Eight participants (n=4 caregivers; n=4 patients) were recruited from a local dementia clinic to participate in MMATG. Participants attended four 2.5-hour long sessions, which included a brief botanical workshop, a sensory garden walk, and a hands-on nature-inspired activity. At baseline and after each monthly session, quality of life, caregiver burden, and engagement with MMATG activities were measured using mixed methods. MMATG was designed to provide dementia-friendly programming in a natural setting, to reduce stress and facilitate engagement between the dyad. Both members of the dyad rated activities that encouraged autonomy (e.g., making unique blends of herbal dressings/teas) most highly; dyads appreciated a focus on humor and engagement over traditional learning outcomes. Dyads highly rated independent-but-together activities, and found that the dementia-friendly space facilitated sharing personal stories and creativity. Patients in particular indicated improvement in dyad relationship quality as the program progressed. Dementia-friendly and informed programming can improve engagement and quality of life for patient-caregiver dyads, particularly when best practices for dementia-informed programming are adopted.

**Anita Reina**, Postdoctoral Fellow

### **Mindful Eating Improves DASH Diet Quality in Full-Time Working Adults: Findings from The Mind Your Heart Pilot Study**

The DASH diet is efficacious in reducing blood pressure, but dietary adherence in the controlled trials exceeds that of the general public. Although nutrition education is the default to improve adherence, evidence supports that education alone scarcely affects dietary adherence. Behavioral interventions to address maladaptive eating behaviors may improve long-term adherence. Mindful eating effectively increases adaptive eating behaviors to improve adult dietary habits but has rarely been applied to improve dietary adherence. The purpose of this quasi-experimental, pseudo-randomized controlled trial was to examine if mindful eating training improves DASH diet adherence and blood pressure beyond DASH diet education alone. A sample of 30 full-time working adults (M=47.10±12.22; 93.3% female; 13.3% non-white) were enrolled in a six-week asynchronous e-learning diet program called Mind Your Heart. Participants were pseudo-randomized based on matched baseline trait mindfulness scores into either a virtual, asynchronous DASH education-only (n=15) or a DASH education + mindful eating training (n=15). Blood pressure, anthropometrics, and diet adherence (DASH diet score) changes from pre- to post-test were examined using the Mann-Whitney U test between groups and Wilcoxon signed-rank tests for within-group changes. Participants in the DASH education + mindful eating group diet quality improved their overall DASH

diet score ( $Z= 1.79$ ;  $p<.05$ ;  $r= .33$ ) from pre to posttest. Specifically, saturated fat ( $Z= 2.24$ ;  $p<.05$ ;  $r= .41$ ), calcium ( $Z= 2.33$ ;  $p<.05$ ;  $r= .43$ ), fiber ( $Z= 1.90$ ;  $p<.05$ ;  $r= .35$ ) and BMI ( $Z= - 2.86$ ;  $p<.05$ ;  $r= .52$ ) improved with mindful eating training. The DASH education-only group increased calcium ( $Z=3.04$ ;  $p<.05$ ;  $r=.55$ ), protein ( $Z=1.89$ ;  $p<.05$ ;  $r=.35$ ), dietary cholesterol ( $Z= -1.93$ ;  $p<.05$ ;  $r= .35$ ) and sodium ( $Z=-1.65$ ;  $p=.05$ ;  $r= .30$ ). The results show significant decrease from pre- to posttest in the diet education-only group for systolic blood pressure ( $Z= -2.78$ ;  $p<.05$ ;  $r=.51$ ), diastolic blood pressure ( $Z= -2.16$ ;  $p<.05$ ;  $r=.39$ ), pulse pressure ( $Z= -2.44$ ;  $p<.05$ ;  $r= .45$ ), and BMI ( $Z= -2.77$ ;  $p<.05$ ;  $r= .51$ ). Though blood pressure changes were not significant after mindful training, more participants in the mindful training group were taking blood pressure medication ( $n=6$ ; 40%). Mindful eating may be an effective behavioral tool for improving DASH diet quality, particularly for fiber, saturated fat, and calcium.

**Annaleesa Rogers**, IOG Clinical Research Coordinator

### **Lessons learned: Development of a Memory Education and Assessment Clinic in an Academic Public Health Setting**

To promote dementia education and diagnosis in under-resourced communities in GA. Georgia is predominately rural, older, and under-resourced with limited dementia care resources. Create a hub-and-spoke model in a non-medical academic College of Public Health in which the “hub” is University of Georgia’s (UGA) Cognitive Aging Research and Education (CARE) Center and the “spokes” are UGA’s land-grant community outreach networks that bridge to rural communities. The clinic “hub” is built upon the expertise of its’ three licensed providers: a geriatrician, a doctor of pharmacy, and a clinical neuropsychologist. Faculty from other colleges, departments, and disciplines contribute to patient services and include social work, speech and language pathology, music therapy, psychology, and public health. Faculty in each of these disciplines developed opportunities for their students to gain experience and skills while receiving academic credit. Medical assessments occur twice weekly for patients who are self- or provider referred. Patient 001 was seen in June 2021. Currently >100 patients have received care by one or more of our licensed providers and social work team. Feedback from patients and referring providers has been consistently positive.