



**University at Buffalo**

**School of Public Health  
and Health Professions**

# **J. Warren Perry Poster Day**

**April 30, 2024**

**Harriman Hall**

**South Campus**

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**Raisa Togani**, Gordon Fang, Emanukere Ajang, Francisco Benavides, Hang Jin Jo

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## Department of Rehabilitation Science

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## Biostatistics

### **Quantitative Evaluation of Intersecting Lifespan and diverse populations Impacted by Health Outcome**

Adeshina Bello, Changxing Ma  
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**Objective:** This study aimed to explore the complex relationships between health outcomes and equity across diverse populations, highlighting their dynamics and multidimensional nature.

**Methods:** Employing a segmented analysis approach, this research scrutinized health equity outcomes to ensure a realistic framework and avoid overgeneralization. Utilizing datasets spanning from 2008 to 2018 sourced from the CDC website, the study examined infant mortality data for various ethnicities in the US, alongside data on heart disease and cancer outcomes among adults aged 18 and above, stratified by sex and age. Furthermore, data on life expectancy relative to race, age-group, and gender (1980-2018) were analyzed. Statistical methodologies employed included negative binomial modeling, graphical correspondent analysis, and model comparison techniques.

**Results:** The study unveiled significant associations between maternal ethnicity and infant mortality incidents (ANOVA /Chi-squared  $p < .0001$ ). Noteworthy interactions were observed between age group, outcome, and gender concerning heart disease and cancer outcomes ( $p < .0001$ ), particularly notable for females ( $p = 0.004$ ). Exploratory data analysis suggests complex interactions, with negative binomial modeling exhibiting superior fit (indicated by lowest QIC/QICu values), spotlighting significant effects for age at 65 and 75, and female gender ( $p < .0001$ ).

**Conclusion:** This research underscores the nuanced nature of health equity variations, stressing the necessity for targeted

interventions to alleviate disparities. The findings advocate for focused efforts to address infant mortality disparities among Black/African American communities. Moreover, there is a call for expanded research on healthy aging and interventions tailored to support individuals at age 65 and 75, considering declining life expectancy trends.

### **A Bayesian framework for medical product safety assessment using correlated spontaneous reporting system data**

Xin-Wei Huang, Saptarshi Chakraborty  
Department of Biostatistics, University at Buffalo

**Objective:** Determining adverse events (AEs) of concern of drugs or other medical products from spontaneous reporting system databases is a core challenge of pharmacovigilance. These databases catalog reports on a multitude of AEs and drugs. However, the similarity and interaction between drugs and AEs often induce correlations in the recorded data. Existing statistical approaches for pharmacovigilance, including the likelihood ratio test-based methods, do not adequately address these correlations, potentially leading to suboptimal assessments.

**Methods:** We propose a formal multilevel Bayesian framework that can acknowledge these correlations more faithfully. The vanilla model with horseshoe prior handles the shrinkage in sparse data, and the flexible model with LKJ prior deals with the correlation structure. Our implementation uses state-of-the-art MCMC sampling (via stan). An R package implementing our methods is developed.

**Results:** Extensive simulation experiments document notable superiority of our approach over other existing approaches. We present a case study involving statin drugs.

**Conclusions:** Our approach can handle zero-inflated report counts, rigorously controls the (positive) false discovery rate when used for AE signal discovery, and

through appropriately articulated shrinkage prior layers aid statistically stable and interpretable inference.

### **A New method to determine recurring CNN analysis black-box problem in Brain Images**

HyunAh Lee, M.S., Jihnhee Yu, Ph.D.  
Department of Biostatistics, University at Buffalo, Buffalo, NY USA

**OBJECTIVE:** This study aims to address the recurring black-box problem encountered in convolutional neural network (CNN) analysis of brain images, hampering interpretability of models built. We proposed a new approach that integrates a kriging interpolator into CNN analysis to address this issue.

**METHODS:** Traditionally, 2D or 3D convolutional neural network analysis can be time-consuming, taking several hours or even a few days. Therefore, incorporating a kriging method will reduce computing time and better identify regions of interest (ROIs) in the brain. Furthermore, kriging techniques enable the quantification of interpolation errors in computed regions, thereby enhancing the reliability of the analysis.

**RESULTS:** Our simulation results demonstrate the efficacy and accuracy of our proposed method in resolving the black-box problem within CNN analysis of brain images. The approach not only expedites ROI identification but also ensures precise delineation, thereby improving overall analysis efficiency and interpretability of results.

**CONCLUSIONS:** Our study is the first to effectively address the black-box model in CNN analysis of brain images. By enhancing the speed and accuracy of ROI detection, our approach offers significant advancements in brain image analysis, with potential applications across various neuroscience research domains.

### **Unravel Penguin Morphology with Bayesian Non-parametric Methods: A Comparative Study of Finite and Infinite Mixture Model-Based Clustering**

Shuliang Yu B.S., Saptarshi Chakraborty PhD., Department of Biostatistics, University at Buffalo, Buffalo, NY USA

**OBJECTIVE:** Our study delved into penguin morphology to compare the clustering across frequentist, Bayesian parametric and Bayesian non-parametric models, and through which to unveil patterns and relationships between input features and class labels.

**METHODS:** The ECM and the Gibbs sampling algorithms were employed in designing the frequentist and Bayesian multi-level models, respectively. For dirichlet process models, the concentration parameters were drawn with a slice sampler. The selected Gaussian model was applied in linear regression to examine the cluster-specific effects with a hard clustering that's determined a posteriori.

**RESULTS:** The clustering we found separated the data into meaningful clusters, with cluster-specific effects of culmen length and depth on flipper length differing significantly from global effects. An evaluation between the similarities between species types and soft clustering quantified how well these align, explaining the differences in effects.

**CONCLUSIONS:** Our findings demonstrated fairly similar clustering across models. The selected clustering effectively segmented the data into meaningful clusters, and intriguing nuances in cluster-specific effects were revealed. This underscores the importance of considering cluster-specific dynamics when assessing data with potential uncovered clusters which are easily found in gene expressions, text mining, environmental risk modeling, and more.

## Testing the Homogeneity of Differences between Two Proportions for Stratified Bilateral and Unilateral Data across Strata

Xueqing Zhang, Changxing Ma  
Department of Biostatistics, University at Buffalo, Buffalo, NY USA

**OBJECTIVE:** Medical comparative studies often involve collecting data from paired organs, which can produce either bilateral or unilateral data. Using Donner's model, our paper constructs a series of methods for testing the homogeneity of differences between two proportions for stratified bilateral and unilateral data across strata.

**METHODS:** We propose three Maximum Likelihood Estimation (MLE)-based methods and compare the performance of these methods with a model-based method based on Generalized Estimating Equations using Monte Carlo simulations.

**RESULTS:** When the number of stratum J and the sample size are small, the LR test behaves liberally. The Wald test becomes inflated when J increases. The Score test shows a relatively stable type I error control, and its box plots are closest to the nominal level  $\alpha = 0.05$ . All three tests behave better when given a larger sample size and a smaller J. The model-based method is robust and performs well on power, sometimes even more robustly than the Score test. However, this GEE for repeated measures analysis is developed without the explicit form of the test statistics and is very time-consuming.

**CONCLUSIONS:** The Score test performs well and offers a valuable alternative to the exact tests in future studies.

## Community Health and Health Behavior

### Increased water consumption is associated with decreased caries experience in youth: A potential strategy to improve oral health equity

Kristin B Adair, Frank Scannapieco, Sarah C Heavey

Department of Community Health and Health Behavior, Department of Oral Biology, University at Buffalo, Buffalo, NY USA

**OBJECTIVE:** Nearly half of youth under nineteen have experience with dental caries. Dental caries risk may be impacted by social determinants of health (SDH), and mitigated by increased water consumption. This study explores whether there is a relationship between plain water consumption, caries experience, and SDH.

**METHODS:** Data from the National Health and Nutrition Examination Survey (NHANES), 2011-2018, limited to youth aged 1-to-19 years with a history of at least one erupted tooth, completed diet interview, body weight measurement, and oral health and dentition exams, were analyzed.

Logistic regressions explored the relationship between water consumption and caries experience ("any" versus "none"). Additional variables representing SDH were added step-wise to refine caries risk assessment, including income, caregiver educational attainment, race/ethnicity, gender, and age.

**RESULTS:** Results demonstrated increased water consumption was associated with decreased caries experience. Specifically, in the initial, unadjusted model, there was a 13.8% decreased risk of having caries experience (RR=0.862; 95% CI: 0.841-0.883;  $p < 0.05$ ) for every 10mL/kg/day increase in water consumption. In the final, adjusted model there was a 4.2% decreased risk of having caries experience, for every 10ml/kg/day of water consumed (RR=0.958; 95% CI: 0.932-0.985;  $p < 0.05$ ).

When evaluated independently, lower income, lower education, and race/ethnicity "other-than-white" were also significantly

associated with increased risk of caries experience.

**CONCLUSION:** Increased water consumption is associated with decreased risk of caries experience, and SDH were impactful. Promotion of increased water consumption should be considered in future dental public health programming as it is lowcost intervention and widely accessible.

### **Primary Care Physicians utilization and knowledge of Crisis Services Resources in WNY**

Jacqueline Flores Department of Community Health and Health Behavior, University at Buffalo, Buffalo, NY  
Collaborators: Cameron Burns and Celia Spacone Phd. Crisis Services of WNY

**OBJECTIVE:** This study investigates the utilization and awareness of crisis services resources among Primary Care Physicians (PCPs) in Western New York (WNY), specifically Erie County.

**METHODS:** Utilizing a mixed methods approach, the study incorporated a 17 item survey with both structured survey items and open-ended questions. A sample of 160 PCPs in the region participated in the study, providing insights into their utilization patterns and knowledge of crisis services resources.

**RESULTS:** Preliminary findings revealed variations in PCPs' utilization patterns and awareness of crisis resources, highlighting potential gaps in accessibility and awareness. While some PCPs demonstrated a high level of familiarity with available crisis services, others exhibited limited knowledge or utilization thereof. Factors influencing utilization and awareness included, time constraints, and lack of knowledge of resources.

**CONCLUSIONS:** Understanding PCPs' utilization patterns and knowledge of crisis services is essential for optimizing mental health care delivery in the region. These findings underscore the importance of addressing barriers to access and enhancing awareness among PCPs to ensure timely interventions for individuals in need. Strategies to improve access may

include targeted education and training initiatives, collaboration with mental health specialists, and integration of crisis resources into primary care settings. Further research is warranted to explore the effectiveness of such interventions in enhancing PCPs' utilization of crisis services and improving mental health outcomes for patients in Western New York.

### ***Modes of cannabis administration and frequency of consumption: Differences among young adult sexual minority populations in the state of New York.***

Michelle Goulette<sup>1</sup>, Heather Orom<sup>1</sup>, Gregory Homish<sup>1</sup>, Alison Haney<sup>1</sup>, Kenneth Lenoard<sup>2</sup>, Jessica A. Kulak<sup>1</sup>.

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**Objective:** Sexual minorities report frequent cannabis use and have higher levels of cannabis use disorder (CUD) as compared to non-minorities. Certain cannabis products have been linked to more frequent consumption among users, which could lead to faster development of CUD. Thus, it is important to understand cannabis product preference across sexual minority subgroups.

**Methods:** Data were analyzed from a community sample of young adults (18-25 years) who completed a web-based survey (n=3,005). Participants reported frequent cannabis use (20 days or more/month), and product choice (joint, blunt, vaped concentrates, dried herb vape, dabbed concentrates, and edibles). Using separate multivariable logistic regressions, we assessed differences in the frequency of each cannabis product used among current cannabis consumers. All models controlled for sex, relationship status, race, and past month cigarette, vaping, and alcohol use.

**Results:** Among respondents, 33.0% identified as a sexual minority, and 41.8% of those individuals engaged in frequent cannabis use. Among sexual minorities, combustible methods were the most popular

and those who identified as pansexual had the highest odds of engaging in frequent joint consumption (AOR:1.9,  $p<0.005$ ). However, those who identified as bisexual had higher odds of engaging in frequent vaped concentrates (AOR:1.4,  $p<0.005$ ) and frequent edible consumption (AOR:1.5,  $p<0.049$ ).

**Conclusions:** Sexual minority subgroups have different preferences when it comes to cannabis product use, and it is important to consider how modes of administration may be associated with frequency of use. Future research should consider cannabis product preferences and how they may be associated with the development of CUD symptoms.

### **Food Box Program: An Interventional Model to Address Food Insecurity in a Student-Run Free Clinic**

Srikriithi Krishnan and Jessica Kruger  
School of Public Health and Health Professions, University at Buffalo, Buffalo, NY USA

**Objective:** At the Lighthouse Free Medical Clinic, patients are screened for food insecurity by a group of allied health professions students prior to being seen by the medical team. Our objective is to combat food insecurity amongst the underserved communities through a Food Box Program.

**Methods:** Once patients screen positive for food insecurity, they speak with our team to start scheduling their food deliveries.

Through our partnership with Fresh Fix, a local organization, boxes are filled with in season fresh fruits and vegetables.

Volunteer drivers pick up the food boxes during the week and do a no contact delivery to the participants' homes. A total of 3 boxes are scheduled to be delivered to the participant over a course of 6 weeks, a biweekly delivery structure.

**Results:** A food box delivery program is a sustainable way to intervene in our community with fresh fruits and vegetables. This program helps address existing structural inequities in the Buffalo community. Through our Food Box Initiative,

we have been able to help over 140 individuals and families.

**Conclusion:** When individuals are provided accessible health services, they utilize them and have better health outcomes. While a food box program does not address food volume concerns for food insecure individuals, it promotes healthy eating and reduces risk factors among our clinic's population of low-income individuals. This is a feasible program to adapt at our clinic, and could be used as a model for other clinics around the country.

### **Prevalence of Problematic Alcohol Use Among Clients in Two Distinct Drug Treatment Court Settings**

Malaiikha N McCormick-Cisse, Lynn D Homish, Linda S Kahn, Gregory G Homish  
Health Evaluation on the Results of Opioid Intervention Court, Department of Community Health and Health Behavior & Department of Family Medicine, University at Buffalo, Buffalo, NY USA

**Objective:** There is limited information on the alcohol use of drug treatment court participants. Additionally, it is unknown if the prevalence of problematic alcohol use of traditional Drug Treatment Court (tDTC) participants differs from those in Opioid Intervention Court (OIC). While tDTC are structured programs lasting 12-18 months, OIC is an intensive program focusing on individuals with the greatest overdose risk. The goal of this study is to provide new knowledge on the prevalence of problematic alcohol use among participants in two distinct treatment court settings.

**Methods:** Data were collected from HEROIC (Health Evaluation on the Results of Opioid Intervention Court), an ongoing longitudinal study that assesses clients in drug courts (N=165). The AUDIT was used to assess participants' baseline, 3, and 6-month prevalence of problematic alcohol use overall and by court setting.

**Results:** The overall prevalence of problematic alcohol use at the baseline, 3-month, and 6-month assessments were 18.8%, 13.3%, and 10.9%, respectively. By court setting, participants in tDTC had a

problematic alcohol use prevalence of 25.0%, 19.1%, and 15.5% at the baseline, 3 months, and 6 months compared to 8.2%, 8.9%, and 14.3% among OIC participants, respectively.

**Conclusion:** tDTC clients report a decrease in use across all time points while OIC clients initially report a much lower prevalence which increased over time with both courts having similar 6-month reports. Future research is needed to understand this finding and to determine how the fundamental differences in court treatment philosophies impact participants problematic alcohol use behaviors.

### ***Dental Health Screening in Low Income Communities***

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**OBJECTIVE:** Low income communities face significant barriers to accessing dental care, and suffer poor oral health as a result. We administered dental health screenings in a food pantry and a free medical clinic to determine if screening patients in a community setting increases their likelihood of establishing a dental home.

**METHODS:** A total of 130 participants across two sites were assigned to intervention (54 participants) or comparison (76 participants) groups. Comparison group participants completed a dental health screening form and received referral paperwork to the dental school. Intervention group participants completed the screening form, had their teeth checked by a dentist, and spoke with a social worker. All participants were contacted one month post-enrollment to determine if they had visited a dentist.

**RESULTS:** 62.03% of participants had not seen a dentist for more than a year, and

18.61% had not seen a dentist for more than 5 years. 94.57% agreed that having healthy teeth and gums was important to them, yet only 44.53% rated their current oral health as good or excellent.

**CONCLUSIONS:** Participants in the intervention group were no more likely than those in the comparison group to have a dental appointment within the one month follow up period. However, considering that the majority of participants had not visited a dentist in over a year, the number that visited a dentist during the one month follow up period indicates that screening in community-relevant locations encourages patients to establish a dental home.

### **Investigating Associations Between Screen Time, Parental Involvement, and Home Environment Quality Among Adolescents**

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**Objective:** This study aimed to explore the relationships between adolescents' screen time, parental involvement, and the quality of the home environment.

**Methods:** Data were collected from a sample of adolescents (N=500) using surveys assessing screen time (hours/day), parental involvement (e.g., supervision, communication), and home environment quality (e.g., family routines, communication, organization). Descriptive statistics and regression analyses were conducted to examine the associations between these variables while controlling for demographic factors.

**Results:** Results indicated that higher levels of screen time among adolescents were associated with lower quality of the home environment, including disruptions in family routines and decreased communication. Additionally, parental involvement played a significant role in mitigating the negative effects of screen



time on the home environment. Specifically, greater parental supervision and communication were associated with better home environment quality, even in the presence of high screen time.

**Conclusions:** These findings underscore the importance of parental involvement in mitigating the potential negative impact of adolescents' screen time on the quality of the home environment. Interventions aimed at promoting effective parental monitoring and communication strategies may be crucial for fostering a positive home environment conducive to adolescent well-being. Further research is warranted to explore additional factors influencing these associations and to inform targeted interventions aimed at promoting healthy screen time behaviors and family dynamics among adolescents.

### **Cannabis Use Among a Statewide Sample of Young Adults: Is Student Status a Risk Factor?**

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**OBJECTIVE:** There is little research that has examined differences in legalized cannabis use by college student status. Our purpose was to understand the use of cannabis among non-students and part-time college students compared to full-time college students in New York State (NYS).

**METHODS:** Data was collected from a self-administered, web-based survey about substance use. Participants were recruited from a commercial database of young adults (18-25 years) in NYS via postcard mailing and/or e-mail. Logistic regression models examined current (past 30-day) cannabis use. Negative binomial models examined Cannabis Use Disorder (CUD; measured with the CUDIT-R). Both models were stratified by student status (non-student, part-time, full-time) and controlled

for college type (i.e., 2 or 4-year college), residency, age, and gender.

**RESULTS:** In unadjusted models, the odds of current cannabis use are higher for part-time students (AOR=1.44,  $p=0.015$ ) and non-students (AOR=1.72,  $p<0.001$ ) compared to full-time students. The incidence of CUD is lower for non-students (IRR=0.31,  $p<0.001$ ) and part-time students (IRR =0.40,  $p<0.001$ ) compared to full-time students. However, in adjusted models, part-time and non-students had higher incidence of CUD (IRR=1.48,  $p<0.001$ ; IRR=1.39,  $p<0.001$ , respectively). Among full-time students, those attending 2-year colleges had higher odds of current cannabis use (AOR=1.68,  $p=0.008$ ) and higher incidence of CUD (IRR=1.27,  $p=0.044$ ) compared to those attending 4-year colleges.

**CONCLUSION:** Student status has a significant impact on the odds of current cannabis use and risk of CUD. Further research is recommended to look at the differences in outcomes between college types.

### **Mental Health and Cognitive Behavioral Therapy in Female Military Veterans**

Tasnim Tarannum

**Background:** Mental health is often overlooked in female veteran populations. However, there are many mental health related issues that come up post-deployment such as post-traumatic stress disorder, anxiety, depression, eating disorders, and reproductive health issues. Various treatments are used to help veterans navigate issues dealing with mental disorders such as cognitive behavioral therapy and community-based support systems.

**Objective:** This literature review that provides a comprehensive background understanding of mental health disorders and the various treatments for mental health issues in female veterans and how various treatments aid in lessening the gender gap in veteran care.

**Methods:** I used database searches for scholarly articles related to gaps and

recommendations for mental health in female military veterans. The search strategy involved searching through various databases and libraries such as PubMed, Google Scholar, and PsycInfo with keywords such as “mental health,” “cognitive behavioral therapy,” and “female veterans,” and “therapy.” The search identified 11 articles published in English between 2012 and 2023.

**Results:** Evidence shows that behavioral therapy and patient-centered mental health care is crucial for reducing comorbidities in the female veteran population. A combination of different evidence-based therapies is effective for a significant number of veterans post-deployment.

**Conclusion:** This literature review highlights the importance of evidence-based therapies to alleviate and lessen mental health issues in female veteran populations. There is still ongoing research conducted on more effective strategies that need to be implemented to help meet the mental health needs of female veterans.

### **Understanding Food Insecurity Among College Students: Implications for Academic Achievement and Equity Interventions**

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**Objective:** Food insecurity (FI) on university campuses has surged alongside shifting student demographics. Despite perceptions of privilege, campuses now accommodate a diverse student body, including historically marginalized groups. This study aims to evaluate students' food security, elucidating disparities to guide the development and adaptation of interventions.

**Methods:** With a mixed methods design, we conducted a cross-sectional online survey among UB undergraduates in Fall 2023 (n=662). Measures encompassed Food Security (USDA), and participants self-reported their GPAs and college food

experiences. Demographic data were obtained from institutional records. Chi-square tests and logistic regression models evaluated group variations. Semi-structured interviews (n=20) were conducted with FI students, with qualitative data analysis scheduled for completion in May 2024.

**Results:** 58% of students reported FI. Minority groups, including Hispanic/Latino (OR=5.4, 95%CI:2.5–11.8), Black/African American (OR=2.8, 95%CI:1.4–5.4), and international students (OR=2.5, 95%CI:1.1–5.3) had significantly higher odds of FI compared to their White counterparts. Seeking employment vs. not needing one showed increased odds for FI (OR=5.1, 95%CI:3.1–8.5). Pell Grant eligibility and independent living arrangements (on or off-campus) were also associated with higher odds of FI. Enrollment in campus meal plans showed no associations. Multivariate logistic regression, adjusting for sociodemographic variables, housing, meal plans, and employment, revealed that FI students had significantly higher odds of achieving <3.0 GPAs (OR=1.6, 95%CI:1.04–2.48) than food-secure students.

**Conclusions:** FI is associated with lower educational attainment. Race/ethnicity/origin and employment emerged as crucial food security predictors. Addressing FI could mitigate academic achievement disparities, underscoring the urgency of targeted interventions.

### **Public Health Entrepreneurs Wanted: Integrating the Entrepreneurial Spirit in the MPH Curriculum**

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**OBJECTIVE:** Public health is faced with many challenges, yet oftentimes solutions lack innovation and creativity. One strategy to increase the effectiveness and reach of public health programs is to infuse social entrepreneurship into public health education. Social entrepreneurship, characterized by its mission to create social

value and pursue innovative solutions, offers a distinct approach to problem-solving within the public health domain.

**METHODS:** Non-profit social entrepreneurship strategies and their integration into public health education were utilized to meet the Applied Practice Experience (APE) requirements set by the Council on Education for Public Health (CEPH) to transform a community crowdfunding event, Buffalo SOUP, into a public health-oriented organization.

**RESULTS:** Through an established event theme, such as environmental health and sustainability education, the initiative addressed various MPH competencies, including population-based intervention development, assessing community needs, and stakeholder engagement.

**CONCLUSIONS:** Entrepreneurial principles can be integrated into the MPH curriculum through core courses and campus-based entrepreneurial centers and may better prepare future public health practitioners to develop innovative problem-solving skills and meet growing demands in healthcare systems.

## **Epidemiology and Environmental Health**

### **Contraceptive Use, Pregnancy Intention, and Pregnancy Fatalism Among Young Adult African Immigrants Living in the United States**

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**OBJECTIVE:** The purpose of this project was to assess contraceptive use, pregnancy intention, and pregnancy fatalism among African Immigrants living in the United States.

**METHODS:** 93 participants were recruited using WhatsApp, a confidential messaging platform. The survey was distributed via REDCap, a web-based research database between November and December 2023. Survey items included participant demographics, reproductive intention, contraception, fertility preferences, and

attitudes towards pregnancy. Survey data was screened for fraudulent activity.

**RESULTS:** N = 93 African immigrants completed the survey, with a mean age of 22 years. The most commonly represented countries were Ghana (55%), Nigeria (15%) and Ethiopia (7%). Most participants relocated to the US as minors (81.8%). Most participants had some college education or trade school (54.8%). Sixty-seven percent reported wanting children, with 84% planning to wait “years” before having children. A majority of participants (56.8%) indicated they would use a family planning strategy to delay or avoid pregnancy. Most commonly reported contraceptive methods included condoms, the pill, and intrauterine devices (IUDs). Few participants showed signs of pregnancy fatalism, with 97.8% believing that pregnancy is something they can control with their partner.

**CONCLUSION:** Among young adult African immigrants who relocated to the US as minors, we found a high prevalence of pregnancy intention, high contraceptive acceptability, and low pregnancy fatalism. Future research should compare these outcomes by relocation age to assess for country-of-residence influence during childhood and adolescence and to identify the unique family planning needs of these different populations.

### **Effect modifications of wildfire-related pregnancy health by greenspace and human sentiment in the US**

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**OBJECTIVE:** Pregnant women are at increased risk of adverse pregnancy outcomes due to recent surges in wildfires. Greenspace and positive attitudes and

feelings of individuals may provide beneficial effects during pregnancy. Little is understood about how wildfire smoke, greenspace or human sentiment interact to affect pregnancy health. We aim to investigate whether the associations between wildfire smoke and pregnancy outcomes are modified by neighborhood greenspace and human sentiment in the United States.

**METHODS:** Pregnancy outcomes (gestational diabetes mellitus, GDM, gestational hypertension GH, eclampsia) from national birth records of 3,595,994 women in 2018 were linked to wildfire-sourced PM2.5 exposure during six windows throughout pregnancy using logistic regression model. Greenspace was estimated by satellite remote-sensing technique with higher value indicating more vegetation. Human sentiment data was captured through social-media of Twitter/X posts using language-processing algorithms. Quartiles of greenspace and sentiment were applied to calculate effect modification.

**RESULTS:** Wildfire-sourced PM2.5 is associated with increased risks of GDM, GH and eclampsia, with the strongest associations varying by exposure windows. Moreover, increasing the quartile of greenspace or sentiment associated with decreased odds ratio (OR) for GDM, GH and eclampsia. For example, the OR of wildfire-sourced PM2.5 effect on GDM in the lowest greenspace (1.012, 95%CI: 1.004-1.019) or sentiment quantile (1.022, 95%CI: 1.014-1.031) is significantly higher than that in the highest quantiles of greenspace (0.996, 95%CI: 0.988-1.003) or sentiment quantile (0.997, 95%CI: 0.989-1.005).

**CONCLUSIONS:** Our findings showed that increased greenspace and positive sentiment through social media may mitigate risks for GDM, GH and eclampsia due to smoke-sourced PM2.5.

### **Per- and Polyfluoroalkyl Substances (PFAS) Trends in US Adolescents: Racial & Ethnic Disparities.**

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**OBJECTIVE:** To examine the exposure trends of Per- and Polyfuoroakyl( PFAS) among adolescents in the United States while also focusing on identifying racial and ethnic disparities. This study aims to measure these disparities and assess their potential health implications over time. Which will help guide more effective public health strategies and policies to reduce exposure risks in vulnerable populations.

**METHODS:** The National Health and Nutrition Examination Surveys (NHANES) is a design to sample larger numbers of subgroups for public health interest. It is used to provide estimates of health status indicators for population subgroups. This study focused on subgroups in 2011-2018, which consisted of 1,379 participants of ethnic groups such as Mexican American, Non Hispanic White, and Non Hispanic Black. These participants completed blood, urine and other types of specimens to provide information about their health and nutritional status.

**RESULTS:** After adjusting for factors such as Age, BMI, and Education, the Non Hispanic Black group showed consistent high concentrations across multiple PFAS types.

**CONCLUSION:** Disparities in PFAS exposure among racial and ethnic groups indicate significant environmental injustices. Non-Hispanic Black and White communities displayed elevated PFAS levels which are influenced by socioeconomic and residential factors. To address these disparities, it is imperative to enhance the focus on environmental policies to ensure equitable health outcomes.

## **Patient-level Barriers to Chronic Kidney Disease Care: Viewpoints of Nephrologists and Primary Care Physicians.**

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**OBJECTIVE:** To identify key perceptions of patient-level barriers to kidney disease care among Nephrologists and Primary Care Physicians (PCP).

**METHODS:** Nephrologists (n=7) and PCPs (n=6) participated in semi-structured, online interviews about managing patients with chronic kidney disease (CKD). Interview topics included comfort managing advanced CKD, care-team transitions, treatment communication/involvement, and barriers to care. A rapid qualitative analysis was performed.

**RESULTS:** The most dominant perceived barriers to optimal CKD care were “patient non-compliance”, limited health literacy, economics, and transportation. Patient “non-compliance” was commonly identified as a barrier by Nephrologists, sometimes described alongside other social determinants of health (SDOH) or patient fear. Transportation sub-themes, identified by both provider groups, included lack of reliable transportation and travel distance. Many providers (43%) described low-income and job constraints, particularly for those just above the threshold for safety-net care, as creating challenges for appointment attendance and affording newer medications. When discussing health literacy, PCPs described nuanced consequences to patient care/outcomes while Nephrologists simply listed literacy as a possible factor. Interestingly, 42% of Nephrologists (and 0% PCP) identified health-status (age, comorbidities) as limitations to CKD care.

**CONCLUSIONS:** We found that Nephrologists were more likely to identify medically-oriented factors (age, comorbidities, & care-plan non-adherence) as barriers to providing care whereas PCPs were more likely to describe patient characteristics related to SDOH. The stark

difference between PCPs’ understanding of patients’ daily circumstances versus Nephrologists’ simplistic focus on perceived barriers such as “non-compliance” may indicate a need to further connect patient behaviors and outcomes to SDOH circumstances for kidney specialists.

## **Racial and Ethnic Differences in the Association between Lead Exposure and Asthma Diagnosis Among an Urban, Low-income Cohort of Children from Philadelphia, PA**

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**Objective:** To examine racial and ethnic disparities in lead exposure and asthma among an impoverished pediatric cohort residing in Philadelphia.

**Methods:** We analyzed electronic medical records (EHR) of 9,478 children ≤10 years of age who visited the Temple University Hospital System from 2010-2020. Blood lead levels (BLL) were available in EHR as per statewide and national recommendations. First occurrence of asthma diagnosis via ICD codes was used to identify asthma cases. Logistic regression models were fit to estimate the association between BLL and asthma, with adjustment for age, sex, smoking status, and insurance type. Using ArcGIS software, maps of Philadelphia were created to represent the distribution of BLL and asthma among this cohort.

**Results:** Among all children, 24.7% had a BLL exceeding the current CDC action level of 3.5 µg/dL. Compared with children with a level <1 µg/dL, those with elevated levels had 2.15-2.36 times greater odds of asthma (p<0.05). Odds ratios were greater among non-Hispanic children and Black children specifically, with ORs ranging from 2.52-2.86 and 2.30-2.58, respectively for higher categories (>1 µg/dL) of BLL. The map

suggests clusters of elevated BLL and asthma cases.

**Conclusions:** Higher BLLs increased the risk of asthma, with pronounced disparities among Black and non-Hispanic children. Specifically, elevated risk of asthma diagnosis was observed among children with BLL between 1-3.5 µg/dL, below the current CDC action level. These findings underline the urgent need for targeted public health interventions to reduce lead exposure, especially in vulnerable communities with high proportions of racial and ethnic minorities.

### **Didactic Approaches to HIV Education in a Custodial Setting to Decrease HIV Incidence**

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**OBJECTIVE:** In male prisons, we find inmates are five times as likely to contract HIV than the general population, and the intersectionality of risk behaviors and sexuality in custodial settings contribute to the prevalence. We want to effectively decrease the incidence of HIV in Ulster County prisons.

**METHODS:** We want to effectively decrease the incidence of HIV in this high-risk community with the use of a one-year group-based education program for men (N= 217) who are HIV-negative and engage in high-risk behaviors in Ulster County prisons. A didactic approach will be utilized via peer-led discussions, formal presentations from public health professionals, and visual aids. We will assess our intervention using tests to check knowledge retention, behavioral questionnaires to track risky behavior regressions or developments, and OraQuick HIV mouth swab testing to confirm results are still negative.

**RESULTS:** We anticipate that by increasing inmates' knowledge of HIV risk behaviors and prevention, inmates will engage in safer behaviors which consequently will decrease incidence of HIV infection.

**CONCLUSIONS:** Inmates will engage in safer behaviors resulting in a lower incidence of HIV infection within the correctional facility.

### **Harm reduction program proposal for incarcerated individuals diagnosed with OUD implemented during incarceration and post-release.**

Gabrielle Hastings, Jacquelyn Andula

**OBJECTIVE:** There are few options for incarcerated individuals post-release struggling with opioid addiction. The purpose of this intervention is to help incarcerated individuals living with Opioid Use Disorder (OUD), become sober while incarcerated and then help them transition into society and sobriety post-release. This will ultimately lower the rates of OUD within the incarceration system and post-release.

**METHODS:** To implement this program, we would start at the local level, prioritizing local jails that have an existing harm reduction program or have the capacity and capabilities to begin one. We would start with identifying individuals with OUD and link these individuals to medication treatment while incarcerated. Once an individual is released, the program will help the individual get directly connected to a primary care physician, inpatient/outpatient drug rehab, mental health services, career services and housing. The intention of this program is to help individuals become sober from opioid use and transition to life post-release.

**RESULTS:** The anticipated results of this program are to lower the rates of OUD among incarcerated individuals and among individuals post-release. Along with this we anticipate the program will help more individuals find stable housing and careers after incarceration, and help these individuals promote their health by connecting with healthcare resources and resources to maintain sobriety.

**CONCLUSIONS:** To decrease the prevalence of OUD within the incarceration system and in society, implementing a harm reduction program to help individuals stop

using opioids and connect them with necessary resources is crucial.

### **Impact of Individualized Menus on Nursing Home Food Waste Volume**

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**OBJECTIVE:** This intervention aims to develop tailored menus in a nursing home facility in order to improve resident satisfaction while reducing volume of food waste produced. Staff engagement will be encouraged through financial incentives. This program will work to assess the benefits that resident centered programs may have on facility budgets.

**METHODS:** Menus will be developed with current financial/food resources in mind, and limit unnecessary spending by providing residents with a list of food items they can choose from to curate their menus. Both waste and resident satisfaction will be assessed prior to the intervention using a standardized questionnaire and measuring process in order to develop baseline values. Throughout the intervention, waste levels will be recorded and quantified. Throughout the last 3 days of the intervention, resident satisfaction will be reevaluated.

**RESULTS:** A reduction in waste is expected as a result of individualized menus, as long as staff is fully engaged and invested in the intervention. Nutritional intake may be improved by providing residents with more desired food options. An added benefit of staff engagement may be a shift in residents' levels of social fulfillment, leading to an improvement in health outcomes.

**CONCLUSIONS:** By developing and offering menus that are tailored to meet residents' nutritional needs and personal preferences, waste may be reduced in a relatively cost-effective manner. In order for long term success, however, it is necessary to continue to incentivize and

retain staff who are familiar with and engaged in the intervention.

### **Fluoride Focus: Empowering Buffalo Smiles.**

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**Objective:** In 2015 water fluoridation was stopped in Buffalo, however solid evidence exists supporting its effectiveness which underscores the urgency of readopting this practice. The aim of this intervention is to increase awareness of water fluoridation benefits through community education programs and workshops, in turn increasing pressure on authorities to resume this practice, along with collaboration with local water authorities, and advocating for policy changes to support water fluoridation.

**Methods:** We will employ the Precede-Proceed model for our program. Within the Precede phase, we will identify predisposing, reinforcing, and enabling factor by collecting data using surveys, focus groups and interviews. Then we will proceed with program planning and implementation based on the information gathered in the preceding phase which will include the development of educational materials and programs, designing public awareness campaigns through media channels, collaboration with authorities to develop supportive policies, and ensure technical support and resources for implementing water fluoridation.

**Outcomes:** The anticipated short-term outcomes of this program are an increase in community awareness regarding the benefits of water fluoridation and enhanced oral health education. The expected medium-term outcomes are a reduction in dental caries prevalence and a reduction in the overall need and cost of dental treatment. Looking ahead to the long term we anticipate sustained water fluoridation and an enhanced quality of life of residents due to improved oral health.

**Conclusion:** In conclusion, the water fluoridation program holds promise for

achieving significant improvements in oral health outcomes and overall well-being within the community.

**A Scoping Review on the Role of Cesarean Section in the Prevention of Perinatal HIV Transmission When Accompanied by Antiretroviral Therapy**

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**Objective:** This scoping review aims to explore the existing literature on the relationship between perinatal transmission prevention of human immunodeficiency virus (HIV) and cesarean sections when antiretroviral therapy (ART) is used as well.

**Methods:** The databases of PubMed and Web of Science were used to find the articles included in the paper. The inclusion criteria were the following: research addressing both cesarean sections and ART, published in 2000 or later, ART is given to the mother and infant or mother alone, c-sections were mentioned as a valid method of prevention historically or currently, and c-sections were not used as solely emergency procedures.

**Results:** There were 18 articles found and analyzed for this review. Many of the articles compared vaginal delivery on ART with cesarean delivery on ART and cesarean delivery alone. Of the 18 articles, 10 (55%) only recommended cesarean sections when the mother had a high viral load while 4 of 18 (22%) still solely recommended cesarean sections for HIV-positive mothers. In regards to cesarean sections, the articles talked about the importance of it occurring before the rupture of membranes.

**Conclusion:** ART is the primary method used to prevent perinatal HIV transmission. Viral suppression can allow for a safe vaginal delivery of a child from an HIV+ person. Although formerly useful, cesarean sections are no longer recommended as a standard for the prevention of HIV transmission. However, cesarean sections can still be used when viral suppression is not achieved if membranes have not yet ruptured.

**Assessment of Potential Environmental Risk Factors Responsible for Driving the Increase in Community-Acquired *Clostridioides difficile* Infections: A Grant Proposal**

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**OBJECTIVE:** Historically, *Clostridioides difficile* infection has been a long-standing bacterial threat in the inpatient setting and is associated with adverse health outcomes. However, over the past decade, hospital-acquired *Clostridioides difficile* infections (HA-CDI) have been decreasing due to improved infection control and antimicrobial stewardship practices. Simultaneously, there have been substantial increases in community-acquired *C. difficile* infections (CA-CDI). CA-CDI differs from HA-CDI in that affected individuals lack traditional risk factors and exposures typically associated with *C. difficile* infection. Our objective is to identify the risk factors, reservoirs and modes of transmission that are unique to CA-CDI.

**METHODS:** A case series study will be conducted in the Western New York (WNY) region. Individuals admitted to an inpatient facility in WNY and who meet the case definition for CA-CDI will be enrolled into the study. Once enrolled, a thorough interview will be conducted to identify demographic variables and exposure history to determine potential risk factors, reservoirs and modes of transmission.

**RESULTS:** Data analysis will be descriptive in nature and include counts and percentages. The data will be organized by each risk factor, reservoir and mode of transmission that is of focus for this study, and a table will be created to organize the values for each of the variables.



**CONCLUSIONS:** This study will provide valuable knowledge regarding potential environmental risk factors that may explain the increasing incidence of CA-CDI in the WNY region. The findings from this study will help inform community-based prevention initiatives that target community transmission.

### **The association between Per- and polyfluoroalkyl substances and inflammation and oxidative stress biomarkers among U.S adolescents**

Chan Li, Kexin Zhu, Zhongzheng Niu, Diana Aga, Matthew Bonner, Mindula Wijayahena, Lina Mu

**Objective:** There is a limited understanding of the association between Per and polyfluoroalkyl substances (PFAS) and inflammation and oxidative stress among adolescents.

**Method:** We conducted a cross-sectional analysis in a subsample of the National Health and Nutrition Examination Survey (NHANES) participants aged 12-20 years between 2011 and 2018 (n=1379). A linear regression model and Bayesian kernel machine regression (BKMR) model were used to analyze individuals and mixtures of PFAS. The serum PFAS including perfluorooctane sulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), perfluoroundecanoic acid (PFUA), perfluorooctanesulfonamide (pfosa), and perfluorodecanoic acid (PFDeA). The biomarkers include high sensitivity C-reactive protein, alkaline phosphatase, neutrophil number, lymphocyte number, total serum bilirubin, and albumin. The confounding variables that were adjusted in the model included age, sex, race, ethnicity, household reference education, serum cotinine level, and total cholesterol level.

**Result:** After log-transformation of the PFAS, PFAS was negatively associated with acute inflammation biomarkers and positively associated with oxidative stress biomarkers. Specifically, PFNA was

negatively associated with hCRP beta: -0.52(95% Confidence Interval (CI): -1.00, -0.08). PFHxS was negatively associated with alkaline phosphatase -4.44(CI: -8.59, -0.29). PFOS and PFUA were negatively associated with neutrophil number, and the beta values were -0.21(CI: -0.34, -0.09) and -0.22(CI: -0.40, -0.04), respectively. PFOS and PFDeA were negatively associated with lymphocyte number, and the beta values were -0.07 (CI: -0.13, -0.02) and -0.06(CI: -0.12, 0.00). PFOS, PFOA, PFHxS, PFNA, PFUA, and PFDeA were positively associated with total bilirubin concentration, the beta values were 0.10(CI: 0.07, 0.12), 0.13(CI: 0.10, 0.17), 0.05(CI: 0.03, 0.07), 0.08(CI: 0.06, 0.11), 0.07(CI: 0.03, 0.10), and 0.06(CI: 0.04, 0.09), respectively. And PFOS, PFOA, PFHxS, PFNA, PFOSA, and PFDeA were positively associated with albumin, the beta values were 0.70(CI: 0.46, 0.94), 1.13(CI: 0.83, 1.43), 0.38(CI: 0.17, 0.58), 0.76(CI: 0.53, 0.98), 0.43(CI: 0.10, 0.76), and 0.45(CI: 0.18, 0.71), respectively. The BKMR results were robust with these findings except alkaline phosphatase. The PFAS mixture was negatively associated with hCRP, neutrophil, and lymphocyte number, while it is strongly and positively associated with total bilirubin and albumin. No association was observed between PFAS mixture and alkaline phosphatase. **Conclusion:** We found PFAS are positively associated with oxidative biomarkers and negatively associated with acute inflammation biomarkers.

### **Determinants of Breastfeeding Among Ex-Smoking Mothers**

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**Objective:** To explore the determinants that impact breastfeeding duration in ex-smoker mothers, a subpopulation with a high risk of insufficient breastfeeding.

**Methods:** We conducted an intervention study among 74 adult ex-smoker pregnant

mothers from Buffalo, NY. Participants completed a lab screening, pre-test, 3 weekly intervention, and post-test visits monthly for the first year postpartum and trimonthly up to two years postpartum. Our intervention consisted of breastfeeding education and financial incentives. Questionnaires were used to measure breastfeeding duration and intention, newborn feeding knowledge, maternal health, and substance use. Survival analysis was used to examine the termination of breastfeeding and stratified by co-variables to examine the determinants of breastfeeding duration.

**Results:** Married mothers breastfeed longer than single/divorced mothers ( $p=0.018$ ). Mothers with annual family incomes from \$34,999-99,999 breastfed longer than mothers with family incomes  $< \$34,998$  or  $> \$100,000$  ( $p<0.001$ ). Mothers who received more education breastfed longer ( $p=0.01$ ). Intention to breastfeed was associated with longer breastfeeding ( $p=0.014$ ). Intention to exclusively breastfeed was associated with longer breastfeeding duration ( $p=0.037$ ). Mothers who planned to introduce food and stop breastfeeding at an older age breastfed longer ( $p=0.020$ ,  $p=0.007$ ). Mothers with previous breastfeeding education breastfed longer ( $p=0.016$ ). Mothers who smoked in the first month postpartum breastfed for a shorter duration ( $p=0.004$ ). Mothers who consumed alcohol within the first month postpartum breastfed longer than mothers who did not consume alcohol ( $p=0.018$ ).

**Conclusions:** There were substantial disparities in breastfeeding practices among ex-smoking mothers by marital status, educational attainment, family income, breastfeeding intention, breastfeeding education, continued smoking abstinence, and alcohol use.

### **Gonadotropin trajectories in postmenopausal women**

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**Objective:** Gonadotropins may play an important role in aging-related changes in adiposity and health outcomes, but follicle stimulating hormone (FSH) and luteinizing hormone (LH) after menopause have not been well characterized in older women.

**Objective:** We sought to characterize patterns of FSH and LH change after menopause.

**Methods:** In a sample of postmenopausal women from the Women's Health Initiative OsteoPerio study who were not using hormone therapy, we estimated trajectories for FSH and LH at four WHI visits over a 20-year period using group-based trajectory models. Descriptive statistics were used to identify differences according to hormone trajectory group.

**Results:** We estimated three FSH trajectories. The lowest FSH trajectory had stable FSH levels over time (N=105); the moderate FSH trajectory showed FSH increases 30 years after menopause (N=154); and the highest FSH trajectory (N=32), experienced a relatively steep initial FSH decline followed by a slight increase roughly 20 years after menopause. Moderate and high FSH trajectory groups had higher LH concentrations, were more likely to be never smokers, and had lower measures of adiposity at baseline. Three LH trajectories were estimated. The lowest LH trajectory steadily declined over time (N=86); moderate LH declined then increased 30 years after menopause (N=163); and the highest LH trajectory showed a decline followed by a steep increase 30 years after menopause (N=42). Moderate and high LH trajectory groups had higher FSH concentrations and lower measures of adiposity at baseline.

**Conclusion:** There is variability in gonadotropin levels during the postmenopausal period in women not using hormone therapy.

### **Mitigating Disparities: Culturally Tailored Type 2 Diabetes Education for Refugees in Buffalo, NY**

Irma Ramusovic  
School of Public Health and Health Professions, Department of Health Services Administration, University at Buffalo, Buffalo, NY USA

**OBJECTIVE:** Uncontrolled Type 2 Diabetes can lead to serious health complications. Refugees often have limited knowledge of

preventative care measures, leaving them more susceptible to developing Type 2 diabetes than the general U.S. population. By introducing a culturally tailored lifestyle education program, this intervention aims to reduce vulnerability to diabetes and promote better health outcomes for refugees.

**METHODS:** Educational sessions will be conducted within Journey's End resettlement agency. Participants will be recruited exclusively from this agency to ensure a focused approach. To attract more participants, a dual session approach will be used, combining English as a Second Language (ESL) classes with diabetes education sessions, childcare will be provided. The educational sessions will utilize the Centers for Disease Control and Prevention (CDC) Diabetes Prevention Lifestyle curriculum, customized to meet specific cultural and linguistic needs of refugee populations.

**RESULTS:** Pre- and post-intervention surveys will assess improved knowledge about Type 2 Diabetes, adoption of healthier behaviors, and improvements in clinical outcomes such as weight management and overall physical activity levels. Qualitative feedback will be gathered to gauge participants satisfaction and perceived empowerment, highlighting this interventions effectiveness.

**CONCLUSIONS:** This culturally tailored intervention is crucial for improving Type 2 Diabetes outcomes among Buffalo's refugees, bridging the gap in healthcare, and emphasizing the significance of culturally tailored initiatives for refugee empowerment and well-being.

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### **Postpartum Depression and Advanced Maternal Age: A Scoping Review**

Savanna R. Salter, Jacquelyn M. Andula, Department of Epidemiology and Environmental Health, University at Buffalo, Buffalo, NY USA

**OBJECTIVE:** Postpartum depression (PPD) is a severe mental health condition that can affect both the mother and infant. With the

prevalence of PPD increasing, there are women who do not receive or have access to mental health services that focus on PPD. There are various risk factors for PPD, however, there is limited research on its association with advanced maternal age (AMA). The purpose of this scoping review is to find the association between AMA and PPD and how access to care influences the relationship between AMA and PPD.

**Methods:** A Scoping review was conducted utilizing the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). Two databases were utilized to find literature: *PubMed and Web of Science*. Search terms included "advanced maternal age", "postpartum depression", "older women", "health equity", and "lack of access".

**Results:** After removing duplicated and irrelevant articles, 72 were read-, and 10 were selected for this scoping review. Out of the 10 articles, eight specifically mention PPD and AMA. Four articles concluded that AMA increases the risk for PPD, and the other four concluded it did not. Barriers to care were found due to the limited numbers of perinatal mental health practitioners and women not receiving the care they desire.

**Conclusion:** This scoping review gives an overview of what research has been done in regards to the association between PPD and AMA. Considering that research is split on any association, more research needs to be completed.

### **Associations of the Prenatal Exposures to Wildfire and Urban PM<sub>2.5</sub>, and Temperatures with Adverse Birth Outcomes in U.S. Women**

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<sup>2</sup>Gangarosa Department of Environmental Health, Rollins School of Public Health, Emory University, Atlanta, Georgia

**OBJECTIVE:** Climate change increases frequencies of wildfire pollution and extreme temperatures in the United States.

However, the health effects of the climate factors on pregnant women are largely unknown at the national scale. Moreover, the health effects of PM<sub>2.5</sub> from wildfires versus urban sources on birth outcomes are not yet well understood. This study attempts to examine the associations between wildfire and urban PM<sub>2.5</sub>, and temperatures with preterm birth, admission to neonatal intensive care unit (NICU) outcome, and small for gestational age outcome in the United States.

**METHODS:** This is a retrospective cohort study on 3.5 million women for the years 2017-2018. Distributed lag non-linear models (DLNM) were used to examine the lag effects of these exposures on these outcomes for all exposure windows. Associations were adjusted for relevant covariates based on previous literature. Each association was adjusted for the other two exposures.

**RESULTS:** For exposure to wildfire sourced PM<sub>2.5</sub>, positive associations were observed with lag of 2-6 months for preterm birth, and 3 months for admission to NICU outcome. For exposure to urban PM<sub>2.5</sub>, positive associations were observed with lag of 0-9 months for admission to NICU outcome. For exposure to temperatures, positive associations were observed with lag of 0-4 months for preterm birth, with 0-10 months for SGA outcome, and negative associations were observed with lag of 8-10 months for admission to NICU outcome.

**CONCLUSIONS:** Air pollution and temperature increase risk of adverse birth outcomes with the effect estimates varying differently across the exposure variables and exposure windows.

### **Implementing A School-Based Intervention for Substance Abuse Prevention Among Niagara Falls Adolescents**

Gagandip Singh, Dr. Dennis Daniels, Dr. Jerry Yates

**OBJECTIVE:** Substance abuse has continued to cause detrimental outcomes for a prolonged period of time, particularly for adolescents recently (Garofoli, 2020). To address this issue, this intervention will implement a school-based program to educate students. The aim of this intervention is to equip 7th and 8th graders with the skills, knowledge, and resources to prevent substance use and promote a healthy lifestyle.

**METHODS:** The (pilot) educational intervention that will be conducted at LaSalle Preparatory School in Niagara Falls will educate 7th and 8th grade students using the Botvin LifeSkills Training program. Interns from Evergreen Health will conduct lessons about substance abuse to prevent future usage. The program will have three main components, which include drug resistance skills, personal self-management skills, and social skills.

**RESULTS:** Outcomes of interest include increased knowledge on substances, students who are part of the lessons stay substance free (delay first usage) or start to get help to get substance free, decreased hospital visits associated with substance usage, and fewer students requiring assistance related to substance use at Niagara Falls High School.

**CONCLUSIONS:** Favorable outcomes will pave the way for the expansion of this pilot study to include the entire Niagara Falls City School District.

### **Comparing Risk Factors Between Earlier and Later-Onset Colorectal Cancers: A Case-Case Comparison**

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<sup>1</sup>Department of Epidemiology and Environmental Health, School of Public

Health and Health Professions, University at Buffalo, Buffalo, NY

**Objective:** Incidence of Early-onset colorectal cancer (EOCRC) is increasing markedly. There is a critical need for more research on its etiology. We compared risk factors for EOCRC to later-onset colorectal cancers (LOCRC).

**Methods:** This case-case comparison utilized data from the Ohio Colorectal Cancer Prevention Initiative (OCCPI). Residents with newly diagnosed CRCs completed a questionnaire. EOCRC was defined as those < age 50 and LOCRC as those  $\geq$  age 50 (analytic sample, N=1,306). Descriptive statistics were calculated for each risk factor by age-at-diagnosis. Logistic regression models were used to estimate odds ratios (OR), and 95% confidence intervals (CI). Confounding was assessed for each association and model-specific adjustments were made.

**Results:** EOCRC cases were statistically more likely than LOCRC cases to have Lynch syndrome (10.8% vs.3.7%), symptoms prior to diagnosis (87.9% vs.67.3%), be never smokers (62.5% vs.46.7%), ever drunk alcohol (91.0% vs.85.4%), and have consumed the most alcohol in their early-life (70.1% vs.50.9%). In multivariable models, EOCRC cases had statistically higher odds of having Lynch syndrome (OR=4.23, CI: 2.53-7.05), symptoms before diagnosis (OR=6.03, CI: 3.74-9.74), ever consuming alcohol (OR=2.50, CI: 1.57-3.96), and to have consumed more alcohol in their teens/twenties than in the rest of their lives (OR=1.84, CI: 1.3-2.49). Birth weight, IBD status, and body mass index were not different in their associations with EOCRCs compared to LOCRCs.

**Conclusions:** The reporting of symptoms, alcohol use, and alcohol use in early-life, were more associated with EOCRCs. These risk factors may inform targeted screening for CRC among younger individuals.

### **Proton pump inhibitor use and incident hypertension in postmenopausal women: Results from the Women's Health Initiative.**

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Amy E. Millen, PhD; Michael J. LaMonte, PhD, MPH. Department of Epidemiology and Environmental Health, University at Buffalo – SUNY, Buffalo, NY.

**Objectives:** Proton pump inhibitors (PPI) could impact blood pressure regulation through suppressing gastric acid required for the conversion of oral nitrite into nitric oxide. The aim of this study was to examine whether PPI use is associated with incident hypertension.

**Methods:** The sample included 64,720 postmenopausal women who were free from cardiovascular disease and hypertension at enrollment into Women's Health Initiative Observational Study (1993-1998). Baseline PPI use and duration was determined using medication inventories. The outcome was physician diagnosed-treated incident hypertension, assessed by self-report on annual questionnaires. Hazard ratios (HR) and 95% confidence intervals (CI) were estimated using multivariable Cox proportional hazard models for incident hypertension according to baseline PPI use (no/yes) and duration (< 1 year, 1-3 years, >3 years). Propensity score adjustment was examined to account for residual confounding by indication.

**Results:** There were 28,951 cases of incident hypertension after a mean follow up of 8.7 years. PPI use was associated with 15% higher risk of hypertension compared to non-use in the fully adjusted model (HR: 1.15, 95%CI: 1.06-1.25) and the association remained significant after propensity score adjustment (HR: 1.17, 95%CI: 1.14-1.19). Longer PPI use durations were associated with higher risk of hypertension (HR: 1.11, 1.16, 1.28, respectively) and showed a significant trend (P <.001).

**Conclusions:** PPI use was associated with higher risk of diagnosed hypertension in postmenopausal women after adjusting for

relevant demographic, lifestyle, and clinical factors. The association showed a significant trend according to PPI duration of use. Further studies are needed to confirm such findings.

### **Improving Mobility for Hospitalized Patients through a Multi-Modal Approach** **Chris Streeter**

HSA Concentration University at Buffalo, Buffalo, NY

**OBJECTIVE:** Immobility for hospitalized patients poses risks for patient safety. This 6-week pilot study aimed to improve mobility outcomes on an inpatient unit at Rochester General Hospital.

**METHODS:** The target unit was an alternate level of care (ALC) unit, with a long length of stay patient population waiting placement in the community due to complex social determinant of health barriers. The Johns Hopkins Activity and Mobility Program framework was applied through three interventions: unit manager setting expectations for mobility, reducing perceived barriers to mobility, and using data to drive accountability.

**RESULTS:** The baseline weekly average of patients transferring out of bed at least 2x/day was 40.7%. Through the first 4 weeks of intervention, the weekly average of patients transferring out of bed at least 2x/day improved to 53.3%. In the final 2 weeks of intervention period the weekly average was 42.0%.

**CONCLUSIONS:** This pilot study demonstrates that an intervention of setting expectations, with the unit manager sharing performance data with the unit staff on a weekly basis, can drive a rapid improvement in patient mobilization. However this improvement was challenging to sustain due to additional administrative burdens for the unit manager during the intervention period and staffing challenges, which made driving accountability more challenging.

### **Assessing Community Vulnerability to Neurological Diseases: A National Study of Source-Specific Noise and Traffic Air Pollution Exposures near the US**

#### **Airports**

Muwu Xu, Meng Wang

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**Objective:** Older adults residing in communities in proximity to airports are particularly susceptible to integrated noise and air pollution exposures from aviation and motor vehicles. The dominant impacts of individual exposures on neurological diseases, specifically Alzheimer's Disease (AD) and Related Dementias (ADRD), are largely understudied. We aim to assess the effects of long-term exposure to source-specific noise and traffic air pollution on the incidence of ADRD among the US aging population.

**Methods:** We constructed a national cohort of older adults aged over 65 years in the US, residing in communities close to 700 airports from 2000 to 2018. Annual mean nitrogen dioxide (NO<sub>2</sub>) and source-specific noise exposures (aviation, road traffic, and total) were estimated using advanced geo-statistical models and assigned to the ZIP-code of the residents. We applied Cox proportional hazards models to examine the associations of source-specific noise and NO<sub>2</sub> with incidences of ADRD, adjusting for potential confounders.

**Results:** Of 4,936,617 participants, 4.5% had new AD and 11% had new ADRD for 5.5 years mean follow-up. We observed strong and robust associations of aviation noise and NO<sub>2</sub> exposures with AD (noise: 1.021, 95CI: 1.015-1.027; NO<sub>2</sub>: 1.19, 1.18-1.20) and ADRD incidences (noise: 1.007, 95CI: 1.003-1.012; NO<sub>2</sub>: 1.15, 1.14-1.16) after the mutual control of the exposures (i.e. aviation and road noise and NO<sub>2</sub> in the same model). The associations of road noise with AD and ADRD were elevated but cannot be disentangled from traffic air pollution exposure (i.e. NO<sub>2</sub>). For aviation noise, the associations were stronger

among people who are older or Medicaid eligible in the near-airport communities.

**Conclusion:** Long-term exposure to aviation noise and traffic air pollution (NO<sub>2</sub>), rather than road noise, are strongly associated with increased risks of AD and ADRD in the US older adults who live close to airports.

### **Associations between follicle-stimulating hormone and longitudinal body composition among post-menopausal women**

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**Objective:** The postmenopausal period is characterized by changes in both circulating levels of reproductive hormones and body composition. We sought to examine whether follicle-stimulating hormone (FSH) is associated with change in body composition after menopause.

**Methods:** Using data from 675 postmenopausal women enrolled in the WHI OsteoPerio study, we estimated trajectory groups for body composition measures over 17 years and three WHI visits using group-based trajectory modeling. Body composition measures included body mass index (BMI), visceral adipose tissue (VAT), subcutaneous adipose tissue (SAT), total fat, and percent fat derived from dual-energy X-ray absorptiometry (DXA). Generalized estimating equations (GEE) and polytomous regression models were used to estimate the association between baseline FSH with continuous body composition measures over time and body composition trajectories, respectively.

**Results:** We estimated three trajectory patterns for each body composition measure. In GEE models, baseline FSH concentration was inversely associated with 17-year adiposity change for each body composition measure. Results from polytomous regression similarly showed baseline FSH was associated with slightly lower odds of membership in a higher body composition trajectory group.

**Conclusion:** We identified patterns of variability in body composition changes among post-menopausal women, and in contrast to our hypothesis, higher baseline



FSH was associated with lower values of BMI and abdominal adiposity over time.

### Exercise and Nutrition Sciences

#### **Association Among Nutrition Knowledge, Diet Quality and Food Insecurity During Pregnancy**

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**OBJECTIVE:** The aim of this study was to assess the nutrition knowledge of pregnant women in the US and explore the potential association between food insecurity, low diet quality, and poor nutrition knowledge.

**METHODS:** A total of 211 pregnant women participated in a 30-minute, web-based online survey via Cloud Research, focusing on pregnancy nutrition guidelines, food security, and a food frequency questionnaire.

**RESULTS:** The average nutrition knowledge score among participants was 55%, with only 11 people scoring above 70% and zero people scoring above 80%. Participants with lower nutrition knowledge and with food insecurity consumed overall more foods from all categories, including foods to eat (fruits, vegetables, whole grains, proteins, dairy), foods to limit (sodium, added sugar, saturated fat, refined grains) and foods to avoid during pregnancy (cold cuts, deli meats, alcohol, raw seafood, and smoked fish). Higher alcohol intake was related to lower nutrition knowledge in both food secure and food insecure groups, however, the relationship was stronger for those with food insecurity.

**CONCLUSION:** Pregnant women with lower nutrition knowledge and with food insecurity tended to consume more food across all categories, including recommended and non-recommended foods during pregnancy, and were more likely to have higher alcohol intake. Nutrition knowledge positively influenced dietary behaviors, especially regarding foods that should be limited and avoided.

#### **The Relationship Among Disordered Eating Behavior, Power of Food Scale and Sensitization of the Reinforced Value of Food**

Ana Leticia P. Andrade, Jennifer L. Temple, Katherine N. Balantekin

**OBJECTIVE:** Sensitization to repeated intake of high energy density (HED) foods is associated with excess weight gain over time, but less is known about relationships with measures of disordered eating. Thus, this study aims to understand how sensitization relates to disordered eating and power of food scores.

**METHODS:** Participants were 205 adolescents without obesity who were followed for 24 months. Sensitization was assessed by comparing the relative reinforcing value (RRV) of HED food at baseline and after two weeks of daily intake; sensitization was defined as RRV of food after repeated intake. At 24 months, participants also completed the EDEQ, Power of Food Scale. We conducted a multifactorial ANOVA to examine group differences outcomes at 24 months by sensitization status.

**RESULTS:** Sensitization status was positively associated with shape and weight concerns ( $F=4.987$   $p=0.027$ ), global EDEQ score ( $F=5.320$   $p=0.022$ ), and power of food scale scores ( $F=3.950$   $p=0.049$ ).

**CONCLUSION:** We found that sensitization to HED food at baseline predicted increased disordered eating behaviors and power of food scores after 2 years. These findings suggest that sensitization to repeated HED food intake might be a risk factor for later engagement in disordered eating behaviors. Future studies should be aimed at understanding the temporal relationships among these factors and the role that social norms around body weight and weight stigma may play in the development of these behaviors.

## Physiological Strain During Work at Equivalent WBGT in Wildland Firefighting Garments

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**OBJECT:** Assess strain when walking on a treadmill wearing wildland firefighter garments in three environments with equivalent wet-bulb globe temperature (WBGT:  $\sim 28.5^{\circ}\text{C}$ ).

**METHODS:** Twelve subjects (age:  $24 \pm 2$  y) walked intermittently for 150 min in low-humidity ( $40^{\circ}\text{C}$ , 20% relative humidity (RH)), moderate-humidity ( $34^{\circ}\text{C}$ , 50% RH), and high-humidity conditions ( $29^{\circ}\text{C}$ , 90% RH) wearing fire resistant jacket, pants, gloves, and helmet with only the neck and face exposed. Heart (HR), respiratory (RR), and whole body sweat rates, core temperature ( $T_c$ ), evaporative heat loss (EHL), and perceptual strain were assessed throughout.

**RESULTS:** At 150 min,  $T_c$  ( $38.5^{\circ}\text{C} \pm 0.3^{\circ}\text{C}$ ) and HR ( $167 \pm 19$  bpm) were lower in low-humidity compared to high-humidity ( $38.8^{\circ}\text{C} \pm 0.6^{\circ}\text{C}$ ,  $p=0.02$ ;  $174 \pm 14$  bpm,  $p=0.004$ ). RR was highest in high-humidity ( $30.6 \pm 10.1$  breaths/min,  $p=0.002$ ). Thirst, sweating sensation, fatigue, and perceived exertion were lower in low-humidity compared to moderate- and high-humidity (all  $p < 0.001$ ). The EHL required for heat balance ( $E_{\text{req}}$ ) was lowest in high-humidity ( $p < 0.001$ ) and the EHL deficit ( $E_{\text{req}} - \text{EHL}$ ) was lower in low-humidity ( $33 \pm 22$  W) compared to moderate-humidity ( $38 \pm 23$  W,  $p=0.002$ ) and high-humidity ( $39 \pm 28$  W,  $p=0.002$ ). There were no differences in whole body sweat rate ( $14.8 \pm 5.8$  g/min,  $p=0.58$ ) or thermal sensation ( $p=0.40$ ).

**CONCLUSION:** Physiological strain while walking in the heat wearing wildland firefighter garments is higher in a humid environment after 2.5 hours. During shorter intervals, protective garments play a larger role in impaired thermoregulation compared to the environment.

## Postnatal Consumption of Black Bean Powder Protects against Obesity and Dyslipidemia in Male Adult Rat Offspring from Obese Pregnancies

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**Objective:** To investigate whether black bean powder (BBP) supplementation in either the maternal or offspring diet could prevent the risk of metabolic disease in adult offspring born to obese mothers.

**Methods:** Female Sprague Dawley rats were randomly assigned to one of three diets for 3-weeks pre-pregnancy, throughout gestation, and lactation: (i) low-caloric control diet (CON); (ii) high-caloric obesity-inducing diet (HC); or (iii) HC diet with 20% BBP (HC-BBP). After weaning (PND21), one male pup from each dam was weaned onto CON diet until adulthood (PND120). Additionally, a second male from the HC group received the CON diet supplemented with BBP (CON-BBP). Thus, four experimental adult offspring groups were compared: CON/CON, HC/CON, HC-BBP/CON, and HC/CON-BBP. On PND120, blood was collected for biochemical analysis and liver tissue for lipid, mRNA/protein expression of lipid-regulatory targets.

**Results:** Compared with the CON/CON group, adult offspring from the HC/CON group had a higher ( $p < 0.05$ ) body weight ( $682.88 \pm 10.67$  vs.  $628.02 \pm 16.61$  g) and hepatic TG ( $29.55 \pm 1.31$  vs.  $22.86 \pm 1.85$  mmol/g). Maternal BBP (HC-BBP/CON) had little influence, but the postnatal BBP (HC/CON-BBP) lowered hepatic TG and cholesterol compared with the other treatment groups. This reduction was likely associated with lower postnatal BW gain, lower mRNA, and protein expression of hepatic Fasn, and lower serum leptin

concentration (vs. CON/CON and HC groups).

**Conclusions:** Our results suggest that the postnatal consumption of a black-bean-powder-supplemented diet may protect male rat offspring against the programming of obesity and dyslipidemia associated with maternal obesity.

### **Kappa opioid receptor expression in the bed nucleus of the stria terminalis is not affected by binge-like feeding**

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**Objective:** Little is known about the neural mechanisms underlying binge eating behavior. Here, we focus on the central expression of kappa opioid receptors (KORs) and whether this is altered in rats with a history of binge-like eating. Specifically, we investigate expression in the bed nucleus of the stria terminalis (BNST), a site that has been linked to binge-like ingestive behavior.

**Methods:** Male Sprague-Dawley rats (Charles River) were individually housed in hanging wire cages with chow and water in a temperature and humidity-controlled environment. Rats were assigned to receive either intermittent (Mondays, Wednesdays, and Fridays only; INT) or daily (D) 1h access to vegetable shortening (n=7-8 group). We monitored shortening intake on days where all rats had access. To evaluate KOR expression in the BNST, bilateral 1mm<sup>3</sup> tissue punches were collected from BNST using a cryostat. qPCR was performed on these tissue samples to examine KOR expression in both groups of rats.

**Results:** Although our feeding paradigm was successful in that rats on the INT displayed binge-like eating, our qPCR data demonstrate no significant difference between the relative expression of kappa opioid receptors in the BNST of rats

that engaged in binge-like behaviors versus rats that did not.

**Conclusions:** Overall, although this does not provide evidence of a clear benefit to targeting kappa opioid receptors in pharmacotherapies to treat binge-like eating, the limitations of this study suggest it could still be worthwhile to examine the relationship between KOR and binge-like feeding by analyzing expression in female rats or evaluating KOR expression in other areas of the brain known to mediate palatable food intake.

### **Relationship Among Food Insecurity, Eating Disorder Symptoms, and Emotional Eating**

Paige Lammers, Kristiana Feeser, Jennifer L. Temple.

**Introduction:** Adolescence is a critical period for the development of lifelong eating habits, eating disorders, and emotional eating behaviors. Eating disorder behaviors and emotional eating can negatively impact adolescents' wellbeing. The relationships among emotional eating, eating disorder behaviors, and food insecurity (FI) are complex and of public health concern. These relationships have been found to differ based on whether the food insecurity is reported according to the parent or to the adolescent. This study aimed to investigate the relationships among eating disorder symptoms, emotional eating, and food insecurity as reported by both the parent and the child.

**Methods:** The University at Buffalo Eating Among Teens study is a 2-year prospective cohort study that included 99 11- to 14-year-old male and female adolescents from the low-income families from the Buffalo area. The adolescents completed the Eating Disorders Examination Questionnaire (EDE-Q) and Emotional Eating Scale (EES) to respectively measure eating disorder behavior and emotional eating pathology. EDE-Q scores were further broken into two different subscores: EDE-Q Global and EDE\_Q Shape and Weight Concerns. The EES scores were grouped by moods: EES-Anger, EES\_Anxiety, and EES\_Depression

To measure the adolescent's report of food insecurity, we used the Venezuelan Food Security (VFS). To measure the parent's report of food insecurity, we utilized the U.S. Household Food Security Module, which we called FIQ-P. A bivariate Pearson correlation was used to measure the correlation and relationships among these variables.

**Results:** Based on the data from the participants' first visit, we found no significant relationships between EDE-Q scores and parent reported FI. However, adolescent-reported FI scores had a significant positive with both the EDE-Q Shape and Weight Concerns ( $p=0.009$ ) and the EDE-Q Global ( $p = 0.038$ ) subscales. There were also no significant relationships between scores on the Emotional Eating Scale (EES) and either adolescent reported FI or parent reported FI. EES scores also did not have a significant relationship with EDEQ scores and subscores.

**Conclusion:** Eating disorder behaviors increased with adolescent-reported FI but not parent-reported FI. Thus, eating disorder pathology may be related to the adolescent's personal experience with perceived food insecurity, parental pressure, and cyclic nature of food assistance programs. Emotional eating was not significantly related with eating disorder behaviors or food insecurity for both parent reported and child reported FI. Adolescents with perceived FI experienced heightened DEBs; but this relationship was not mediated by higher SENS to palatable foods. These results demonstrate the need to utilize child reported food insecurity measurements to screen for eating disorder behavior risks and design prevention measures.

### Vertical Load Placement Does Not Alter Metabolic Demands in Females during Load Carriage

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**OBJECTIVE:** To test the hypothesis that females would have similar metabolic responses during rucksack-borne load carriage in two vertical load placements.

**METHODS:** Ten females ( $25 \pm 4$  y;  $161.6 \pm 6.4$  cm;  $67.4 \pm 9.6$  kg) completed two 4.8 km walks loaded with 30% of their body mass ( $20.2 \pm 2.9$  kg). The load mass was placed 14.0 cm (Center) and 24.1 cm (High) from the bottom of the rucksack. Subjects were instructed to complete the walk as quickly as possible ( $54 \pm 4$  min). Expired gases were measured the minute prior to reaching 1.6, 3.2 and 4.8 km when intensity was constant ( $5.6 \text{ km}\cdot\text{h}^{-1}$ , 2.5% grade). Oxygen uptake ( $\dot{V}O_2$ ), respiratory exchange ratio (RER), and minute ventilation ( $\dot{V}_E$ ) were analyzed using repeated measures ANOVA and post-hoc paired t-tests.

**RESULTS:**  $\dot{V}O_2$ , RER, and  $\dot{V}_E$  did not differ between load configurations at any time (see table). Over time, changes in  $\dot{V}O_2$  occurred in the high condition, and changes in RER and  $\dot{V}_E$  occurred over time in both conditions (see table).

	Distance (km)	Center	High	p-value
$\dot{V}O_2$ ( $\text{ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ )	1.6	24.03	23.76	0.48
	3.2	24.28	24.36	0.86
	4.8	24.64	24.76*	0.73
RER	1.6	0.91	0.92	0.71
	3.2	0.88†	0.90*	0.71
	4.8	0.87†	0.88††	0.55
$\dot{V}_E$ ( $\text{L}\cdot\text{min}^{-1}$ )	1.6	46.9	48.8	0.34
	3.2	48.7	50.4	0.40
	4.8	50.4*	51.1	0.77

\*Different from 1.6 km within condition ( $p<0.05$ )

†Different from 3.2 km within condition ( $p<0.05$ )

**CONCLUSIONS:** Metabolic responses to load carriage in females were similar in the two positions. Over time, the high position evoked greater metabolic responses. While males generally carry rucksack-borne loads

more efficiently when packed high, females show similar responses when the load is central or high.

### **Influence of Alpha-Lipoic Acid Supplementation in Obese Pregnancies on Maternal Postpartum Health**

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**OBJECTIVE:** Maternal obesity during pregnancy is associated with excessive gestational weight gain (GWG) and poor postpartum metabolic health. Limited work has examined alpha-lipoic acid (LA) supplementation in obese pregnancies. Thus, we aimed to assess if perinatal LA supplementation protects against excessive GWG, improves postpartum body weight (PPBW) and metabolic function in mothers with obesity.

**METHODS:** Female Sprague-Dawley rats were randomized into three dietary groups throughout pre-pregnancy (3 weeks), gestation, and lactation: (i) a low-calorie control diet (CON); (ii) a high-calorie obese-inducing diet (HC); and (iii) the HC diet supplemented with 0.25% LA (HC+LA). Following birth, all mothers consumed the CON diet for a 4-month postpartum period to determine the impact on PPBW and biomarkers of metabolic function.

**RESULTS:** Compared to CON, HC-mothers demonstrated increased GWG ( $p < 0.05$ ), however, LA supplementation reduced GWG ( $p < 0.05$ ) compared to both the CON and HC groups. PPBW was elevated in HC mothers compared to CON, but tended to be reduced ( $p = 0.10$ ) with LA supplementation. Compared with CON, HC mothers had higher ( $p < 0.05$ ) postpartum serum insulin and a lower glucose:insulin ratio, but no change in serum glucose. However, LA supplementation did not protect against reduced glycemic control in HC dams. Serum lipids were similar ( $p > 0.05$ ) between the CON and HC groups, however, HC-LA

dams demonstrated reduced TC ( $p = 0.07$ ) and HDL-C ( $p = 0.03$ ).

**CONCLUSIONS:** In conclusion, although LA supplementation reduced excessive GWG, but did not protect against PPWG and reduced glycemic control in mothers with obesity and may result in a postpartum dyslipidemia phenotype.

### **Dexmedetomidine-Induced TORPOR: A Potential Solution to Life Support Limitations in Space**

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**OBJECTIVE** Space shuttle payloads limit long-duration space travel due to the extensive closed-loop life support systems. Artificial metabolic suppression (torpor) could reduce CO<sub>2</sub> production, easing the burden on life support and propulsion systems. Our purpose was to determine the degree of hypothermia and metabolic suppression induced by dexmedetomidine in cold and thermoneutral conditions.

**METHODS:** Six (n=6) healthy subjects (30±7 y, mass: 76.2±23.8 kg) were sedated with dexmedetomidine in thermoneutral (TN, 31.1±0.3°C) and cold (C, 19.8±0.3°C) environments for three hours. Heart rate (HR) and core temperature (Tc) were measured throughout and mean arterial pressure (MAP) was calculated. Relative oxygen consumption (VO<sub>2</sub>), carbon dioxide production (VCO<sub>2</sub>), and resting metabolic rate (RMR) were measured 30 minutes before each exposure and from 30-60, 90-120, and 150-180 min.

**RESULTS:** HR (57±10) and Tc (36.4±0.5°C) were lower in C than in TN (HR: 67 ± 11,  $p < 0.001$ , after 70 min.; Tc 36.9±0.2°C,  $p < .005$  after 30 min.). VO<sub>2</sub> ( $\Delta = 0.9 \pm 0.4$  mL/kg/min<sup>-1</sup>), VCO<sub>2</sub> ( $\Delta = 56.9 \pm 19.2$  mL/min<sup>-1</sup>), and RMR ( $\Delta = 487.9 \pm 177.8$  Kcal/D) decreased between baseline and 150-180 min in C (all  $p < 0.001$ ) but not in TN. MAP

and SpO<sub>2</sub> were not different between conditions or from baseline measurements. **CONCLUSIONS:** Dexmedetomidine-induced torpor will suppress metabolic functions and lower CO<sub>2</sub> production in a cold environment compared to a thermoneutral one. Torpor could be a viable method to reduce the life support requirements for astronauts during extended space missions. The stability of MAP and SpO<sub>2</sub>, regardless of environmental conditions, suggests a safe profile for regulating metabolic rates in controlled settings.

### Postpartum Bean Consumption and Maternal Weight Outcomes

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**Objectives:** We assessed associations between postpartum bean consumption and maternal weight outcomes from a U.S. cohort.

**Methods:** We conducted a secondary data analysis of 1,362 U.S. mothers from the Infant Feeding Practices Study II. We calculated mothers' postpartum bean consumption (frequency and quantity), postpartum weight retention (PPWR), and overweight/obesity status from different self-administered questionnaires. Associations between postpartum bean consumption and risk of weight outcomes were examined using multivariable logistic and linear regression models.

**Results:** Postpartum bean consumption was low and varied by sociodemographic factors. Mothers who consumed dried beans 1 time/week or more had a lower risk of being overweight or obese at 3 and 9 months postpartum compared to non-consumers. Every 1-cup/week increment of dried bean consumption was associated with a lower risk

of being overweight or obese at 3 months postpartum. Every 1-cup/week increment of chili consumption was associated with higher obesity risk at 6 and 9 months postpartum. However, mothers who consumed chili 2-3 times/month or more had lower obesity risk at 6 years postpartum than non-consumers. Finally, compared to non-consumers, mothers who consumed dried beans 1 time/month had higher PPWR at 3 months, and mothers who consumed bean soup 1 time/month had higher PPWR at 3 and 6 months.

**Conclusions:** High postpartum dried beans consumption was linked with a lower risk of being overweight or obese. Postpartum chili consumption showed mixed results regarding obesity risk. Moderate postpartum dried beans and bean soup consumption was associated with higher PPWR in early postpartum months.

### Effect of Diet on Short Term Heat Acclimation Adaptations

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**OBJECTIVE:** Heat acclimation (HA) is an ergogenic and prophylactic preparatory strategy before exercise in the heat. The purpose of this study was to investigate how a high carbohydrate (high-CHO) or low carbohydrate (low-CHO) diet affects adaptations to a 6-day HA protocol. We sought to determine whether low-CHO had a passively higher sodium intake than high-CHO. We hypothesized that if the differences in sodium were large ( $\geq 2$  g), low-CHO would have greater reductions in heart rate and core temperature, regardless of carbohydrate intake.

**METHODS:** Six participants were pair-matched by body surface area and fitness and assigned to consume either a high-CHO (70% CHO) or low-CHO (35% CHO) diet throughout six days of HA, consisting of aerobic exercise in a 40°C environment, maintaining core temperature above 38.5°C for 60 min. Sodium intake was recorded but not controlled. Participants completed a heat stress test before and after HA. Dietary

intake was tracked by participants and analyzed by the study team in nutrient analysis software.

**RESULTS:** Low-CHO reported higher sodium intake ( $4370 \pm 1021$  mg) compared to high-CHO ( $2597 \pm 923$  mg) (mean difference:  $-1773 \pm 791$  mg,  $p = 0.088$ ). Low-CHO had a reduction in heart rate ( $-15 \pm 4$  bpm,  $p = 0.023$ ) while high-CHO had a reduction in core temperature ( $-0.36 \pm 0.05^\circ\text{C}$ ,  $p = 0.008$ ) compared to before HA. **CONCLUSIONS:** Data collection is ongoing and additional participants are required to fully test the hypothesis and determine if adaptations to six days of HA are impacted by diet.

### Does a priming warm-up influence cardiopulmonary responses to a ramp test?

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**OBJECTIVE:** To compare two different warm-up protocols (normal vs. priming) on the incidence rate of  $\dot{V}O_{2pl}$  during a ramp test.

**METHODS:** 11 Recreational cyclists (age:  $36 \pm 9$  y,  $\dot{V}O_{2max}$ :  $51.0 \pm 5.2$  mL·kg<sup>-1</sup>·min<sup>-1</sup>) performed a normal warm-up (cycling at 50W for 10 minutes) at visit one and a priming warm-up (cycling at 50 W for 4 minutes increasing to 70% difference between the gas exchange threshold and maximum work rate for 6 minutes) at visit two, both followed by a ramp test (30 W·min<sup>-1</sup>) and a verification phase with 30-minute rest between tests.  $\dot{V}O_{2pl}$  was confirmed if the difference between modeled and real  $\dot{V}O_2$  was above the 50%  $\dot{V}O_2$  slope in the last stage of the ramp test.

Cardiopulmonary response and RPE were collected during the tests. Blood lactate (BLa) was measured before and after each test (6 times).

**RESULTS:** The priming warm-up induced greater blood lactate (normal,  $1.4 \pm 0.5$ ; primed,  $10.3 \pm 3.4$  mmol·L<sup>-1</sup>), heart rate (normal,  $113 \pm 10$ ; primed,  $145 \pm 11$  bpm), and  $\dot{V}O_2$  (normal,  $21.7 \pm 2.5$ ; primed,  $34 \pm 3.1$  mL·kg<sup>-1</sup>·min<sup>-1</sup>) compared to normal (all  $p < 0.001$ ). However, the  $\dot{V}O_{2pl}$  incidence rate during the ramp test was the same between groups (73%), and  $\dot{V}O_{2max}$  was not different. The verification phase confirmed  $\dot{V}O_{2max}$  in 91% of the normal and 100% of the priming group.

**CONCLUSION:** Our results suggest a priming warm-up doesn't increase  $\dot{V}O_{2pl}$  incidence rate in a ramp test, and it's not essential for determining true  $\dot{V}O_{2max}$ ; a post-ramp verification phase suffices.

*The views expressed in this abstract are those of the authors and do not reflect the official policy of the U.S. Government, Department of Energy, Department of the Army, or Department of Defense.*

### Humidity increases carbohydrate oxidation in females during walking under load carriage in a hot environment

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**OBJECTIVE:** It is unknown how humidity affects carbohydrate ( $\text{CHO}_{ox}$ ) and fat oxidation ( $\text{Fat}_{ox}$ ) in females during exercise in similar hot temperatures. We compared core temperature ( $T_c$ ),  $\text{CHO}_{ox}$ ,  $\text{Fat}_{ox}$ , and oxygen uptake ( $\dot{V}O_2$ ) in females between hot dry (HD; 40°C, 20% RH) and hot humid (HH; 40°C, 60% RH) conditions during weighted walking at two different speeds.

**METHODS:** Ten females (age  $25 \pm 5$  y, body mass  $65.8 \pm 13.7$  kg,  $\dot{V}O_{2max}$   $41.0 \pm 2.8$  mL·kg<sup>-1</sup>·min<sup>-1</sup>) walked for four min at a moderate ( $1.34$  m·s<sup>-1</sup>) and fast ( $1.70$  m·s<sup>-1</sup>) speed on a level treadmill while carrying a weighted backpack ( $21.5 \pm 4.6$  kg) in both

HD and HH environments. Gas exchange,  $\text{CHO}_{\text{ox}}$ , and  $\text{Fat}_{\text{ox}}$  were assessed via indirect calorimetry.

**RESULTS:** HH increased  $T_c$  at both speeds ( $1.34 \text{ m}\cdot\text{s}^{-1}$ :  $38.3^\circ\text{C} \pm 0.2$  vs.  $37.7 \pm 0.2$ ,  $p < 0.001$ ;  $1.70 \text{ m}\cdot\text{s}^{-1}$ :  $38.7 \pm 0.2$  vs.  $37.9 \pm 0.2$ ,  $p < 0.001$ ).  $\text{CHO}_{\text{ox}}$  was higher in HH at  $1.34 \text{ m}\cdot\text{s}^{-1}$  ( $0.70 \pm 0.27 \text{ g}\cdot\text{min}^{-1}$  vs.  $0.57 \pm 0.19$ ,  $p = 0.015$ ) as well as at  $1.70 \text{ m}\cdot\text{s}^{-1}$  ( $1.85 \pm 0.55$  vs.  $1.60 \pm 0.35$ ,  $p = 0.039$ ), respectively.  $\text{Fat}_{\text{ox}}$  was higher in HD compared to HH at  $1.34 \text{ m}\cdot\text{s}^{-1}$  ( $p = 0.038$ ) and at  $1.70 \text{ m}\cdot\text{s}^{-1}$  ( $p = 0.028$ ), respectively. There were no differences in relative  $\dot{V}\text{O}_2$ .

**CONCLUSION:** Higher humidity during heat stress increased  $\text{CHO}_{\text{ox}}$  in females during loaded walking compared to a lower humidity hot environment. These results paired with higher  $T_c$  in the humid condition indicating a thermal strain-induced metabolic shift.

*The views expressed in this abstract are those of the authors and do not reflect the official policy of the U.S. Government, Department of Energy, Department of the Army, or Department of Defense. Funding provided through the Medical Technology Enterprise Consortium (#W81XWH-22-9-0014)*

### Changes in the Reactive Hyperemia Index After Continuous and Interval Exercise

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**OBJECTIVE:** To examine the acute effects of high intensity interval exercise (HIIE) and moderate intensity interval exercise (MICE) on microvascular function in healthy males and females.

**METHODS:** Ten healthy participants (50% male, mass:  $75.6 \pm 10.0 \text{ kg}$ , ht:  $170 \pm 10 \text{ cm}$ , bmi:  $26 \pm 3 \text{ m}\cdot\text{kg}^{-2}$ ) completed a maximal effort cycle test and single bouts of

HIIE and MICE on separate occasions. The MICE protocol was 20 min of cycling at 60% of maximum power output. The HIIE protocol was a 12 min warm up of cycling at 50% of maximum power output immediately followed by an 8-min Tabata cycling protocol where participants alternated between cycling at  $\geq 100\%$  max power (20 sec) and rest (10 sec). Microvascular function was assessed by the reactive hyperemia index (RHI), measured by peripheral artery tonometry, before, immediately after, and 1 h after exercise.

**RESULTS:** Compared to baseline, RHI increased 1 h after exercise in the MICE condition only ( $p = 0.02$ ) and was not different from baseline in either group immediately post exercise. There was a time by condition effect ( $p < 0.001$ ) such that heart rate was higher during MICE at 5 and 10 minutes ( $p = 0.02$ ) and higher during HIIE at minute 20 ( $p = 0.001$ ).

**CONCLUSION:** Within a sample of healthy adults, the RHI was improved 1 h after a single session of MICE but not HIIE. Future research is needed to determine the significance of the differential effects of exercise regimens on the micro- and microvasculature.

### The effects of cerebellar transcranial magnetic stimulation on the cortical and spinal excitability

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The cerebellum is well known to play important roles in motor control and coordination. Recently, non-invasive cerebellar stimulation has increased its popularity to improve motor function in humans with neurological disorders. However, understanding the physiological mechanisms of the stimulation has been still limited.



**OBJECTIVE:** Our purpose was to examine the changes in cortical and spinal excitability after cerebellar intermittent theta burst stimulation (iTBS) which is one of the most common paradigms of repetitive TMS protocol.

**METHODS:** 10 healthy subjects (5 females and 5 males; Aged 26±6 years) participated in two sessions, one receiving cerebellar iTBS and one receiving sham iTBS. We placed wireless electromyography on the first dorsal interosseous muscle and measured physiological outcomes before and after each iTBS protocol. Outcome measurements include motor evoked potentials (MEP), short-interval intracortical inhibition (SICI), cerebellar brain inhibition (CBI), and F-waves.

**RESULTS:** The amplitude of MEP increased by 81.9% after cerebellar iTBS (PRE: 0.87±0.09 mV, POST: 1.56±0.24 mV p=0.025) but not after sham iTBS protocol. CBI decreased (PRE: 63.5±4.6%, POST: 109.2±4.6%, p<0.001) with cerebellar iTBS but SICI and F-wave did not change with either protocol.

**CONCLUSIONS:** After cerebellar iTBS, there was a decrease in cerebellar inhibition to primary motor cortex and increase in corticospinal excitability.

### **Maternal Egg Consumption during Pregnancy and Breastfeeding Practices**

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**OBJECTIVE:** To examine the association of overall egg intake and different components of eggs/different preparation methods with breastfeeding initiation and duration.

**METHODS:** Data from a U.S. cohort of 1,039 mother-infant dyads in the Infant Feeding Practices Study II and its 6-year follow-up

(2005-2012) were analyzed. In late pregnancy, mothers reported the frequency and serving size of their consuming egg-related products in the past month, including total eggs, egg whites, whole eggs, eggs with fat, egg salad, and egg substitutes. We used multivariable logistic and linear regression models for breastfeeding initiation and duration, respectively, adjusting for socio-demographics, pregnancy-related characteristics, and the Healthy Eating Index.

**RESULTS:** Mean consumption was 2.79, 0.19, 2.51, 1.65, 0.23, and 0.07 cups/week for total eggs, egg whites, whole eggs, egg with fat, egg salad, and egg substitutes, respectively. Mothers consuming eggs 3+ times/week had higher odds of breastfeeding initiation (confounder-adjusted OR, 3.31 [95% CI, 1.49-7.37]), compared to non-consumers. Similar associations were seen with whole eggs 2+ times/week (2.13 [95% CI, 1.16-3.90]), and eggs with fat 2+ times per week (2.23 [95% CI, 1.18-4.21]). Consuming total eggs or whole eggs 1+ times per month had about 5 months longer mean breastfeeding duration, and about 2.5 months longer mean exclusive breastfeeding duration than non-consumers. No significant associations were found for egg whites, egg salad, or egg substitutes.

**CONCLUSIONS:** High consumption of total eggs, whole eggs, or eggs with fat was associated with higher odds of breastfeeding initiation and longer breastfeeding duration. No such associations were found for egg whites or egg substitutes.

## Department of Rehabilitation Science

### **Facilitators and Barriers to Membership in the New York State Occupational Therapy Association: A Survey of Licensed Practitioners**

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**Objective:** Professional organizations provide advocacy, networking, and advancement of professions, though many have limited membership. We sought to identify facilitators and barriers to membership in the New York State Occupational Therapy Association (NYSOTA) for strategic planning.

**Methods:** An anonymous online survey, Facilitators and Barriers Survey (FAB), queried New York State licensed occupational therapists (OTs) and occupational therapy assistants (OTAs). We included the standardized *Professional Association Membership Questionnaire* (PAMQ) along with researcher-developed open and closed-ended queries regarding facilitators and barriers. Results were analyzed for frequency and differences based on demographics of OT/OTA status, education level, region of residency, race/ethnicity, gender, current NYSOTA membership, student membership, and years of practice.

**Results:** The 210 participants comprised 175 OTs (83.3%) and 35 OTAs (16.7%). Participants rated PAMQ items *Education*, *New Ideas*, and *Improvement of my profession* the highest. Top facilitators were *opportunities for continuing education credits* (CEUs; 89.5%), *professional development* (83.3%), and *advocacy* (73.0%). The most-cited barriers were *cost* (69.5%) and *lack of awareness of benefits* (54%). Each demographic factor was shown to be associated with at least one aspect of the survey. Numerous ideas were generated for increasing membership, most notably *reducing costs*, *advertising benefits*

*more widely*, and *connecting with OT schools*.

**Conclusions:** The findings of this study are crucial for understanding factors that influence practitioners' decisions to join NYSOTA. This information can aid NYSOTA and provide targeted marketing ideas to specific demographics. The findings may also benefit other state and national professional healthcare organizations.

### **The Identification of Persistent Post-Concussion Symptoms in Children Using Field-Expedient Assessments**

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**Purpose:** The purpose of this study is to identify assessments that can be easily administered and are responsive to persistent post-concussive symptoms, such as balance, reaction time, cognitive deficits, and vestibular and ocular impairments.

**Methods:** This study used a cross sectional design and recruited 12 participants between the ages of 12 and 17 years. The participants were prospectively assigned to a control group (n=8) and experimental group (n=4). Each participant completed two subjective assessments, the Generalized Anxiety Disorder-7 (GAD-7) and Patient Health Questionnaire-8 (PHQ-8). This was followed by four objective assessments including the Pediatric Berg Balance Scale, the Ruler Drop Test, the Montreal Cognitive Assessment (MoCA), and the Vestibular Ocular Motor Screening (VOMS). Two-tailed independent t-tests were used to analyze all dependent outcomes.

**Results:** There was no significant difference found between the control and experimental groups for the Ruler Drop Test, MoCA, or VOMS. We found a strong statistically significant signal for the Pediatric Berg Balance Scale indicating a difference between the control and the experimental group, as children with concussion were

found to perform worse on the assessment than children without ( $p=.036$ ).

**Conclusions:** Further research with a larger sample size is needed to determine field-expedient assessments that detect persistent post-concussion symptoms in children.

### **Occupational Engagement and Well-Being in Breast Cancer Survivors**

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**OBJECTIVE:** Occupational engagement (engaging in meaningful activities) has not been well-studied in breast cancer survivors related to overall well-being. The purpose of this pilot study was to explore relationships among occupational engagement and well-being indicators including self-efficacy, psychological state, and quality of life (QoL).

**METHODS:** This mixed methods, cross sectional study included 19 female breast cancer survivors aged 27-63 years. Each completed an online survey with demographic questions and 4 measures: Engagement in Meaningful Activities Survey (EMAS), Functional Assessment of Cancer Therapy-Breast (FACT-B), Patient-Reported Outcomes Measurement Information Systems 29+2 Profile v2.1 (PROMIS-29+2), and New General Self-Efficacy Scale (NGSE). Five also completed an online semi-structured interview to better understand the lived experience of breast cancer treatment, survivorship, occupational engagement, and well-being.

**RESULTS:** Quantitative analyses using Spearman's correlations found significant relationships between FACT-B (QoL) and EMAS ( $r_s = .46$ ,  $p = .046$ ), NGSE ( $r_s = .608$ ,  $p = .006$ ), and PROMIS-29+2 measures of pain ( $r_s = .870$ ,  $p = <.001$ ) and depression ( $r_s = .624$ ,  $p = .004$ ). No other significant correlations were found. Qualitative analysis yielded themes of symptomatology (pain,

fatigue, side effects), social support, health care and health literacy, occupational engagement, and mental health (both psychological distress and positive psychological factors).

**CONCLUSIONS:** Occupational engagement, self-efficacy, and psychological state are each related to QoL in breast cancer survivors, but how these variables interact requires further study. Health literacy emerged as a major theme in breast cancer survivors' sense of empowerment and recovery, where occupational therapy could potentially play a larger role.

### **Exploration of gaps among occupational therapy practitioners with literacy-based practice in the school setting**

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**OBJECTIVE:** There is a dearth of research regarding occupational therapy practitioners' competence with literacy-based assessments and literacy-based intervention within the school-based setting. The purpose of this study was to determine if there are any discrepancies with school-based occupational therapy practitioners with their perceived knowledge and perceived ability to apply skills with literacy-based assessments and interventions.

**METHODS:** This is a one-sample descriptive survey study design. A researcher-developed online survey was deployed to participants using occupational therapy professional online platforms and moderated occupational therapy Facebook groups. The survey was divided into four sections, with 7 Likert-scaled questions per section. Section one measured a participant's perceived level of knowledge in literacy-based assessments. Section two measured participants' perceived level of competency with using literacy-based assessments. Section three measured participants' perceived level of knowledge in literacy-based interventions. Section four

measured participants' perceived level of competency with using literacy-based interventions. The survey remained open for 3 months.

**RESULTS:** 151 participants completed the survey; two participants were excluded due to practicing in the school setting for less than a year. Statistical analysis using Wilcoxon Signed Ranks was completed on the responses of the remaining 149 participants (n=149, 141 occupational therapists and 8 occupational therapy assistants). The results indicated a higher perceived knowledge of literacy-based assessments (13.805,  $\pm$  4.462) compared to perceived application of assessments (12.349,  $\pm$  5.187) with  $p < .001$ , and higher perceived knowledge of interventions (20.128,  $\pm$  4.46) compared to the perceived application of interventions (19.765,  $\pm$  4.372) with  $p = .014$ .

**CONCLUSIONS:** The study concludes that occupational therapy practitioners are more confident in their knowledge of literacy-based assessments and interventions compared to their ability to apply this knowledge in practice. This gap may be due to lack of training in literacy-based assessments and interventions signaling that more training is required for competence in this practice area for application in the school-based setting.

### **Inhalational exposure to Manganese fumes and the associated hearing loss**

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**OBJECTIVE:** Occupation-related inhalation of the toxic element manganese (Mn) results in serious health effects, including the neurological symptoms of Manganism, which is similar to Parkinsonism and is caused by Mn accumulation in the extrapyramidal system of the brain. Despite the reports of Mn-induced neurotoxicity in

humans, such as welding-related Parkinsonism, there is not much clinical evidence about manganese-induced ototoxicity.

**METHODS:** We evaluated the effect of 90 days of Mn fumes inhalation alone on the functional integrity of the auditory system using auditory brainstem response (ABR) and distortion product otoacoustic emissions (DPOAE) measures. ABR thresholds, DP iso-intensity curves, and ABR amplitudes were measured between pre and post-Mn exposures.

**RESULTS:** The paired t-test indicates that the ABR thresholds were significantly elevated across frequencies (2, 4, 8, 16, 32, and 64 kHz) in Long-Evans (n=4) that were exposed to 90 days of Mn fumes when compared to the ABR threshold levels before Mn fumes exposure. The mean of differences was  $6.25 \pm$  SEM 1.44 with a 95% CI of 2.54 to 9.96. ABR Wave I latency was increased significantly in Mn-exposed rats.

**CONCLUSIONS:** These results indicate that Mn exposure results in abnormal action potential propagation along AN and demyelination and/or degeneration of AN fibers. We found that otoacoustic emissions were significantly reduced across frequencies (2 kHz, 4 kHz, 6 kHz, 8 kHz, and 16 kHz). Overall, the 90 days of exposure to Mn fumes alone reduced the integrity of outer hair cells and reduced the amplification function.

### **Impact of blast-induced hearing loss on short-term locomotive behavior**

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**OBJECTIVE:** Blast injury experienced by service members often results in a spectrum of neurological sequelae. Blast injury being an acoustic insult results in hearing loss which is accompanied by damage to vestibular organs and the associated higher

cortical centers. However, postural control and motor assessments are not routine assessments in blast-induced TBI patients. Here, we studied the association of blast-induced hearing loss with the performance in short-term locomotive behavior of rats.

**METHODS:** In this study, rats (n=6) were exposed to single blast exposure (180 dB SPL). Auditory brainstem response (ABR) thresholds, distortion product otoacoustic emissions (DPOAE), and general locomotive behavior were assessed using open-field activity, rota rods, and grid walking tests.

The open field activity was measured at pre-blast and post-blast 1, 3-, 7-, 14-, and 21-day post-blast exposure in which parameters such as distance traveled, maximum and average speed, path efficiency, and time in zones were assessed.

**RESULTS:** The ABR thresholds were significantly reduced at 16 and 64 kHz at the alpha level of 0.05 (using multiple t-tests with the two two-stage step-up methods of Benajmini, Krieger, and Yekutieli). The distance traveled and the average speed was significantly reduced in 3d compared to the pre-blast performance.

**CONCLUSIONS:** The single blast exposure results in a threshold shift on the Audiogram. This threshold shift is associated with reduced performance in the general locomotive behavior warranting further morphological and molecular analysis of vestibular nuclei to shed insights on motor and postural instability associated with the blast injury and blast-induced hearing loss.

### **Learning about graduate student's academic experience using Unsupervised Learning.**

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**OBJECTIVE:** Student satisfaction reflects institutional commitment. Continuous program improvement is critical for the enhanced student experience and academic

performance which can be inferred from student satisfaction. Here, we employed unsupervised machine learning techniques to classify DPT program students based on their satisfaction in the Graduate Exit Surveys and determined the factors influencing student satisfaction.

**METHODS:** In this study, student responses (n=335) in the graduate exit survey from the year 2010-2020 were used. The student responses for 10 variables of various academic factors were recorded on a Likert scale of 1-5 with 1 being very dissatisfied to 5 being very satisfied. The students were classified using the k-means clustering algorithm. The dimensionality reduction using PCA determined the variables that are performing together. Ordinal logistic regression determined the factors influencing student satisfaction.

**RESULTS:** Little's MCAR test indicated 11-23% of values were missing completely at random (MCAR) which was imputed by expectation-maximization. The gap statistic determined 3 optimal clusters that are classified based on their satisfaction. The PCA and the ordinal logistic regression determined that clinical placement, Quality of Teaching, and Preparation for employment were the significant factors influencing overall student satisfaction.

**CONCLUSIONS:** Thus, the use of unsupervised ML tools determines the factors influencing student satisfaction and predicts overall DPT program student satisfaction based on their satisfaction with involved academic variables.

### **Neuronal Morphology in Rat Medial and Lateral Vestibular Nuclei after Blast Exposure**

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**OBJECTIVE:** The commissural inhibitory system between the bilateral vestibular

nuclei plays a crucial role in vestibular compensation after unilateral damage. Here, the objective is to analyze the dendritic morphology of neurons in the rat medial vestibular nuclei (MVN) and lateral vestibular nuclei (LVN) using Golgi staining at 21 days after mild blast-induced traumatic brain injury (mTBI).

**METHODS:** MVN and LVN were collected for Golgi staining in sham control (n=3). The 21 days post-injury neurons were analyzed (n=3) from a blast-exposed rat (~180 dB SPL, 45 psi, <2ms duration). Sholl analysis was performed on stained neurons to quantify dendritic complexity using the Fiji software package. Images were preprocessed by inverting their color scheme.

**RESULTS:** The Sholl analysis plot shows sampled dendritic intersections as a function of distance from the neuronal soma. Sham controls exhibit a peak in intersections at ~60  $\mu\text{m}$  from the soma. At 21 days post-injury, neurons display reduced dendritic complexity, with fewer intersections at most distances and a leftward shift in the peak. A 20th-degree fit of the sampled data closely matches the overall trends ( $R^2 = 0.969$ ).

**CONCLUSIONS:** Blast exposure induces changes in MVN and LVN neuronal dendrite structure, with initial simplification followed by recovery. These changes likely reflect plasticity in the commissural inhibitory system after vestibular damage. By describing this structural remodeling, our Golgi staining approach may help elucidate vestibular rehabilitation and compensation mechanisms.

### **COVID-19 or its Vaccine? Which influences tinnitus perception more?**

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**OBJECTIVE:** Several reports indicate an uptick in tinnitus during the COVID-19 pandemic. However, it is unclear if the perception of tinnitus is worsened by the SARS-COV2 infection or the vaccine itself. In this study, we studied the perception of tinnitus severity in tinnitus patients who received various COVID-19 vaccines (Johnson & Johnson, Moderna, and Pfizer).

**METHODS:** We analyzed the tinnitus perception responses in 200 patients (28.5% males, 71% females, and 0.5% nonbinary). Of which 31% were infected with COVID-19 and 12.5% were not vaccinated. The chi-square test and likelihood chi-square tests determined the independence of the distribution between pre-covid severity and post-covid severity and between the post-covid severity and the vaccination.

**RESULTS:** A significant association was found in tinnitus severity between pre-covid and post-covid. However, we have not found any association between vaccination and the tinnitus severity perception. In addition, a significant association was found between health-related worries affecting tinnitus and COVID-induced lifestyle changes on sound tolerance.

**CONCLUSIONS:** The perception of tinnitus severity is not associated with the vaccination or specific types. However, COVID-induced lifestyle changes and the related social determinants affect the post-COVID tinnitus severity. Thus, addressing those determinants would help to reduce the Tinnitus severity.

## **Effects of Occupational Therapy Professional Development Training on School-based Practice**

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**Objective:** A training program was provided to school-based occupational therapy practitioners (SBOTPs) in Massachusetts to support practices aligned with educational policies and regulations. The purpose of this study was to determine the impact on school-based practice patterns.

**Methods:** This study used a researcher-designed online exploratory survey to determine occupational therapy practice patterns in Massachusetts public schools following the training program. The survey was emailed to the 309 SBOTPs who participated in a Massachusetts Department of Education sponsored training between 2007 and 2019. The survey questions analyzed the frequency of participation-based intervention methods, the frequency of in-context and out-of-context services used, and the frequency of interdisciplinary collaboration used by these practitioners. A Chi Square Goodness of Fit Test was performed to determine if there were categorical differences in the frequency of responses to each research question.

**Results:** After analyzing our 29 responses we determined that the training program was effective and had an impact on how SBOTPs practice within their schools. After the training, SBOTPs in Massachusetts are engaging in participation-based practice in the least restrictive environment, and collaborating more with teachers and other school professionals.

**Conclusions:** This research serves as evidence that professional development courses are beneficial to SBOTPs. This study can be used to justify the cost and implementation of this type of training program and give a reason to provide this training for SBOTPs in other states.