

communities to begin their projects. Community of practice development continues through interactive webinars and development of a web-based repository of training videos and discussion board posts. Evaluation data show high participant learning and satisfaction, with mean confidence scores improving on 6/8 metrics. Evaluation data also suggest several areas for improvement such as more time spent in teams for planning and additional opportunities for interaction within the cohort and with program instructors for problem-solving. **DISCUSSION/SIGNIFICANCE:** Effective training for team-based community-engaged research requires careful planning for team development and study implementation. Longitudinal training and support for the technical aspects of utilizing air sensors is also critical to team success. The RISE Communities program is actively recruiting for future training cohorts.

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### Multimodal assessment of sleep in individuals with chronic post-concussive symptoms: A Pilot Study

Caitlyn Emma Wong, Seiji Koike, Madison Luther, Avery Scatena, Laura Dennis, Erin A Yamamoto, Seva Khambadkone, Emily Garavatti and Juan Piantino  
Oregon Health & Science University

**OBJECTIVES/GOALS:** We aimed to compare subjective and objective sleep in individuals with chronic post-concussive symptoms. We hypothesized an association between self-reported sleep quality and objective sleep parameters, which is different for concussed and control cohorts. **METHODS/STUDY POPULATION:** 28 individuals with chronic post-concussive symptoms and 13 age-matched controls (no concussion history) completed the ISI, PSQI, PROMIS Depression, Anxiety, Stress and Cognitive questionnaires at enrollment. Objective sleep parameters were obtained for a minimum of 7 days and up to 30 days with a validated sleep monitoring device placed under the subject's bed (Emfit). For each night, raw activity data per minute were analyzed to determine in-bed, sleep, wake, and out-of-bed times. These measures were used to calculate total sleep time (TST), sleep onset latency (SOL), and wake after sleep onset (WASO) for each night. **RESULTS/ANTICIPATED RESULTS:** Concussed individuals reported worse sleep with PSQI and ISI scores significantly higher than controls. They also showed significant associations between PSQI and Depression, ISI and Depression, and ISI and Anxiety scores. There was no difference between objective sleep parameters in the concussed and control cohorts (in-bed/sleep/wake/out-of-bed times, TST, SOL, and WASO). Instead, higher PSQI, ISI, Depression, Anxiety, and Stress scores (greater symptom burden) were all associated with later sleep times, whereas higher Cognitive scores (greater cognitive function) were associated with earlier sleep times, regardless of group status. **DISCUSSION/SIGNIFICANCE:** Concussed individuals report worse subjective sleep but no differences to controls when objectively assessing sleep. Depression/anxiety, and not concussion status, determine objective sleep parameters. Psychiatric comorbidities should inform the treatment of post-concussive sleep disturbances.

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### Aerodynamic Size Distribution of SARS-CoV-2 Aerosol Shedding

Kristen K. Coleman<sup>1</sup>, Petri Kalliomäki<sup>2</sup>, Jianyu Lai<sup>2</sup>, S.-H. Sheldon Tai<sup>2</sup>, Jennifer German<sup>2</sup>, Filbert Hong<sup>2</sup>, Barbara Albert<sup>2</sup>, Yi Esparza<sup>2</sup>, Aditya K. Srikakulapu<sup>2</sup>, Maria Schanz<sup>2</sup>, Alycia Ann Smith<sup>2</sup>,

Isabel Sierra Maldonado<sup>2</sup>, Molly Oertela<sup>3</sup>, Naja Fadula<sup>3</sup>, Arantza Eiguren-Fernandez<sup>4</sup>, Gregory S. Lewis<sup>4</sup>, Kathleen M. McPhaul<sup>2</sup> and Donald K. Milton<sup>2</sup>

<sup>1</sup>University of Maryland; <sup>2</sup>Institute for Applied Environmental Health, University of Maryland School of Public Health, College Park, MD, USA; <sup>3</sup>Institute for Clinical and Translational Research, University of Maryland School of Medicine, Baltimore, MD, USA and <sup>4</sup>Aerosol Dynamics Inc., Berkeley, CA, USA

**OBJECTIVES/GOALS:** We designed the Biocascade Exhaled Breath Sampler (BEBS) to characterize viral aerosol shedding among individuals with influenza and other respiratory virus infections. We first aimed to test the BEBS on volunteer COVID-19 cases and report the aerodynamic size distribution of exhaled breath aerosol particles carrying SARS-CoV-2 RNA. **METHODS/STUDY POPULATION:** From June 15 through December 15, 2022, we recruited 27 PCR-confirmed COVID-19 cases from a college campus and the surrounding community to provide 30-minute breath samples into a well-validated Gesundheit-II (G-II) exhaled breath aerosol sampler. Among these individuals, 17 provided an additional exhaled breath sample into the newly designed BEBS. We quantified samples for viral RNA using reverse transcription digital polymerase chain reaction (RT-dPCR) and determined the viral RNA copies collected within two aerosol size fractions ( $\leq 5 \mu\text{m}$  and  $> 5 \mu\text{m}$  in diameter) from the G-II, and four aerosol size fractions ( $< 1.15 \mu\text{m}$ ,  $1.15\text{--}3.2 \mu\text{m}$ ,  $3.3\text{--}8.2 \mu\text{m}$ , and  $> 8.2 \mu\text{m}$ ) from the BEBS. **RESULTS/ANTICIPATED RESULTS:** Individuals with a SARS-CoV-2 Omicron BA.4 or BA.5 infection shed virus in aerosols at an average rate of  $7.5 \times 10^3$  RNA copies per 30-minute G-II sample, with 78% of the total RNA in aerosols  $\leq 5 \mu\text{m}$  in diameter. Among the BEBS samples, 10% of the total viral RNA was detected in aerosols  $< 1.15 \mu\text{m}$ , 43% in  $1.15\text{--}3.2 \mu\text{m}$ , 37% in  $3.3\text{--}8.2 \mu\text{m}$ , and 10% in the  $> 8.2 \mu\text{m}$  size fraction. Based on viral RNA loads, our results indicate that exhaled aerosols  $\leq 3.2 \mu\text{m}$  contribute the majority of SARS-CoV-2 inhalation exposure. **DISCUSSION/SIGNIFICANCE:** Our data provide additional evidence that respirable aerosols contribute to the spread of SARS-CoV-2. Thus, our data suggest that mitigation measures designed to reduce infectious aerosol inhalation, such as ventilation and the use of air cleaners and respirators, are needed to control the spread.

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### Alexithymia impacts vulnerability for cognitive decline in healthy elders via frontal lobe connectivity during response inhibition, especially in women

Christian Otteman and Kristy A. Nielson  
Marquette University

**OBJECTIVES/GOALS:** This project aimed to examine the impacts of biological sex and alexithymia on frontal lobe connectivity in executive functioning (EF)-related neural networks during successful inhibition as a means to index vulnerability for future cognitive decline. **METHODS/STUDY POPULATION:** Healthy, cognitively intact older adults ( $n=43$ , 33 female,  $\text{Age}=79$ ) completed the 20-item Toronto Alexithymia Scale (TAS-20) and the stop-signal task in this study. We used electroencephalography (EEG) source estimation to investigate EF-related frontal connectivity during successful inhibition in stop-signal task trials. Connectivity was measured in bilateral frontal ROIs relevant to inhibition using time series correlations over the N200 (186–350ms) and P300 (340–616ms) time windows, associated with the inhibitory

subprocesses of conflict processing and performance evaluation, respectively. RESULTS/ANTICIPATED RESULTS: Those with higher alexithymia, as measured by the difficulty identifying feelings (DIF) facet of the TAS-20, had lower right anterior cingulate cortex (ACC)-left superior frontal gyrus (SFG) connectivity in the P300 window, suggesting impaired performance evaluation. Further, in females specifically, those with higher DIF had greater right inferior frontal gyrus (rIFG)-bilateral ACC connectivity in the N200 window than those with lower DIF, suggesting greater resources were allocated for conflict processing and inhibition. Right ACC-rIFG connectivity also correlated with better stop accuracy and faster stop-signal reaction time, supporting this network's role in successful inhibition. DISCUSSION/SIGNIFICANCE: Overall, during successful inhibition, higher DIF was associated with reduced performance monitoring efficiency as well as greater resource allocation for conflict processing during motor stopping in women only. Thus, alexithymia (via DIF) may exacerbate age-related EF dysfunction and risk for future cognitive decline, especially for females.

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### Addressing the Gaps in Diabetic Foot Ulcer Management: Prediction and Prevention

Shirley Lin and Ronald Sherman

Johns Hopkins University School of Medicine

OBJECTIVES/GOALS: Globally, diabetes affects 537 million people and 15-25% will develop a foot ulcer in their lifetime. Diabetic foot ulcers (DFU) tend to be chronic and non-healing due to the poor wound healing environment, leading to infection or amputation. Our study aims to develop a method to predict and prevent DFU formation. METHODS/STUDY POPULATION: Our preliminary plan is to develop a method to detect high plantar pressures, coupled with the ability to automatically adjust an orthotic device to offload excess pressure. Our current aim is to create a "smart orthotic" which will link with foot mapping technology to automatically offload high pressure areas, reducing the need for a separate clinic visit for orthotic adjustment. We aim to prove that our device will normalize plantar pressure distribution, which will prevent callus and subsequent DFU formation. The current target population includes those with diagnosed diabetes and are ambulatory. RESULTS/ANTICIPATED RESULTS: With our technology, we anticipate normalization of plantar pressure distribution in a more frequent fashion than is currently done. Because annual orthotic fittings, which is current standard of care, do not provide regular enough adjustments to match the rate of diabetic foot structural changes and peak plantar pressure redistribution, our device will address two gaps in management. One, patients will receive near-instantaneous changes in plantar pressure offloading, allowing for near continuous orthotic customization. Secondly, our device would reduce the clinical appointment burden, which would be especially important for patients with multiple medical comorbidities or experience other barriers to accessing healthcare. DISCUSSION/SIGNIFICANCE: While DFUs are commonplace and their complications are well recognized, there still exists a gap in ulcer prevention. Our proposed solution will redistribute pathologic plantar pressures, allow for more frequent monitoring, automatic therapy, and aid in the management of high ulcer risk patients.

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### Effects of GLP-1 Agonist on Pediatric Populations in a Real-World Setting

Gabi Barajas and Jessica Schmitt

University of Alabama at Birmingham

OBJECTIVES/GOALS: Compare metabolic health of type 2 diabetics on GLP-1 to those on traditional therapy METHODS/STUDY POPULATION: Outcomes of interest of this study include analyzing GLP-1 agonists on overall metabolic health, focusing primarily on weight loss and ability to wane off insulin without rebounding metabolic health. The data will be collected in a retrospective chart review from medical records of type II diabetics from Children's of Alabama and will follow patients over two years. The charts have been narrowed to those patients prescribed GLP-1 agonists who have been on the medication for at least one year with consistent visits to the endocrinology clinic. The following data will be collected from the charts: race/ethnicity, date of visit, BMI/weight, A1C, insulin therapy, lipids, LFTs (AST/ALT), and insurance coverage RESULTS/ANTICIPATED RESULTS: With these results, we hope to study the metabolic health effects of GLP-1 agonists on type II diabetes in the pediatric population. It is known that obesity is a risk factor for type II diabetes, and that GLP-1 agonists aid in weight-loss in adults. Further research is needed to see the real world health effects, and with these results we hope to assess if GLP-1 agonist have an affect on metabolic health within the pediatric population by collecting data on values aforementioned. We also hope to compare and contrast the different GLP-1 agonists being used based on adherence, insurance coverage, adverse effects, and patient preference. Currently, only Liraglutide and Exetanide are approved for pediatric type II diabetics. DISCUSSION/SIGNIFICANCE: Insulin use can lead to weight gain; metformin does not aid in weight reductions. If GLP-1 agonists aid in weight loss, it could potentially help slow complications of diabetes in the pediatric population. B-cell function in children declines more rapidly; and, as a result, insulin resistance occurs more rapidly.

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### Can Exogenous Ketones Prevent the Effects of High Salt Intake on Renal Vascular Resistance During Sympathoexcitation?

Soolim Jeong<sup>1</sup>, Braxton A. Linder<sup>1</sup>, Meral N. Culver<sup>1</sup>, Nina L. Stute<sup>1</sup>, Sofia O. Sanchez<sup>1</sup>, Zachary J. Schlader<sup>2</sup>, Orlando M. Gutierrez<sup>3</sup> and Austin T. Robinson<sup>1</sup>

<sup>1</sup>Auburn University; <sup>2</sup>Indiana University and <sup>3</sup>University of Alabama at Birmingham

OBJECTIVES/GOALS: Renal vascular resistance (RVR) is the opposition to blood flow by renal arteries. At the population level, dietary salt increases RVR and blood pressure (BP), which are associated with cardiovascular disease. Recent data indicate exogenous ketones may offset adverse cardiorenal effects of salt. METHODS/STUDY POPULATION: Our registered clinical trial (NCT05545501) is a double-blinded, placebo-controlled, crossover study. Participants are being randomized to three 10-day conditions: A) control; B) high salt; C) high salt and ketone