

preterm dyads pre and during COVID-19 METHODS/STUDY POPULATION: Total and HSV lysate, glycoprotein D (gD) and glycoprotein B (gB)-specific IgG, IgG1 and IgG3 as well as HSV neutralizing Abs (nAbs) and ADCC were quantified in paired 3rd-trimester pregnant women and their newborns (cord) blood. Transfer ratios (TR) were defined as cord:maternal Ab levels. IgG1 and IgG3 subclass and gD or gB-specific Abs were isolated by column purification and glycan profiles were assessed by mass spectrometry. The study population included 21 term and 15 preterm dyads who were HSV-1 (+/- HSV-2) seropositive enrolled between 2018-2019 (pre-COVID) and 25 additional HSV-1 (+/- HSV-2) seropositive term dyads whose mothers were SARS-CoV-2 PCR and COVID Ab+ at delivery; 14 were asymptomatic and 11 had mild-moderate COVID disease. None of the mothers had active genital HSV lesions during delivery RESULTS/ANTICIPATED RESULTS: Anti-HSV IgG, IgG1 and IgG3 TR were higher in term vs. preterm dyads ( $p < 0.05$ ). The nAb TR was 2.4 in term vs. 0.8 in preterm ( $p < 0.001$ ) but the ADCC TR was  $< 1.0$  for both. To determine if the latter reflected antigenic target, subclass or glycans, we enriched for gD and gB specific and IgG1 and IgG3 Abs. The gD Abs were IgG1 and had only neutralizing activity. In contrast, gB Abs were polyfunctional and included IgG1 and IgG3 but only the IgG1 Abs had ADCC activity. The gD Abs were enriched for glycans associated with an affinity for the neonatal Fc receptor (FcRn); gB Abs expressed glycans associated with both FcRn and Fc $\beta$ RIIIa binding. There was no significant difference in total HSV-specific IgG TR in pre-COVID vs post-COVID dyads but the nAb TR was lower ( $p = 0.018$ ) and ADCC TR higher ( $p < 0.001$ ) in the COVID compared to pre-COVID cohort DISCUSSION/SIGNIFICANCE: HSV ADCC Abs, which may provide greater protection than nAbs against neonatal disease, transfer poorly particularly to preterm newborns. However, in the setting of SARS-CoV-2, the TR of HSV ADCC is significantly higher. This may reflect alterations in the placental architecture and/or glycan composition which is currently being investigated.

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### Using team science to support outbreak management in a large urban region during the COVID-19 pandemic

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OBJECTIVES/GOALS: To describe how the UCLA Clinical and Translational Science Institute (CTSI) assembled and deployed a

science team in support of a local jurisdictions effort to manage and control COVID-19 outbreaks in one of the nations largest metropolitan regions, Los Angeles County (LAC). METHODS/STUDY POPULATION: During the COVID-19 pandemic (2020-21), building an efficient data infrastructure to support outbreak management became a priority for the local health department. In response, the UCLA CTSI assembled a science team with expertise across the translational continuum: epidemiology, laboratory and microbiology, machine learning, health policy, medicine and clinical care, and community engagement. The team partnered with a new LAC Data Science Team to foster a collaborative learning environment for scientists and public health personnel, employing improvement and implementation science to help mitigate COVID-19 outbreaks in sectors including healthcare, skilled nursing facilities, and K-12 education. The goal was a public health workforce that is prepared to problem-solve complex, evolving outbreaks. RESULTS/ANTICIPATED RESULTS: The science team created a learning environment with data modeling and visualization, problem-based learning, and active knowledge and skills acquisition. First, control charts and time series methods were used to visualize COVID-19 data and find signals for action. Second, a series of 16 Grand Rounds offered interactive sessions on problem-solving of outbreak challenges in different sectors. Third, a biweekly Public Health Digest provided fieldworkers with the latest scientific studies on COVID-19. All three elements guided and empowered the workforce to implement timelier, efficient outbreak mitigation strategies in the field. The partnered team also identified barriers to adoption of selected new data and management techniques, revealing areas for further skill-building and data-driven leadership. DISCUSSION/SIGNIFICANCE: The UCLA CTSI science team offered a backbone science infrastructure for helping public health and other sector agencies manage COVID-19 outbreaks and mitigation. It showed promise in bringing and translating science into public health practice. It revealed future priorities for CTSI innovation and scientific support of public agencies.

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### Development and implementation of research team: Lessons learned from conducting studies focusing on sleep and brain aging

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OBJECTIVES/GOALS: This poster summarizes the development and implementation of research exploring the relationship between sleep and brain health. METHODS/STUDY POPULATION: Three pilot studies and two secondary data analyses were conducted on 20 older adults with coronary artery disease and 30 older adults without major cardiovascular disease. They were recruited for 10 older adults with multiple chronic conditions. The study included interviews, magnetic resonance imaging, and sleep assessment of participants. Data were also gathered from two secondary sources on multiple chronic conditions, sleep, neuroimaging, cognition, and Alzheimers biomarkers. RESULTS/ANTICIPATED RESULTS: The multidisciplinary team was from nursing, medicine, cardiology, psychology, neuroscience, radiology, and data science to address the separate research aims. The pilot studies and secondary data analyses were successfully implemented. The University of Iowa Institute for Clinical and Translational Science, Center for Advancing Multimorbidity Science, and Iowa Neuroscience Consortium supported the collaboration. The teams have found that sleep and circadian rhythms

characteristics may be associated with not only coronary artery disease, but also multiple chronic conditions. Having sleep disorders and reduced circadian amplitude can be associated with white matter microstructure and functional connectivity. These collaborations provided multiple funding and publication opportunities. **DISCUSSION/SIGNIFICANCE:** Interdisciplinary team research is important to enhance translational science. Although challenges were identified, using multiple methods and dataset sources with multidisciplinary team members enabled opportunities to explore multifaced topics related to sleep and brain aging.

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### Extrapulmonary Gas Exchange Through Peritoneal Perfluorocarbon Perfusion

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**OBJECTIVES/GOALS:** For patients suffering from respiratory failure there are limited options to support gas exchange aside from mechanical ventilation. Our goal is to design, investigate, and refine a novel device for extrapulmonary gas exchange via peritoneal perfusion with perfluorocarbons (PFC) in an animal model. **METHODS/STUDY POPULATION:** Hypoxic respiratory failure will be modeled using 50 kg swine mechanically ventilated with subatmospheric (10-12%) oxygen. Through a midline laparotomy, two cannulas, one for inflow and one for outflow, will be placed into the peritoneal space. After abdominal closure, the cannulas will be connected to a device capable of draining, oxygenating, regulating temperature, filtering, and pumping perfluorodecalin at a rate of 3-4 liters per minute. During induced hypoxia, the physiologic response to PFC circulation through the peritoneal space will be monitored with invasive (e.g. arterial and venous blood gases) and non-invasive measurements (e.g. pulse oximetry). **RESULTS/ANTICIPATED RESULTS:** We anticipate that the initiation of oxygenated perfluorocarbons perfusion through the peritoneal space during induced hypoxia will create an increase in hemoglobin oxygen saturation and partial pressure of oxygen in arterial blood. As we expect gas exchange to be occurring in the microvascular beds of the peritoneal membrane, we expect to observe an increase in the venous blood oxygen content sampled from the inferior vena cava. Using other invasive hemodynamic measures (e.g. cardiac output) and blood samples taken from multiple venous sites, a quantifiable rate of oxygen delivery will be calculable. **DISCUSSION/SIGNIFICANCE:** Peritoneal perfluorocarbon perfusion, if able to deliver significant amounts of oxygen, would provide a potentially lifesaving therapy for patients in respiratory failure who are unable to be supported with mechanical ventilation alone, and are not candidates for extracorporeal membrane oxygenation.

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### A TL1 Team Approach: Physician Strategies to Promote Physical Activity Among Youth with Comorbid Asthma and Overweight/Obesity\*

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**OBJECTIVES/GOALS:** Youth with comorbid asthma and overweight/obesity (OW/OB) are at risk for increased morbidity.

Physical activity (PA) engagement can mitigate risks, but the majority of youth do not meet national PA guidelines. This study examines caregiver and youth perspectives about ways physicians can promote PA in this population. **METHODS/STUDY POPULATION:** Participants included 20 adolescents (M age = 16.0; 55% male) with asthma and OW/OB and a primary caregiver (90% mothers). Caregivers and adolescents participated in separate semi-structured interviews about adolescent PA engagement, including questions regarding strategies for physicians to promote PA. Interviews were audio recorded, transcribed, and analyzed using NVivo. Two authors assigned conceptual codes to the transcripts to identify key concepts and then met to create a codebook. Authors independently coded 4 transcripts and met to resolve discrepancies. Authors then independently coded 2 additional transcripts (final kappa = .62) and met to reach consensus before dividing the remainder for coding. Codes were collapsed and sorted into themes, and attributes of each theme were determined. **RESULTS/ANTICIPATED RESULTS:** Dyads discussed the importance of physicians providing general (positive statements) and PA-specific encouragement. Dyads also stated that physicians should encourage teens to set and reach PA-related goals. Caregivers and youth reported that physicians should provide education about the importance of PA and ways to engage in PA, awareness about adolescents weight and its impact on health, and resources (camps, events, and locations). Additionally, caregivers and a teen noted that physicians should talk directly to and address questions toward teens. Dyads mentioned the importance of focusing on overall health (instead of weight) as well. Dyads also noted that physicians should avoid judgmental and shaming statements when talking about weight. **DISCUSSION/SIGNIFICANCE:** Results provide information about strategies physicians can use to promote PA among adolescents with asthma and OW/OB, a population that is at risk for low PA and poor health outcomes. Findings suggest that physicians may effectively motivate behavior change by providing health guidelines, encouragement, resources, and positive reinforcement.

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### Impact of Maternal Diabetes on Neonatal Body Composition, Energy Homeostasis and Hypothalamic Salivary Gene Expression\*

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**OBJECTIVES/GOALS:** Infants of diabetic mothers (IDMs) may exhibit decreased oral intake, requiring nasogastric feedings and prolonged hospitalization. We hypothesize that increased insulin exposure and resulting overgrowth in utero disrupts hypothalamic regulation of food intake, correlates to body composition and impacts feeding in IDMs. **METHODS/STUDY POPULATION:** Infants born at ≥35 weeks gestation to mothers with gestational or type II diabetes (IDM cohort), and normoglycemic mothers (control cohort) were recruited. Infants born to mothers with Type I DM or preeclampsia and with a history of intrauterine growth restriction, opioid exposure, or major congenital anomalies were excluded. Salivary expression of known hunger signaling genes 5AMP-activated protein kinase (AMPK), Neuropeptide Y receptor Y2 (NPY2R), leptin (LEP), ghrelin (GHRL), proopiomelanocortin (POMC), and adiponectin (ADIPOQ) were quantified using RT-