

people living with or directly affected by opioid use disorder (OUD). RESULTS/ANTICIPATED RESULTS: Themes emerged around stigma (e.g., constant judgment, majority of interactions focused on addiction, addiction comes from bad choices), the healthcare system (e.g., healthcare system bias and stigma, misalignment of services and timing of need, no support for support network), and relating to recovery (very variable but generally ambiguous and uncertain process and outcomes, importance of peer recovery coaches, importance of community resources). Identified themes were used to create insights that informed the underlying concepts of an engagement strategy including support and resources for recovery coaches, and education materials for mothers with OUD. One of human-centered design's strengths is iteration, and the materials created for this have yet to be tested and refined thoroughly to be meaningful and lasting interventions. DISCUSSION/SIGNIFICANCE OF IMPACT: Considerable insights into the lived experience of those experiencing OUD and those who support these individuals yielded tangible ways to test improved engagement and recruitment of women with OUD at the time of birth.

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Utilization of quantitative and qualitative methodology to characterize patient-level factors associated with sustained data transmission and clinical benefit from remote patient monitoring over 12 months

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OBJECTIVES/GOALS:

1. Identify patient-level factors associated with hemoglobin A1c reduction and sustained device use after 12 months of participation in a diabetes and hypertension remote monitoring program
2. Utilize qualitative methodology to characterize key barriers and facilitators to remote monitoring engagement

METHODS/STUDY POPULATION: All participants in statewide quality improvement initiative utilizing a cellular-enabled device with glucose and blood pressure monitoring capability will be included in quantitative analysis (N = 302 at baseline and N = 125 at 6 months at the time of analysis). We developed multi-level regression analyses to model factors associated with clinical outcome (hemoglobin A1c change) and transmission frequency over time. Focus groups and surveys will be conducted to identify barriers and facilitators to continued data transmission and hemoglobin A1c change over 12 months. Semi-structured interview guides are mapped to Wagner's Chronic Care Model. RESULTS/ANTICIPATED RESULTS: Overall, program participation was associated with 1.8% and 1.3% A1c reduction at 6 (n = 302) and 12 months (n = 125). Regression models showed no association of age, gender, race, income, or insurance with hemoglobin A1c change. Modeling of patient factors associated with sustained transmission frequency or device use is ongoing. Patient focus groups and surveys are currently being scheduled and qualitative data will be analyzed using content analysis. After completing qualitative and quantitative data analyses independently, we will use graphical matrix configurations ("joint displays") to synthesize findings. DISCUSSION/SIGNIFICANCE OF IMPACT: Our goal is to identify variables associated with the likelihood of

patients to engage in and benefit from sustained remote monitoring. Results may inform health policy and guide recruitment approaches, implementation strategies, and methodologic design for future trials. CONFLICT OF INTEREST DESCRIPTION: The authors have no conflicts of interest or disclosures to report

Mechanistic Basic to Clinical

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A TL1 Team Approach to Personalization of Donor Human Milk for Preterm Infants

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OBJECTIVES/GOALS: Feeding preterm infants with mother's own milk (MOM) lowers rates of sepsis, decreases necrotizing enterocolitis, and shortens hospital stay. Our objective is to determine whether a similar microbial diversity to MOM can be obtained when fresh or frozen MOM is inoculated in donor human milk (DHM). METHODS/STUDY POPULATION: Subjects included 12 mothers of infants born 100ml of MOM per day and were excluded if they had taken antibiotics within 3 days of the 1-time pumped MOM sample collection. MOM sample was divided into fresh (processed immediately) and frozen (-20°C) for 24h fractions. MOM was inoculated in DHM [referred to as refaunated milk (RM)] at 10% (RM10) and 30% (RM30) dilutions, then incubated at timepoints: 0h, 2h, 4h at 37°C. At each timepoint, total viable microbial cell counts were performed in differential or selective media along with future 16S rRNA sequencing. RESULTS/ANTICIPATED RESULTS: Microbiota expansion was detected in MOM, RM10 and RM30 over time whether fresh or frozen milk was used as the inoculum. Incubated fresh and frozen MOM had similar bacterial loads when tested on nutrient agar (10⁵-10⁶ CFU/mL), mannitol salt (10⁶ CFU/mL), MacConkey (10²-10⁵ CFU/mL), blood agar (10⁶ CFU/mL) and MRS (10⁴ CFU/mL) plates. Based on these CFU counts, RM30 incubated for 2h and RM10 at 4h showed similar counts to that of MOM at 0h. DISCUSSION/SIGNIFICANCE OF IMPACT: RM, inoculated with fresh or frozen MOM, obtained a similar microbial count compared to MOM at 0h indicates that fresh or frozen MOM can inoculate DHM. 16s rRNA sequencing is ongoing. Future studies are needed to support an inoculation protocol to be used in clinical practice and human milk banking.

4290

Acoustic screening for the "wet voice" in a canine laryngeal model

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OBJECTIVES/GOALS: Early dysphagia detection reduces risk of pulmonary complications, length of hospital stay, and overall health-care costs. The biggest limitation for early detection has been the lack of a sensitive, reliable, and noninvasive screening tool. The bedside swallow examination may miss silent aspiration in up to 40% of patients. The objective of this study is to evaluate if acoustic parameters can distinguish normal and wet voice in a canine laryngeal

model. Ultimately, our goal is to establish whether the sensitivity of the bedside swallow examination can be augmented with the addition of an acoustic screen in humans. **METHODS/STUDY POPULATION:** Two excised canine larynges were used for laryngeal phonation simulations under six different conditions over 48 hours. Acoustic recordings were obtained while the larynges were in vibration at the phonation threshold pressure. Phonation was recorded under dry conditions and when the laryngeal introitus was covered with low viscosity glycerin (9.5cP) or high viscosity glycerin (950cP), as well as in adducted and abducted conditions. The latter mimics glottic insufficiency seen in presbylarynx or vocal fold paralysis. **RESULTS/ANTICIPATED RESULTS:** A total of 112 voice samples were generated and analyzed for pitch, sound pressure level (SPL), % shimmer, % jitter, relative average perturbation (RAP), and noise-to-harmonics using PRAAT software. A multivariate regression model showed that pitch, SPL, % shimmer, % jitter and RAP could significantly predict wetness in abducted conditions only. Could you please add numbers and p values? **DISCUSSION/SIGNIFICANCE OF IMPACT:** This pilot study indicates that classic acoustic perturbation measures distinguish the dry from the wet larynx only in glottic insufficiency condition in an ex vivo canine laryngeal model. Our next step is to study whether non-linear time series analysis and machine learning can differentiate dry and wet phonation in both adducted and abducted conditions in our animal model. **CONFLICT OF INTEREST DESCRIPTION:** Dr. Anais Rameau is a co-founder and Chief Executive Officer of MyophonX, a wearable device used to restore speech in patients with limited phonation capacity.

4483

Activity and Abundance of Mucus-degrading Microbes in Inflammatory Bowel Disease

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OBJECTIVES/GOALS: This study seeks to culture and characterize mucus-degrading microbes from the microbiome of inflammatory bowel disease (IBD) patients. **METHODS/STUDY POPULATION:** Stool will be collected from IBD patients and healthy first-degree relatives, then enriched for mucin-degrading microbes through growth on porcine rectal mucin. Dilution plating in both liquid and solid culture formats will be employed to isolate strains capable of growth on mucin. Cultures that are positive for mucin degradation will be identified with 16S rRNA sequencing; unique isolates will be genome sequenced and transcriptionally profiled on simple monosaccharides and mucin in order to identify putative mucin-degrading genes. The abundance of novel enzymes, pathways, and microbes will be compared in healthy and IBD patient populations using existing datasets in the literature. **RESULTS/ANTICIPATED RESULTS:** We expect to isolate previously uncultured mucin-degrading microbes, which will likely include new strains and possibly new species of bacteria. Through the transcriptomic characterization of mucin-degrading pathways, we will expand the lexicon of known mucin-degrading enzymes and pathways used by bacteria in the human colon. We expect mucin-degrading microbes to be more abundant and active in IBD patients compared to healthy controls. **DISCUSSION/SIGNIFICANCE OF IMPACT:** There is no cure for IBD and treatment relies heavily on suppressing a patient's immune system. This research seeks to understand the contribution of the gut

microbiota in the pathogenesis of IBD, which may lead to future therapeutic targets.

4503

Adaptation of Motor Action in Children with Hemiplegic Cerebral Palsy

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OBJECTIVES/GOALS: We study the association of adaptive decision-making, motor planning, and neuromuscular constraints, in children with hemiplegia. We examine how children scale motor decisions to body mechanics and the distance of a target while reaching in sitting/standing, and if they can recalibrate motor decisions to sudden changes in body mechanics. **METHODS/STUDY POPULATION:** Forty-five 6-12 year-olds with hemiplegia and 45 age/gender matched typically developing controls participate in clinical tests (i.e. balance, visual perceptual skills, etc.) and 3 experiments. Children "reach to tap" toward a target while sitting with both preferred and not preferred arms under three conditions: regular elbow extension sitting and standing and elbow extension range reduced by 50% via a splint while sitting. Trials are easy, ambiguous, and difficult. Motor decisions are compared to abilities and motion sensors (IMUs) worn at wrist, arm, sternum and lumbar area, record biomechanical strategies children use under different decisions. Synchronized video analysis presents biomechanical strategies under different decisions. **RESULTS/ANTICIPATED RESULTS:** Data collection is still underway. A mixed models analysis is used to compare 2 (group: hemiplegic/typically developing) X 2 (arms: healthy/impaired & dominant/non dominant) X 3 (difficulty levels) the children's decisions. Functional analysis is used to capture biomechanical strategies children use under different decisions and levels of difficulty. Exploration strategies are recorded relative to levels of difficulty. We will also compute correlations between affordance thresholds for all children and measures of sensation, range of motion, cognition and balance (in each posture). Lastly, a secondary analysis will compare behaviors of children with left/right hemisphere lesions, as they differ in spatial abilities. Preliminary results show that children with hemiplegia make errors with both their affected and unaffected side. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Motor deficits in children with hemiplegia are the primary focus of treatments. Motor learning interventions focus on biomechanical deficits. Results from these studies expand the focus to planning and cognitive control issues underlying motor deficits.

4212

An age-dependent, rescuable defect in intestinal barrier repair is associated with an immature enteric glial network in a neonatal pig model of intestinal ischemia

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OBJECTIVES/GOALS: An age-dependent restitution defect in our neonatal pig intestinal ischemia model is rescued by unknown factors within homogenized mucosa of weaned pigs. A postnatally