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Cross-institutional implementation of a clinical research recruitment and retention design studio

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OBJECTIVES/GOALS: Rush University developed human-centered design studios to help translation research teams overcome recruitment and retention barriers in clinical trials. We describe the adaptation process and lessons learned when implementing these studios at The University of Chicago (UChicago). **METHODS/STUDY POPULATION:** UChicago studios followed the core Rush design, including study presentation, process mapping, partner identification, insight framing, and idea generation, but were adapted to local context and resources. The main adaptation transitioned the role of studio facilitator from a faculty human-centered design expert to trained research coordinators. This process included structured training and adaptation of workflows within the institutional context. Regular cross-institutional meetings provided a forum to debrief challenges and implement needed adjustments. Evaluation data included attendance records, post-session surveys, and regular debriefs to assess fidelity and adaptation. **RESULTS/ANTICIPATED RESULTS:** In 2025, six 1-hour studios were held at UChicago, averaging eight participants per session (range 6–10; n=50). Participants included faculty and research, administrative, and community engagement staff. Feedback surveys (n=14) yielded a Net Promoter Score of 85 (12 promoters, 2 passives, and 0 detractors). Among respondents, 71% found sessions useful, 50% were first-time attendees, and 57% attended primarily to help research teams overcome recruitment barriers. Participants described the studios as valuable for generating concrete solutions and fostering cross-departmental connections. Key challenges included sustaining attendance, expanding presenter recruitment, and engaging more faculty. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Replication of design studios at UChicago demonstrates that the model can be sustained through trained non-faculty facilitators. Key lessons include the importance of faculty mentorship, facilitator training, consistent coordination, and cross-institutional learning to strengthen implementation.

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Influence of prenatal substance exposure and adverse childhood experiences on long-term mental and physical health in offspring

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OBJECTIVES/GOALS: 1. Determine if adverse childhood experiences in our novel database are associated with adverse mental and physical health outcomes. 2. Assess differences in developmental and neuropsychological functioning in children with PME and/or opioid exposure. 3. Predict long-term impact of prenatal METH, opioid, and co-use exposures on cognitive development. **METHODS/STUDY POPULATION:** The Minnesota Foster Care and Adoption Population-level Database includes demographics, birth data (date of birth, gestational age, birth weight, birth length), medical visits and hospital admissions, growth measures over time (height, weight, BMI, and head circumference), vitals, labs, ICD diagnoses, type of prenatal substance exposure (PSE), ACEs (PEARL standards), caregiver placement types (adoption, traditional foster care, kinship care, institutional care, orphanage care, respite care), number of caregiver transitions, and risky behaviors (being detained, suicidal ideation or attempt, self-injurious behaviors, and substance use). **RESULTS/ANTICIPATED RESULTS:** The study includes 2,725 participants, comprising both adopted children and those in various foster care settings. Transitions are frequent, with only 17% of participants experiencing no transitions. The most common numbers of transitions are two (10%), four (10%), five (9.8%), and six (9.7%). The leading adverse childhood experiences are household substance abuse, mental illness, physical neglect, domestic violence, and physical abuse. Alcohol, tobacco, and methamphetamine are the most frequently used substances during pregnancy, a trend that persists with polysubstance exposure. Adverse childhood experiences are linked to ADHD, conduct disorders, depression, anxiety, mood disorders, and adjustment disorders. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Our findings could help identify a comprehensive profile of developmental and neuropsychological functioning in PSE populations. Our strongest asset is our database, which controls environmental factors better than the general population when we study neurodevelopmental outcomes of PSE.

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Using Brillouin spectroscopy to quantify mechanical properties of human vitreous *in vivo*

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OBJECTIVES/GOALS: The objective of this study is to quantify the physical properties of the human vitreous noninvasively *in vivo*, by applying Brillouin Spectroscopy. Our goal is to measure the Brillouin shift and linewidth of the human vitreous in normal aging, diabetes, and myopia. **METHODS/STUDY POPULATION:** Our study population will include three groups: patients with emmetropia and no diabetes, patients with diabetes without proliferative retinopathy, and patients with axial myopia. We will exclude patients with any prior vitreoretinal surgery or other systemic or ocular conditions that may affect the vitreous such as rhegmatogenous retinal detachment or systemic collagen disorders. We will measure baseline characteristics including age, axial eye length, diabetes duration, and A1c level. We will perform a complete dilated eye exam and obtain imaging including optical coherence tomography in addition to Brillouin microscopy of the anterior and mid vitreous. **RESULTS/ANTICIPATED RESULTS:** We anticipate the following findings