

Education

Team Science

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Older adults show biomarker evidence of PICS after sepsis

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OBJECTIVES/GOALS: Many older sepsis survivors develop chronic critical illness (CCI) with poor outcomes. Sepsis is caused by a dysregulated immune response and biomarkers reflecting PICS. The purpose was to compare serial PICS biomarkers in a) older (versus young) adults and b) older CCI (versus older RAP) patients to gain insight into underlying pathobiology of CCI. **METHODS/STUDY POPULATION:** Prospective longitudinal study with young (45 years) and older (65 years) septic adults who were characterized by a) baseline predisposition, b) hospital outcomes, c) serial SOFA organ dysfunction scores over 14 days, d) Zubrod Performance status at three, six and 12-month follow-up and e) mortality over 12 months. Serial blood samples over 14 days were analyzed for selected biomarkers reflecting PICS. **RESULTS/ANTICIPATED RESULTS:** Compared to the young, more older adults developed CCI (20% vs 42%) and had markedly worse serial SOFA scores, performance status and mortality over 12 months. Additionally, older (versus young) and older CCI (versus older RAP) patients had more persistent aberrations in biomarkers reflecting inflammation, immunosuppression, stress metabolism, lack of anabolism and anti-angiogenesis over 14 days after sepsis. **DISCUSSION/SIGNIFICANCE:** Older (versus young) and older CCI (versus older RAP) patient subgroups demonstrate early biomarker evidence of the underlying pathobiology of PICS. The population of older sepsis survivors is in need of interventions to lower systemic inflammation and stimulate anabolism to prevent skeletal muscle wasting and disability.

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Assessment of Learning Modules Promoting Team Science Practices to the Translational Scientist

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OBJECTIVES/GOALS: The overarching objective is to assess the value of promoting team science practices across a diverse clinical translational science community through the development of learning modules. We aim to share lessons learned to help inform best practices for CTSA hubs interested in promoting team science. **METHODS/STUDY POPULATION:** We recently created a series of self-paced learning modules focused on the science of team science, which include a variety of text and multimedia content. A preliminary assessment was conducted to determine the perceived value of six video team science Learning Shots and to identify areas for improvement. Significant content revisions are underway based on respondent feedback. In early 2022, a follow up survey will solicit

feedback from a larger sample of researchers to reassess the learning modules and to ensure that desired improvements were achieved. We will incorporate continuous improvement cycles to gather future feedback, track improvements, and identify potential future direction for new content. **RESULTS/ANTICIPATED RESULTS:** The preliminary assessment identified the most effective aspects of the modules to be the variety and knowledge of speakers, diversity of topics, organization of the content, and appropriateness of length. Least effective aspects included a desire for more information in some content areas and not enough focus on the challenges of team science for junior faculty. Suggested areas for improvement include a desire for supplemental descriptive text, links to tools that enable teams to be productive, and additional examples from researchers. The follow up study is expected to yield more detailed information on the impacts of the improvements and the overall effectiveness of the modules. **DISCUSSION/SIGNIFICANCE:** This project provides insights for CTSA Hubs interested in promoting team science and best practices when developing learning modules. Results contribute to what is known about researchers interest in learning about team science and the effectiveness of using online formats for delivery.

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A Team-based Approach to an Integrated Model of Diabetes Care

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OBJECTIVES/GOALS: Diabetes is related to risk for heart disease, stroke, high blood pressure, and COVID-19. It is exacerbated by built/social environment issues, e.g., food insecurity, access to healthy foods and health care, and other poverty-related factors. Our goal is to assess the efficacy of an integrated care model for patients with poorly controlled diabetes. **METHODS/STUDY POPULATION:** We utilize an integrated, team-based approach to diabetes treatment. In a traditional care model, too little focus is on social determinants and their impacts on health and well-being. Our project involves enrollment of patients with diabetes in an intervention whereby their medical care is integrated with intensive diabetes education and provision of social and other health services, including diet and nutrition, exercise, provision of foods and nutritional supplements, and other support services as needed to achieve optimal health and to reduce morbidity and unnecessary hospitalization and emergency room visits. Subjects are underserved patients treated through our non-profit community clinic partners. We track metrics including individual outcomes, organizational outcomes, and collective impact. **RESULTS/ANTICIPATED RESULTS:** We anticipate that patients enrolled in this study will demonstrate significant improvements in diabetes control and management. Clinical improvements will include better glycemic control, improved hypertension and dyslipidemia management, reduced complications, and increased preventive measures including foot, eye and oral health exams and monitoring of microalbuminuria. Overall, we anticipate decreased frequency of hospitalizations and readmissions as well as decreased frequency of emergency care visits for treatment of diabetes-related issues. We expect patients to experience enhanced self-efficacy, increased physical activity, and improved quality of life. Their outcomes will be compared to controls receiving the standard medical regimen, matched on age, race, gender, and time of onset. **DISCUSSION/SIGNIFICANCE:** These activities will improve understanding of factors influencing diabetes

outcomes at individual and upstream levels. It will inform food distribution and models of care for improved patient outcomes, including social determinants of health and will establish new protocols for community-based provision of health care to our most vulnerable.

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Diversity Among Research Coordinators in a Pediatric Emergency Medicine Collaborative Research Network

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OBJECTIVES/GOALS: Our primary objective was to determine the demographic and linguistic characteristics of research coordinators (RCs) in a large pediatric emergency medicine research collaborative network. Our secondary objective was to determine if the RCs perceived any impact of those characteristics on their duties. **METHODS/STUDY POPULATION:** We conducted a 15-question electronic survey of RCs at the member institutions of the Pediatric Emergency Care Applied Research Network (PECARN). A total of 74 potential respondents were identified and received the survey. **RESULTS/ANTICIPATED RESULTS:** Fifty-three surveys (71.6%) were completed. Most respondents identified as female; white; and not Hispanic or Latino. Fourteen respondents (26.4%) identified as underrepresented minorities in medicine (UIM), which is similar to the percentage of UIM among the general population (30%). Twenty-eight respondents (52%) felt that their race/ethnicity positively impacted recruitment efforts. Twenty-three respondents (43%) felt that their ability to speak a language other than English positively impacted recruitment efforts. Four female respondents felt that their gender hindered their recruitment activities and impacted their sense of belonging within the research team. **DISCUSSION/SIGNIFICANCE:** RCs felt that their backgrounds and attributes positively impacted subject recruitment. However, some female coordinators felt negatively impacted by their gender. Increasing diversity amongst clinical research professionals and incorporating team cultural humility practices, may help increase diversity among clinical research subjects.

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Benefits and Challenges of Human-Centered Design: Perspectives from Research Teams

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OBJECTIVES/GOALS: The use of Human Centered Design (HCD) to improve the quality of team science is a recent application, and HCDs benefits and challenges have not been rigorously evaluated. We conducted a qualitative study with health sciences researchers trained in HCD methods to determine how they applied HCD methods and perceived its benefits and challenges. **METHODS/STUDY POPULATION:** The University of Pittsburgh offered HCD training to three cohorts of research scientists (staff as well as faculty) over a three-year period. The training was provided by the LUMA Institute, a premier HCD design firm with a highly regarded training program. We then evaluated this training by conducting 1-hour, semi-structured interviews with trainees from three training cohorts. Interviews focused on perceptions of the training, subsequent uses

of HCD, barriers and facilitators, and perceptions of the utility of HCD to science teams. Data analysis was conducted using Braun and Clarke's process for thematic analysis. **RESULTS/ANTICIPATED RESULTS:** We interviewed 18 researchers (nine faculty and nine staff) trained in HCD methods and identified distinct themes regarding HCD use and its perceived benefits and challenges. Trainees found HCD relevant to research teams for stakeholder engagement, research design, project planning, meeting facilitation, and team management. They also described benefits of HCD in five distinct areas: creativity, egalitarianism, structure, efficiency, and visibility. We also identified challenges, including tensions between HCD approaches and academic culture. **DISCUSSION/SIGNIFICANCE:** Our data suggest that HCD has the potential to help researchers work more inclusively and collaboratively on interdisciplinary teams and generate more innovative and impactful science. The application of HCD methods is not without challenges; however, we believe these challenges can be overcome with institutional investment.

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Effects of GLP-1 on Glucose and Islet-Cell Secretory Responses to Protein Ingestion After Gastric Bypass or Sleeve Gastrectomy

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OBJECTIVES/GOALS: In this study we sought to determine the role of glucagon-like peptide-1 (GLP-1), one of the main gut hormones in regulating glucose metabolism, after protein ingestion in patients with a history of Roux-en-Y gastric bypass (GB) and sleeve gastrectomy (SG). **METHODS/STUDY POPULATION:** We examined the glucose and islet-cell secretory responses to 50 g protein ingestion with and without a potent GLP-1 receptor antagonist, exendin-(9-39) [Ex-9], in 10 GB-treated subjects, 9 SG-treated, and 7 non-operated controls (CN). The groups were matched for age, BMI, fat-free mass, fasting glucose and insulin, and HbA1c. The surgical groups also were matched for weight loss and time post-surgery. No subjects had diabetes. **RESULTS/ANTICIPATED RESULTS:** Protein ingestion resulted in an early rise in glycemia (AUC_{Glucose1hr}) in GB and SG, whereas CN had minimal change in glucose ($p < 0.05$). Protein ingestion enhanced C-peptide responses in all groups, but to a larger extent in GB and SG when compared to CN ($p < 0.05$). Early glucagon response to protein ingestion (AUC_{Glucagon1hr}) tended to be larger in GB and SG subjects when compared to CN ($p = 0.07$). Ex-9 increased premeal and prandial glycemia in all groups ($p < 0.05$), but increase in early glycemia (AUC_{Glucose1hr}) was most notable in GB ($p = 0.1$, interaction). This glycemic effect of Ex-9 was associated with a ~25% reduction in prandial C-peptide secretion in GB and SG and ~8% increase in CN ($p < 0.05$, interaction). Early prandial glucagon responses were larger during studies with Ex-9 compared to those without ($p < 0.05$). **DISCUSSION/SIGNIFICANCE:** Our findings indicate that glucose metabolism after protein ingestion is altered after GB and SG. To our knowledge, this is the first report to demonstrate that endogenous GLP-1 contributes to glucose and islet-cell secretory response to protein ingestion, and that GB and SG exaggerate GLP-1 contribution to insulin secretion after protein ingestion.