

**ANTICIPATED RESULTS:** The culmination of 20+ years of CRP has led to the current state of CRP at CCHMC. CRP operates an internal website to collate all activities and resources, including educational opportunities and helpful links related to CCHMC research processes. CRP currently has leadership, membership, education, and regulatory committees providing opportunities for all clinical research professionals to join, collaborate, and grow within CCHMC and beyond. Established career pathways and centralized CRP advancement guidelines support career development. The centralized REDCap onboarding tool is accessible at any time for initial onboarding and then continuing education. **DISCUSSION/SIGNIFICANCE:** The formation and evolution of CRP, developed by work of past CRPs, has fostered an innovative community to meet clinical research needs through education, career development, and process standardization. We aim to continue to disseminate knowledge and lessons learned beyond our institutional walls.

### **Building the Future of Dissemination and Implementation (D&I) Science at Frontiers CTSI: Capacity Building, Infrastructure, and Emerging Research Areas**

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**OBJECTIVES/GOALS:** A diverse workforce is an aspiration of CTSIs and embedded in goals to build D&I workforce capacity. However, little research describes the diversity of the current workforce. We assessed current assets, opportunities, and diversity of D&I efforts at Frontiers and characterized investigators and those supported by services offered. **METHODS/STUDY POPULATION:** In January 2021, Frontiers convened a working group to identify existing D&I assets and needs in the CTSI multi-state catchment area. The committee catalogued existing training and consultation resources and services, which the CTSI supported with infrastructure to support, track, and evaluate ongoing efforts. We obtained data from the evaluation platform and conducted descriptive analyses of the investigators and service uptake among two programs offered, contrasting the workforce with national data obtained from the American Academy of Medical Colleges (2022) and the National Institutes of Health (2018). **RESULTS/ANTICIPATED RESULTS:** Ninety individuals at 9 institutions across Kansas and Missouri identified as implementation researchers. Since 2022, 28 D&I consultations were provided, 92% for grant applications. Five early-stage investigators were identified for career development in an NIH-supported Health Equity and Implementation Center (ESI). The network mirrors the larger workforce regarding underrepresented racial/ethnic minorities (18%) and new investigators (60%). More women (76%) are represented in the D&I network and among ESIs (80%) than the academic workforce (44%), but significantly fewer women used consultation services ( $p < 0.001$ ). Lower proportions of underrepresented minority investigators ( $p < 0.001$ ) and investigators from disadvantaged statuses ( $p = 0.027$ ) accessed consultations services. **DISCUSSION/SIGNIFICANCE:** Investigators underrepresented in science on multiple dimensions were less likely to use consulting services, Outreach for consultation services may be necessary, if needs are not being met in other programs. Further exploration of overall D&I workforce trends is needed to ensure goals for the field and the CTSA network are achieved.

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### **Impact of the COVID-19 Pandemic on CTSA Training and Career Development**

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**OBJECTIVES/GOALS:** Immediate negative impact of the COVID pandemic on CTSA T trainees and K scholars was reported in 2020 to be lack of access to research facilities, clinics, human subjects, and team members, and a need for homeschooling. In this study we examined in more detail the perceived impact of the COVID pandemic on training and career development three years later. **METHODS/STUDY POPULATION:** CTSA T trainees and K scholars were surveyed in May-June 2023 to assess the impact of the COVID-19 pandemic on training and career development. Data were included from 309 T trainees and K scholars appointed in 2018-2023 at 50 institutions, with good representation from states that were heavily impacted by COVID. Respondents included 76 past and 64 current T trainees, and 56 past and 113 current K scholars. There were no significant differences in race, ethnicity, or gender between T and K respondents. Significantly more K scholars reported both being married or in a committed relationship, and having children. Survey items included the same questions asked in the 2020 survey, plus additional new questions. Results compare impact for T trainees and K scholars. **RESULTS/ANTICIPATED RESULTS:** K scholars were more negatively impacted for access to clinic/human subjects, home environment, child care, access to staff, increased clinical responsibilities, and other hospital service. T trainees and K scholars reported higher positive impact than in 2020, for having more time to think/write and develop new research ideas. About 2/3 of respondents reported returning to research full-time by April 2021, and the remaining by August 2021. Lasting changes in career progression or research direction were reported as both positive and negative (48%), negative (25%), or positive (10%). Most (2/3) respondents in faculty positions reported that a time extension was available for promotion and/or tenure. Additional in-depth analysis will be presented, based on qualitative analysis of open-ended questions. **DISCUSSION/SIGNIFICANCE:** Despite research shutdowns in response to the COVID-19 pandemic that lasted for about a year, CTSA T trainees and K scholars were remarkably resilient. They were able to continue some research activities and professional development activities, and developed strategies to maintain productivity and minimize impact on their training duration.

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### **Leveraging Implementation Science Competencies to Establish a D&I Science Core**

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**OBJECTIVES/GOALS:** Clinical and Translational Science Award (CTSA) hubs are launching D&I Science cores to provide resources

and services to promote the translation of clinical evidence into practice. We developed a D&I Science Core strategic plan reflecting our research community's needs by assessing Implementation Science (IS) competencies. **METHODS/STUDY POPULATION:** The Tufts CTSI D&I Science Core was launched in early 2023. To design services that meet research community needs, we conducted a survey and key informant interviews based on Padek et al.'s list of Implementation Science (IS) competencies. The competencies are organized into four domains (Definition, Background, and Rationale; Theory and Approaches; Design & Analysis; and Practice-Based Considerations) and categorized by expertise level (beginner, intermediate, advanced). Participants who had attended or expressed interest in a D&I interest group were asked via an email survey to rate their level of confidence in completing selected IS-related research activities, about their experience with IS research or practice, and the types of resources, services and training they desired. **RESULTS/ANTICIPATED RESULTS:** Twenty researchers (20/65, 31%) submitted survey responses and six researchers participated in in-depth interviews. Survey respondents felt most confident in engaging stakeholders in IS research and least confident selecting a model or framework for a study. Results suggest that researcher capacity building is needed to: • Understand IS models and frameworks and their approaches, strengths, and limitations • Select and use models and frameworks in studies • Assemble IS teams and prepare grant proposals Suggestions for resources, services, and training, include: • Customized education to address diverse needs, knowledge levels, and learning styles • Promotion of D&I Core consultations and grant support services • Sharing of successful proposals to help researchers learn how to apply IS methods **DISCUSSION/SIGNIFICANCE:** A strategic workplan for the D&I Science Core was developed and implemented to address the findings. Initial emphasis is on developing easily accessible resources and timely consultations for investigators new to IS needing to apply these methods in current grant proposals, while also providing training resources for deeper skill building.

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### **Bridging Gaps in Global Health Engineering Education**

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**OBJECTIVES/GOALS:** This project aims to improve the design of medical technology for global health by addressing gaps in engineering education. Our primary goal is to develop open educational resource 'curriculum boosters' that can be added to existing BME curricula to build skills in transdisciplinary collaboration, practical ethics, and failure resilience. **METHODS/STUDY POPULATION:** A phasic mixed-method research strategy has been employed. The Needs Analysis includes a systematic review and meta-analysis of existing knowledge regarding the three conceptual pillars of Transdisciplinary Collaboration, Practical Ethics, and Integrated Resilience. The Behavioral Study includes surveys, interviews, observations, and biometric data collection from working engineers, engineering students, global health stakeholders, and clinicians. The Validation Study will be conducted via small group workshops, a semester-long engineering design course, and a summer study-abroad course. Data collected will be analyzed and

used to refine the proposed educational strategies. **RESULTS/ANTICIPATED RESULTS:** The final educational strategies will be structured into 'curriculum boosters' and published as open educational resource materials. The boosters and their supporting data will be made available to other engineering education programs with the goal of promoting widespread adoption and integration of these methods. **DISCUSSION/SIGNIFICANCE:** The long-term outcome of this ongoing work is to train a new generation of engineers prepared to participate adeptly in the co-design of technological solutions for complex global healthcare challenges by working 'with, not for,' clinicians, communities, and other stakeholders in peripheral healthcare settings.

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### **Art as a Multiplier of Science Communication**

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**OBJECTIVES/GOALS:** Scientists are increasingly confronted with 'science critical' #\_msocom\_1 belief systems. The politicization of science fuels hesitancy towards evidence-based therapies. To overcome these barriers, we aim to devise strategies to communicate clinical translational science (CTS) through art. **METHODS/STUDY POPULATION:** A two-year pilot artist-in-residency (AIR) program embedded in the Translational Research Immersion Program (TRIP). Since 2009, TRIP contributes to CTS Workforce Development (WD) through a 10-week mentored, curriculum-rich summer undergraduate research experience. Students are recruited from 5 regional institutions, 6 HBCUs, and the University of Puerto Rico. AIR is composed of 3 phases: the "Immersive Phase" where the artist gains intensive exposure to the scientific process through the lived experience of TRIP students, the "Productive Phase" where the artist conceptualizes the process of CTS into works of art, and the "Engagement Phase" where the CTS workforce, artists, and community members coalesce around science-to-art materializations. **RESULTS/ANTICIPATED RESULTS:** In 2022 & 2023 the AIR participated in ~35hrs of CTS research seminars, panel discussions, and professional skills workshops. Additional TRIP student-AIR interaction occurred in focus groups including visits to mentor's labs. An AIR-led workshop culminated in an Empowering CTS Communication event where TRIP students engaged with community members through elevator pitches of their CTS summer project on a speed-rotating basis. A month-long art-CTS exhibition planned for 3/2024 will feature contributions from AIR, TRIP students, and ITMAT community members. Qualitative insights were that TRIP is an effective art-science incubator, students strengthened their CTS communication skills, art functions as an icebreaker between science and communities with an ocean of opportunities for science education. **DISCUSSION/SIGNIFICANCE:** AIR embedded into existing CTS WD programs is proposed as creative approach to strengthen the reputation of science in the public. CTS-informed art functions as connective tissue between public and CTS workforce. The hands-on experience to adopt art as a science communication tool is a powerful soft skill for the next generation of CTS investigators.