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E-learning for best practices in social and behavioral research: A multisite pilot evaluation

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OBJECTIVES/SPECIFIC AIMS: To evaluate the NIH-sponsored Best Practices for Social and Behavioral Research e-learning course. **METHODS/STUDY POPULATION:** Four universities partnered in a pilot study to evaluate this new course. Outcomes from 294 participants completing the course included efficient progress through the training, perceived relevance of the course to current work, level of engagement with the course material, intent to work differently as a result of the course, and downloading digital resources. **RESULTS/ANTICIPATED RESULTS:** Participants rated the course as relevant and engaging (6.4 and 5.8 on a 7-point Likert scale) and 96% of respondents said they would recommend the course to colleagues. Qualitative analysis of participant testimonials suggested that most respondents had a readiness to change in the way they worked as a result of the course. Overall, results suggest participants completed the course efficiently, perceived outcomes positively and worked differently after the training. **DISCUSSION/SIGNIFICANCE OF IMPACT:** These results will inform new guidelines for future participants (e.g., average time to complete, expectations for knowledge checks in the training). Future studies should include larger samples and closer coordination and communication between study sites.

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Evaluating the impact of a K-award on clinical and translational research

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OBJECTIVES/SPECIFIC AIMS: Identify the impact of the provision of clinical and translational research training awards on investigators' pursuit of clinical and translational research careers. **METHODS/STUDY POPULATION:** Propensity score matching and qualitative analysis/investigators receiving MICHR's KL2 research training awards. **RESULTS/ANTICIPATED RESULTS:** While the evaluations of the impact of this service have shown participants find them to be valuable it is expected that participation in the workshop may be more beneficial to investigators with certain types of prior research experiences and who utilize more CTSA research support. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Because this evaluation of a research service incorporate data representing investigator's receipt of different CTSA resources, the findings can be used to inform the ongoing coordination of these services in ways that optimize their impact on the production of clinical and translational research. There is an enduring need for evaluations of CTSA programs to account for investigators' use of different constellations of research services in order to identify what combinations of services over time are most effective at fostering successful clinical and translational research careers.

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Evaluation of a clinical investigation curriculum: Post-graduate outcomes

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OBJECTIVES/SPECIFIC AIMS: Many CTSA programs have implemented curricula leading to clinical investigation master's degrees. Evaluation of long-term outcomes for graduates can support curriculum improvement. **METHODS/STUDY POPULATION:** We evaluated graduates 1–3 years post completion of an MS in Clinical Investigation at the University of Utah. We administered the 12-item Clinical Research Appraisal Inventory (CRAI-12) describing confidence in ability to perform research tasks; we derived 6 CRAI sub-scales. Additional questionnaire items assessed current engagement in research, including percent of effort devoted to research and level of involvement in research projects using specific research methods. **RESULTS/ANTICIPATED RESULTS:** Graduates reported high

confidence for the CRAI domain of reporting, interpreting, and presenting (on a scale of 0–20, mean $17.9 \pm SD 1.9$) and the domain of conceptualizing and collaborating (16.5 ± 2.2) on research projects; confidence was somewhat lower in the domains of planning (14.6 ± 3.3) and funding (14.9 ± 2.8) projects. Graduates' estimated current professional effort devoted to research had a median of 32%, interquartile range (IQR) 20%–70%; among graduates with clinical responsibilities, median effort devoted to research was 23%, IQR 15%–45%. In total, 74% of graduates reported moderate or high involvement in research using existing large databases, 46% reported moderate or high involvement in comparative effectiveness research, and 54% reported moderate or high involvement in quality improvement. **DISCUSSION/SIGNIFICANCE OF IMPACT:** A majority of clinical investigation graduates remain engaged in research but most are able to devote less than one-third of professional effort to research. Evaluation of clinical investigation graduates who have moved into their research careers can inform program directors about domains of research expertise and methodological areas that may merit additional emphasis in the curriculum.

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Evaluation of the current status of urologic training programs in the delivery of transgender care

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OBJECTIVES/SPECIFIC AIMS: Transgender individuals remain an underserved population with a unique set of healthcare needs. Given the recent increase in demand for gender affirmation surgery, there is a need to train urologists in the various aspects of surgical management of transgender patients. It is unclear how many urologic residency programs are participating in transgender care. In this study, we sought to determine the current status of urologic training programs in the delivery of transgender care and the sentiments regarding the current and future need to train urologists. **METHODS/STUDY POPULATION:** Between June and August 2017, a 22 item cross-sectional survey was emailed to all 138 program directors (PDs) as listed by the ACGME. Participation was voluntary and responses were anonymous. Statistical analysis was performed using SAS version 9.4. **RESULTS/ANTICIPATED RESULTS:** In total, 48 PDs completed the survey (36% of US PDs) and 1 declined to participate. All AUA regions had at least 25% representation, except the Western region (13%). In total, 42% of urology programs that responded participate in institutional transgender health programs; 76% of PDs believe there is a current or future need to train urology residents in the surgical care of transgender patients. PDs were significantly more likely to endorse a need for transgender training if their institution has a transgender health program (95% vs. 58%, $p < 0.005$). Similarly, expressed interest in transgender care by trainees was associated with increased belief among PDs in the need for transgender training (95% vs. 58%, $p < 0.005$). There was also an association between the presence of a transgender health program and trainee interest in transgender care (64% vs. 33%, $p = 0.04$). Need for resident training in the following procedures was cited most often by PDs: complicated catheter placement (91%), orchiectomy (89%), urethral fistula repair (82%), penile/testicle prosthesis insertion (77%), phalloplasty (69%), vaginoplasty (66%), and metoidioplasty/urethral lengthening (54%). Despite the overall consensus that residents should be trained in transgender care, 83% of PDs responded that urologic transgender surgery should be trained in fellowship rather. **DISCUSSION/SIGNIFICANCE OF IMPACT:** There is an increased demand for surgeons competent in providing gender affirmation surgery. The majority of urology residency PDs believe in the need to train residents in the surgical care of transgender patients. A formalized curriculum for the urologic management of transgender patients should be instituted across residency programs to ensure adequate exposure and competency.

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Expanding our educational reach: Development of a massive open online course (MOOC)

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OBJECTIVES/SPECIFIC AIMS: Translational Science 101 aims to: (1) Orient the public to the field of clinical and translational science; (2) Provide a brief overview of each phase of translation (T0–T4); (3) Provide real-world examples of clinical and translational researchers and research projects that have directly impacted patients; (4) Provide learners with information on how they can become involved in clinical and translational science through many different avenues (study volunteer, student, faculty member, or study coordinator). **METHODS/STUDY POPULATION:** The primary audience for Translational

Science 101 is the general public and media outlets who are interested in learning more about clinical and translational science and how this research is improving population health. The University of Rochester Clinical and Translational Science Institute created the course in order to inform the public about the field of clinical and translational science, orient the public to the types of research that fall under the translational science umbrella, and demonstrate how translational research impacts populations. The Coursera Massive Open Online Course (MOOC) platform was selected to host the course in order to promote the greatest level of exposure and also to expand the educational reach of the UR-CTSI to new external audiences. The course was constructed from scratch utilizing the Community of Inquiry (Col) framework, an approach that is often utilized to guide the design and construction of asynchronous online coursework. Col highlights the elements of social presence, cognitive presence and teaching presence as key factors impacting the educational experience learners have when enrolled in an online course. Discussion boards, embedded quizzes, and end of module quizzes were integrated in to the course design to promote learner engagement, collaborative learning, and interactions among learners. The “storytelling” instructional strategy is the backbone of the Introduction to Clinical Science modules, with various researchers from the University of Rochester Medical Center explaining their lines of research and how the research impacts patients and communities. Educational research has shown that there are many benefits to including storytelling in instruction (Green, 2004; Geanellos, 1996), including: (1) Stories create interest: The narrative structure increases learner interest and engagement as they are drawn in to a good story. (2) Stories create a more personal link between the learner and the content: Storytelling allows exploration of shared lived experiences without the demands of practice and allows students to make connections between the shared experiences and their own previous experiences and knowledge. (3) Stories provide a structure for remembering course materials: The inclusion of stories facilitates remembering because it is easier to remember a story rather than a list of disparate facts, and stories evoke vivid mental images which are an excellent cue for recall. (4) Stories are a familiar and accessible form of sharing information: Storytelling aids in overall learner understanding as it is a nonthreatening way of sharing information. Storytelling can also enhance course discussions as students feel more at ease discussing a story than discussing abstract or new concepts that they are still in the process of mastering. RESULTS/ANTICIPATED RESULTS: Introduction to Translational Science was launched on October 16, 2017, and is automatically scheduled to begin a new session every 3 weeks. To date the course has reported the following analytics: (1) 2308 learners have visited the course page, (a)476 learners have enrolled in the course; (b) 244 learners are currently active in the course; (c) 11 learners have completed all of the requirements of the course. (2)Learners by Continent, (a) North America 31%; (b) Asia 30%; (c) Europe 23%; (d) Africa 9%; (e) South America 5%; (f) Oceania 2%. (2) Learners by Country: Learners have come from 84 different countries from around the world. The 15 highest enrollment numbers are: (a) USA 25%, (b) India 11%, (c) Egypt 3.7%, (d) United Kingdom 3.4%, (e) Mexico 3.2%, (f) Brazil 2.8%, (g) China 2.8%, (h) Saudi Arabia 2.2%, (i) Spain 2.2%, (j) Germany 1.7%, (k) Russian Federation 1.7%, (l) Malaysia 1.5%, (m) Turkey 1.5%, (n) Italy 1.5%, and (o) Canada 1.5%. (3) Gender: 48% women and 50% men. (4) Age: (a) 13–17: 0.72%, (b) 18–24: 19.6%, (c) 25–34: 44%, (d) 35–44: 14.4%, (e) 45–54: 8.6%, (f) 55–64: 7.2%, (g) 65 + : 3.6%. (5) Highest Education Level o Doctorate Degree: 17%; (a) Professional School Degree: 14%; (b) Master’s Degree: 31%; (c) Bachelor’s Degree: 27%; (d) Associate’s Degree: 2.3%; (e) Some College But No Degree: 4.5%; (f) High School Diploma: 3.8%; (g) Some High School: 0.75%. DISCUSSION/SIGNIFICANCE OF IMPACT: The Massive Open Online Course (MOOC) platform offers new, exciting opportunities for CTSA institutions to create courses and trainings that are accessible by learners all over the world. This greatly expands the educational reach that the CTSA education programs can have, moving beyond hub-focused or consortium-focused education to a much broader audience. The expansion of educational reach can promote increased visibility of the CTSA program, encourage collaborations amongst researchers at different institutions, and also inform the public about clinical and translational science, potentially fostering advancement opportunities.

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First year medical student characteristics associated with readiness to talk about race

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OBJECTIVES/SPECIFIC AIMS: Calls to break the silence around the effects of racism on health are growing. Few researchers have examined the relationship between medical student characteristics and students’ comfort, motivation, and skill to discuss racism. This paper examines medical student characteristics associated with readiness to talk about racism among first-year medical students

at the University of Minnesota. METHODS/STUDY POPULATION: In February 2017 prior to a lecture on racism and health, we invited first year medical students to participate in a web-based survey about their experiences and comfort discussing racism. We calculated descriptive statistics and measured differences by student race (White vs. Asian vs. Black/multiracial/other) and undergraduate major type (STEM vs. non-STEM) using χ^2 tests for variables with categorical responses and generalized linear regression models with pairwise comparisons (i.e., 2-sample t-tests) for variables with continuous responses. RESULTS/ANTICIPATED RESULTS: (n = 107/163). The majority of students were male (53%); White (75%); and majored in STEM majors in college (85%). College major was not associated with race. Students’ responses to multiple items suggest that the vast majority perceived racial inequality as a major problem in the United States. Race was significantly associated with only 1 of these items. Specifically, 100% (16/16) of Black/multiracial/other students [under-represented minority (URM) students] reported “too little attention” is paid to race and racial issues, while only 53% of White students (42/79) and 55% of Asian students (6/11) chose this response. Students with non-STEM majors and students who identified as URM students reported talking about racism with friends more often than STEM majors and white students, respectively. In conversations about race at school, two-thirds of students were concerned that they might unintentionally offend others or be misunderstood. However, non-STEM majors and URM students were significantly less worried that they would unintentionally offend others in conversations about race at school than STEM majors and white students. Larger percentages of URM students (50%) than White students (25%) were afraid that others would not respect their views because of their race. White students were more afraid that they might that they would be called racist than URM students. DISCUSSION/SIGNIFICANCE OF IMPACT: Many students find it challenging to discuss race and racism in medical education settings. URM students and non-STEM majors reported greater frequency talking about racism with friends and appear to be less anxious in conversations about racism than White students and STEM majors respectively. Given non-STEM majors’ greater psychological safety discussing racism, future research should explore whether non-STEM majors are better prepared and more motivated to address racial disparities in health and health care than STEM majors. Such research could have important implications for medical school admissions.

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Fostering cross-disciplinary research: Lessons learned from STTEP-UP

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OBJECTIVES/SPECIFIC AIMS: N/A. METHODS/STUDY POPULATION: N/A. RESULTS/ANTICIPATED RESULTS: N/A. DISCUSSION/SIGNIFICANCE OF IMPACT: There is an increasing need to foster cross-disciplinary research to address complex problems within healthcare. The Sinai Team-based Translational Education Program: the URM Propeller (STTEP-UP) is a NCATS funded program through the Icahn School of Medicine at Mount Sinai. Its goal is to facilitate URM post-doctoral trainees becoming innovative leaders in clinical and translational research. The program includes a team-based research component, where fellows collaborate on a project. This year, disciplines represented by the four fellows include Cardiology, Psychiatry, Neurology, and Pediatrics. Identifying a clinical question and designing an investigation was facilitated by group brainstorming meetings with program mentors. Fellows designed a project to identify medical testing and prescribing that were not clinically indicated throughout the healthcare system, with the goal of exploring whether an intervention, including provider education, could reduce ordering practices. In addition to regular in-person meetings, a licensed virtual learning environment and free web-based sharing platform were used to foster collaboration. Challenges faced throughout this process, included fellows struggling to find protected time, difficulties accessing broad sets of data across the healthcare system, and overcoming administrative barriers between departments. Strengths of this approach, included fellows learning new research strategies and feeling a deeper sense of commonality with their peers. Overall, this experience supports the idea that cross-disciplinary research improves the collaboration and education of emerging researchers. However, addressing logistical and systems-based barriers may better facilitate this education and research.

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Frequently overlooked challenges of pragmatic trials

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