OBJECTIVES/GOALS: The Competency-Based All-Level Training (COBALT) curriculum standardizes learning for clinical research coordinators (CRCs) across multiple institutions within Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI), with flexible, topic-specific training at all experience levels, in both academic and industry-sponsored research. METHODS/STUDY POPULATION: The COBALT curriculum was developed in collaboration with subject matter experts, managers of CRCs, and other clinical research professionals from institutions across the WWAMI region. A thorough assessment of existing training programs within the region helped identify gaps and unmet needs. The curriculum was designed within a user-friendly learning management system that can be accessed across institutions. It has been piloted with diverse groups and committees of CRCs, professionals, and institutional leaders in clinical and translational science. Ongoing evaluation is being conducted qualitatively using built-in assessment surveys, demonstrations, and interviews. RESULTS/ANTICIPATED RESULTS: The anticipated outcome is the creation of a highly standardized and efficient training program for clinical research professionals across multiple institutions in the WWAMI region. This program will be carefully tailored to each professional's level of experience, ensuring personalized skill development. By aligning training with diverse expertise levels, the initiative aims to significantly elevate the quality, consistency, and overall performance of clinical research efforts across the regional research community. DISCUSSION/SIGNIFICANCE OF IMPACT: The COBALT curriculum provides a vetted learning curriculum for CRCs, with a tailorable training plan that helps them collaborate with their supervisors to tailor training to their career goals. This ensures that the curriculum is not only comprehensive but also adaptable to individual needs.

An algebra assessment and primer for future clinical and translational scientists entering training

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OBJECTIVES/GOALS: Trainees in clinical and translational science (CTS) take courses in biostatistics, epidemiology, and other quantitative areas. To be most successful, trainees require competency in algebra. We developed a quantitative assessment and study guide to assess trainee's quantitative skills and provide review material to address weaknesses. METHODS/STUDY POPULATION: The Tufts CTS Graduate Program is the training core of the Tufts CTSI and its associated pre- and post-doctoral T32 awards. Approximately 10 trainees with a range of backgrounds (e.g., physicians, medical students, master's-level researchers, and basic science PhDs) and varying math education experiences matriculate each year. We wanted to address the resulting range of quantitative skills to help students succeed in our program. In Spring 2023, we met with faculty teaching quantitative courses to identify core algebra concepts needed to succeed in their classes. A graduate student in computational mathematics with extensive tutoring experience then

drafted assessment questions, a comprehensive study guide, and brief cheat sheet. The material was reviewed and revised with input from quantitative faculty. RESULTS/ANTICIPATED RESULTS: We developed a 20-item quantitative assessment covering properties of operators; identity elements and inverses; simplification of arithmetic and algebraic expressions; solving algebraic equations; functions; equations of a line; and exponents/logarithms. A cheat sheet provided trainees with a brief refresher for these topics. A study guide provided more detailed instruction, example exercises and solutions, and referenced publicly available, online resources (e.g., Khan Academy). During the introductory summer course for the Tufts CTS Program, trainees were allowed to use the cheat sheet and were given 1 hour to complete the assessment. Trainees who got questions incorrect were directed to relevant sections in the study guide. We anticipate collecting formal feedback to evaluate the material. DISCUSSION/SIGNIFICANCE OF IMPACT: Trainees must have adequate foundational algebra skills to succeed in CTS graduate programs and as future researchers. Developing a quantitative assessment allowed us to identify areas of weakness resulting from educational disparities or reflecting other aspects of their backgrounds and to provide material to reinforce their preparation.

Development of science communication rubrics for trainees in clinical and translational science

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OBJECTIVES/GOALS: Trainees in clinical and translational science (CTS) must learn to effectively communicate their research ideas and findings to a range of audiences. As part of our science communication curriculum, we developed ORAL and WRITTEN science communication rubrics for our trainees to use across their courses and research activities. METHODS/STUDY POPULATION: The Tufts CTS Graduate Program is the training core of the Tufts CTSI and its associated pre- and post-doctoral T32 awards. Approximately 10 trainees with a range of backgrounds (e.g., physicians, medical students, master's-level researchers, and basic science PhDs) matriculate each year. Faculty members and staff with expertise in science communication and pedagogy formed a committee to develop the rubrics. Because oral and written communication require different skills, we developed separate rubrics for each. We reviewed our current science communication curriculum, reviewed existing communication rubrics, and identified common mistakes students make. Following pilot testing by students and faculty pilot for one semester, we modified the rubrics based on informal feedback. RESULTS/ANTICIPATED RESULTS: Both rubrics include a section to identify the target audience and specific items organized by theme. Oral rubric themes include presentation content, slides, verbal communication, nonverbal communication, and following instructions. Written rubric themes include overall, manuscript/proposal sections, and following instructions. The rubrics serve as feedback tools for faculty and students to evaluate work others produce and as self-evaluation tools. Feedback elements include a 4-point

rating for each rubric item, open text feedback for each theme, and an open text holistic assessment. We now use the rubrics in our study design course, which features student presentations of planned research, and in our writing course. We anticipate collecting formal student feedback to further evaluate the rubrics. DISCUSSION/SIGNIFICANCE OF IMPACT: Our rubrics can supplement existing science communication training and can be integrated into all CTS coursework and research activities. For future clinical and translational scientists to have the greatest impact, they must learn to effectively communicate findings to multiple audiences, ranging from experts in their field to the general public.

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Individual Retention Conversations (IRC): Unlocking clinical research professional engagement

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OBJECTIVES/GOALS: The clinical research professional (CRP) workforce suffers from high turnover. Stay interviews have led to increased satisfaction and reduced turnover in other industries. We describe a multi-institutional project to develop, disseminate, and evaluate a CRP-tailored Stay Interview tool reimagined as the Individual Retention Conversation (IRC) toolkit. METHODS/STUDY POPULATION: In August 2022, following on the heels of a series of un-meeting conversations focused on CRP workforce development, the CRP taskforce initiated a working group to tackle issues related to CRP workforce retention. As a first initiative, this multi-institutional working group set out to develop, disseminate, and evaluate a Stay Interview tool tailored for a CRP audience and reimagined as the IRC toolkit. A 2-phase pilot study was initiated across six academic medical centers (AMCs: ASU, Duke, MUSC, UAB, UPenn, VCU) to: 1) optimize the toolkit for the CRP audience and 2) evaluate the impact of the toolkit using a standardized CRP satisfaction survey. Quantitative and qualitative data were collected via surveys using the REDCap platform. RESULTS/ANTICIPATED RESULTS: The optimization phase of the pilot included 69 participants (16 managers and 53 of their CRP team members) from 6 AMCs. Respondents identified most and least useful questions for stimulating meaningful conversations regarding job satisfaction and retention issues with additional feedback on the IRC experience and tools. CRPs and managers represented a variety of roles, with 77% patient facing. The majority were satisfied with the IRC experience (82%) and found the experience personally beneficial (76%). Managers were satisfied with the manager's guide (90%). Quantitative and qualitative feedback was used to optimize the toolkit prior to launch of phase 2 in September 2024, which includes a longitudinal survey-based assessment of CRP job satisfaction and IRC-consequent work environment changes. DISCUSSION/SIGNIFICANCE OF IMPACT: CRP retention is impacted by complex factors, many related to job satisfaction, supervisor /employee relationships, and beneficial work environments. Initial evaluation of the IRC suggests that this intervention fosters positive supervisor/employee relationships and beneficial work environment changes, which may lead to improved retention.

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Attitudes toward bioethical issues in the applications of big data and artificial intelligence in clinical and translational research in underrepresented populations: A qualitative assessment

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OBJECTIVES/GOALS: We designed a forum to educate participants about bioethical issues in the application of big data (BD) and artificial intelligence (AI) in clinical and translational research (CTR) in underrepresented populations. We sought to determine changes in participants' interests in ethics, bias, and trustworthiness of AI and BD. METHODS/STUDY POPULATION: 141 individuals registered for the forum, which was advertised to our partner institutions, minority-serving institutions, and community organizations. Registrants received email instructions to complete an AI Trustworthiness (AI-Trust) survey, a questionnaire with integrated qualitative and quantitative measures designed to better understand learners who engaged with the institution-specific AI/Data Science curriculum. Respondents completed the survey using personal devices via a link and QR code, with anonymized responses and enhanced privacy features. 82 people attended; 22 responded to the survey pre-forum and 22 post-forum. Pre- and post-forum responses were qualitatively compared to assess shifts in attitudes toward AI and BD and related interests in ethics, bias, and trustworthiness. RESULTS/ANTICIPATED RESULTS: We found increased interests post- vs. pre-forum in the use of AI for CTR, AI bias and its effects on underrepresented populations, and ethical risk assessment and mitigation strategies for the use of BD to empower research participants. In contrast, trust in AI was lower post- vs. pre-forum. Moreover, respondents also indicated that the current application of AI in healthcare practice would result in increased racial, economic, and gender bias. In comparison, interest in ethical challenges, bioethical considerations, and trustworthiness regarding use of BD and AI in health research and practice did not differ pre- vs. post-forum. DISCUSSION/SIGNIFICANCE OF IMPACT: Interest in the application of BD/AI in CTR increased post-forum, but AI distrust and bias expectations also increased, suggesting that learners become more skeptical and discerning as they become more knowledgeable about the complexity of the ethics of AI and BD use in healthcare, especially its application to underrepresented populations.

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Modeling biomedical graduate student career development needs and training contexts

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OBJECTIVES/GOALS: To design and implement programming that better prepares graduate students for diverse roles in a variety of workforce environments, our study models the training landscape and programming needs of graduate students in behavioral, clinical, and biomedical graduate programs at a large Midwestern school of medicine and public health. METHODS/STUDY POPULATION: