are germane to the conduct of research and evaluated its effectiveness in resident research education. METHODS/STUDY POPULATION: Research 101 was utilized by residents at the Brookdale Hospital Medical Center in Brooklyn, NY. Resident knowledge, confidence, and satisfaction were assessed using pre- and post-module surveys with 5-point Likert scaled questions, open-ended text responses, and a final quiz. RESULTS/ANTICIPATED RESULTS: Pre-module survey results indicated that residents were most confident with the Aligning expectations, Introduction to research, and Study design and data analysis basics modules and least confident with the Submitting an Institutional Review Board (IRB) protocol at UC and Presenting your summer research modules. Post-module survey responses increased significantly compared to pre-module results for all modules and learning objectives (p<0.0001). "This module met my needs" was endorsed 91.4% of the time. A final quiz of 25 multiple choice questions resulted in a median score of 23. Content analysis of open-ended post-module survey responses identified multiple strengths and opportunities for improvement in course content and instructional methods. DISCUSSION/SIGNIFICANCE: These data demonstrate that residents can benefit from completion of Research 101, as post-module survey scores were significantly higher than pre-module survey scores for all modules and questions, and final quiz scores were high and highlighted opportunities for additional resident learning.

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LaparoscopiX: Expanding Minimally Invasive Surgery Training in Kenya

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OBJECTIVES/GOALS: Open surgery prevails in low- and middle-income countries (LMICs) due to scarcity of laparoscopic equipment and poor access to training. LaparosopiX is a box trainer system designed for teaching hospitals in LMICs; it includes an open-source laser print design and an app to allow surgical trainees to receive feedback from laparoscopic experts. METHODS/STUDY POPULATION: This study aims to assess the usability of Laparoscopix for surgical trainees and mentors at five large teaching hospitals in Kenya. Surgical trainees and mentors who participate in this study will be observed while setting up and using the app to identify natural pain-points. A post-session survey will be conducted to assess immediate perceptions of the platform including ease of navigation and intuitive design. Over three months, aggregate data regarding platform usage at these hospital sites will be collected and analyzed to assess user retention rates, usage and traffic patterns, and skill progression over time. Surveys will be sent out to assess attitudes towards the platform and to elucidate any aspects of the system we can improve. RESULTS/ANTICIPATED RESULTS: We hope to find overall positive impressions towards the LaparoscopiX system during this study. We expect there to be some pain-points that arise during navigation of the app, but we expect no large changes to the application architecture required. We anticipate an immediate increase and eventual plateau of users recruited. We hope to see that surgical trainees are advancing through the app while gaining practice and confidence. We will gather insightful data on which aspects of the app were helpful for trainees, and which can be improved. We also hope to learn what factors may play into trainee and mentor retention in the system. DISCUSSION/SIGNIFICANCE: Through this study, we hope to elucidate ways in which we can improve the LaparoscopiX platform,

identify which features to prioritize, and determine the direction of future app development. We believe and hope that LaparoscopiX can expand access to laparoscopic surgical mentorship to improve surgical outcomes and health equity worldwide.

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Developing a Conceptual Data Model for Nursing Workload

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OBJECTIVES/GOALS: Nurses are leaving the profession at an alarming rate due to increased workload and burnout.#_msocom_1 Computational models that are reliable and reproducible are needed to quantitatively examine nursing workload and estimate potential effect of interventions. This project developed a logical data model to represent nursing EHR interactions. METHODS/STUDY POPULATION: With nursing EHR interactions as a starting point, we expand upon literature that examined the EHR workload of physicians. We conducted an exploratory analysis of nursing EHR audit log data at a large academic medical center, and explored components of nursing workload that can be extracted from other health system data. Using concepts derived from the studying temporal biomedical data patterns, we formulated a data structure that describes nurse EHR interactions, nurse intrinsic and situational characteristics, and nurse outcomes of interest in a scalable and extensible manner. RESULTS/ANTICIPATED RESULTS: Temporal machine learning models are grounded in the concept of vectors. We developed a logical data model that describes tasks performed by nurses (NTask), nurse types (NType), and nursing outcomes (NOutcome). For each nurse (k), we define a function $<NTask (k, i)>$, i=1 to N as a vector of dimension N, where N is the number of time periods in the study. The i component corresponds to the activity that the nurse is doing. The model will allow the quantitative classification of activity patterns for any finite number of nurses for an arbitrary set of tasks and for time at any specified resolution. The expected outcome is a set of vectors that can then be utilized to quantitatively model nurse activity trajectories and other patterns of nurse EHR interactions. DISCUSSION/SIGNIFICANCE: By instantiating the logical data model, we will demonstrate how nurse EHR interactions can be studied using temporal unsupervised learning and state-of-the-art artificial intelligence methods. We plan to simulate the potential impact of workload interventions and predict risk for nurse burnout.

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Investing in Education: Design and evaluation of an innovative clinical research coordinator New Hire Education Program to strengthen clinical and translational research

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OBJECTIVES/GOALS: The overarching goal of the Mayo Clinic in Florida Clinical Research New Hire Training Programis to create a standardized work force development model that ensures all new research coordinators receive the same high-quality training and

can perform their role. METHODS/STUDY POPULATION: Mayo Clinic implemented a comprehensive six-week in-class training program to teach research coordinators how to conduct clinical research studies and trials. A multi-disciplinary team with expertise in education, operations, study coordination, and human resources assisted in development. The program approaches education through the lens of application. Staff start on designated hire dates and have an assigned trainer, allowing them to complete the program in cohorts and build connections with one another. During the program, they complete assignments, checkpoints, and shadow within their units. At the conclusion, they take a one-on-one assessment with a trainer to confirm they can work independently. If a learner cannot pass, the trainer and supervisor implement a learning plan targeting their needs. RESULTS/ANTICIPATED RESULTS: The program has had 110 graduates since its April 2022 inception, with a steady improvement in learner satisfaction scores. Based on the question "My site's new hire education program was good," with 5 being strongly agree and 1 being strongly disagree, learners rate the current iteration as 4.38. The program has a positive correlation with retention and favorable quality reviews. 23.8% of new coordinators hired from April of 2021 to March of 2022 left within the first year. From April 2022 to September 2023, the first-year turnover rate fell to 14.55%. Additionally, 43% of quality reviews completed for graduates required no follow-up, compared to 35% of staff hired before implementation of the program. Only 5% of reviews for graduates required urgent follow-up, compared to 15% of those completed for existing staff. DISCUSSION/SIGNIFICANCE: Research Coordinators who complete the training program report a higher confidence level and demonstrate they can perform their role. The effects of our program have been so pronounced that the curriculum is being translated within Clinical Research across all of Mayo Clinic and our Florida site is researching ways to market it outside of Mayo Clinic.

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Modernizing Onboarding for Clinical Research Professionals: An Interactive and Adoptable Approach

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OBJECTIVES/GOALS: The Clinical Research Professionals (CRP) at Cincinnati Children's Hospital Medical Center (CCHMC) identified and addressed gaps in a static on boarding material by transforming it into an interactive, centralized, and customizable REDCap checklist to better meet researcher needs across the institution. METHODS/STUDY POPULATION: The CRP On boarding Checklist is a tool designed to assist clinical researchers in their onboarding process at CCHMC. This tool helps CRPs determine the required/recommended trainings available to assist with skill-building and establishing job role competency. CRP supervisorsand subject matter experts were included incontent revisions, format, and transition to a RED Capsurvey. The new checklist is interactive, targets training requirements by job function, and clearly labels mandatory training. A companion document allows new CRPs to create and track their own individualized training plan. RESULTS/ANTICIPATED RESULTS: The revised CRP On boarding Checklist was launched in April 2022 and announced via email communication. Alive demonstration was presented to all CRPs during the May

2022 CRP Monthly Meeting. The checklist and companion document are linked to the internal CRP website, which is accessible institutionally. Sincelaunch, almost 100 new and internally transferring CRPs have utilized the online tool to guide their training needs. The checklist is intended to reflect real-time changes in educational offerings. In addition to feedback and change requests from the CRP community, the checklist is updated as necessary and routinely reviewed on a biannual basisby the CRP Education Committee. DISCUSSION/SIGNIFICANCE: The creation and maintenance of the CRP Onboarding Checklist is a modern and accessible way for CRPs and supervisors to explore role-applicable training and take active roles in the on boarding process. The RED Capformat allows easy sharing and adoptability to other institutions via data dictionary.

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Research in Action: Engaging Clinicians to Advance the Academic Learning Health System

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OBJECTIVES/GOALS: Research in Action is an on-demand, interactive curriculum designed to increase the ability of clinicians to advance the Academic Learning Health System (aLHS). The 7-module course provides clinicians with the knowledge and skills to lead rigorous quality improvement (QI) projects, translating research evidence into practice. METHODS/STUDY POPULATION: We engaged nurses, physicians, and advanced practice providers (APPs) working in the health system to participate in focus group and advise us in the creation of the curriculum. We conducted focus groups with these stakeholders on the proposed learning objectives, course content, and mode of delivery (in person, virtual, hybrid). Informed by the focus groups, the course was designed for hybrid format so participants could either (1) access the modules on-demand, or (2) learners could participate in a facilitator moderated course where the modules served as the curriculum to guide development of a QI project. The Iowa Model of Evidence-Based Practice was the framework for curriculum development. Upon completion of the modules, stakeholders reviewed each module and provided feedback for improvement. RESULTS/ANTICIPATED RESULTS: Research in Action is a 7-module course, with modules addressing the following topics: (1) Introduction to Quality Improvement, (2) Identify the Problem and Write a Purpose Statement, (3) Form a Team, (4) Appraise and Synthesize the Literature, (5) Design and Pilot the Project, (6) Integrate and Sustain Practice Change, (7) Disseminate the Results. The curriculum is being piloted with multiple clinician groups in the health system. In the next phase of development, a facilitator guide will be created to guide a cohort of clinicians to apply knowledge through discussion sessions and completion of a QI project in the healthcare setting. We anticipate scaling the program for spread to diverse clinician groups in the health system. Pre- and post-implementation data are being collected from current pilot sites. DISCUSSION/SIGNIFICANCE: The aLHS is an essential means for improving healthcare delivery. Research in Action, a hybrid training curriculum, engages frontline clinicians in creating and leading QI projects that implement research evidence into practice to solve problems commonly encountered in the healthcare setting; thus, supporting the advancement of the aLHS.