

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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### LaparoscopyX: 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. LaparoscopyX 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 LaparoscopyX 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 LaparoscopyX 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 LaparoscopyX platform,

identify which features to prioritize, and determine the direction of future app development. We believe and hope that LaparoscopyX 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. 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  $\langle NTask(k, i) \rangle$ ,  $i=1$  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 Program is to create a standardized work force development model that ensures all new research coordinators receive the same high-quality training and