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Equipping health professional students to apply pharmacogenomic data to clinical decision making in real-world scenarios: Comparison of an active engagement Versus didactic teaching approach

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OBJECTIVES/SPECIFIC AIMS: Compare effectiveness of a patient case-based, interactive teaching approach that included optional student genotyping with traditional didactic teaching strategies for increasing students' knowledge and ability to effectively use pharmacogenomic data in clinical decision making. METHODS/STUDY POPULATION: The UF College of Pharmacy offers a required Personalized Medicine (PM) course for pharmacy students as well as an elective course, Clinical Applications of Personalized Medicine (CAPM). Students dual enrolled in the PM and elective CAPM courses comprised the intervention (INT) group, with interactive patient case-based teaching and the option to undergo personal genotyping, whereas students enrolled in PM alone comprised the control (CTR) group, which primarily used a traditional didactic teaching format and did not include personal genotyping. Both groups completed a pre- and post-course patient case-based test (15 questions/1 point each) to evaluate their knowledge and abilities to apply genotype and other patient-specific data to drug therapy recommendations. Pre- and post-course test scores for knowledge were compared between the INT and CTR groups using the Student *t*-test. RESULTS/ANTICIPATED RESULTS: In total, 52 students completed surveys (INT group, n = 21; CTR group, n = 31). Race was similar between groups, but there were fewer females in the INT compared with CTR group (8 vs. 22, $p = 0.02$). Pre-course knowledge scores did not differ between INT and CTR groups (6.8 ± 2.2 vs. 6.3 ± 1.6 respectively, $p = 0.34$), however, post-course scores were significantly higher in the INT Versus CTR group (10.0 ± 2.3 vs. 7.5 ± 1.7, $p < 0.0001$). DISCUSSION/SIGNIFICANCE OF IMPACT: There have been significant advancements in the clinical applications of pharmacogenomic and genomic data, however, barriers to routine clinical adoption of genomic medicine persist. Developing education and training methods that equip practitioners to effectively translate genomic data into evidence-based clinical recommendations has been identified as a key strategy to overcome such barriers. Our data suggest that a personalized medicine course that employs patient-centered, case-based teaching strategies and includes optional personal genotyping for students compared with traditional didactic instruction improves students' knowledge and abilities to apply pharmacogenomic data in practice-based scenarios. These results can inform future strategies for educating healthcare professionals on the clinical use of pharmacogenomic and genomic data.

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Objectively assessing student learning and effectiveness of an introductory educational program in clinical and translational research

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OBJECTIVES/SPECIFIC AIMS: The first goal of this project is to test the reliability and validity of an objective structured clinical exam (OSCE) that was designed to assess competency in clinical and translational research. The second goal is to evaluate the impact of MICHR's Summer Research Program on the participating trainee's competency development. METHODS/STUDY POPULATION: The methodology used for this study was reviewed and exempted from oversight by the U-M Institutional Review Board (HUM00113293). The participants in the study include 17 pre-doctoral students in health professions programs at U-M who participated MICHR's Summer Research Program. The Research OSCE was administered using a pretest, post-test design. The pretest was administered once during the 1st week of program in the Summer of 2016 and the post-test during the 10th week of the program. The Research OSCE was proctored and rated by trained staff members. We will assess the reliability of the Research OSCE using Generalizability Theory (Webb *et al*., 2006). And the construct validity of the Research OSCE will be tested using factor analysis and other statistical analyses. Growth in the competence of the trainees participating in the Summer Research program will be evaluated by testing for significant differences between their pretest and post-test scores. RESULTS/ANTICIPATED RESULTS: We anticipate that this study will show that the Research OSCE is a reliable competency assessment with proven construct validity. We also anticipate that the use of the Research OSCE will show the trainees participating in the Summer Research program experienced a gain in competence during the course of the 10-week program. DISCUSSION/SIGNIFICANCE OF IMPACT: This project uses a common and standardized testing approach. The primary goal of this project is to evaluate the reliability and validity of an OSCE to assess competency in clinical and translational research. It represents a new application for a well-studied testing method used extensively in the health professions to assess the clinical competency of health practitioners. This project will lead to a better understanding of (a) the reliability and validity of the Research OSCE designed to test research competency and (b) the effectiveness of the Summer Research Program curriculum in better preparing participants to conduct clinical and translational research. Showing how a specific competency assessment can be used for this purpose will provide the administrators, evaluators, and other stakeholders of clinical and translational research training programs with information that can be used to design more rigorous and relevant evaluations of their research training programs.

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Silicone renal tumor models: The validation of a surgical training tool

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OBJECTIVES/SPECIFIC AIMS: More partial nephrectomies are performed every year as a surgical treatment for kidney cancer. However, this procedure remains technically challenging. Surgeons require a substantial number of cases before their performance plateaus. No established practice mode exists; thus, there is a need for training models to simulate real tumor excisions and kidney suturing. In this study, we seek to validate these silicone models using multiple simulations with urologists of different training levels. METHODS/STUDY POPULATION: We created silicone renal tumor models using 3D printed molds of a patient's kidney with a mass. Medical students, urology residents, fellows, and attending surgeons are recruited to perform simulated partial nephrectomies on these models. Four trials are performed with a da Vinci surgical robot on 2 different days. We are evaluating surgeon performance and improvement using validated measures as well as operation-specific metrics. Operation-specific metrics include renal artery clamp time and surgical margins. Validated measures of self-assessed operative demand (NASA TLX) and reviewer-assessed surgical performance (GEARS) are also recorded across trials. RESULTS/ANTICIPATED RESULTS: The preliminary results of 2 medical students, 10 urology residents, 3 endourology fellows, and 2 attending urologists are reported here. Model face validity was evaluated on a 0–100 sliding scale anchored at unrealistic and realistic. Mean results thus far are 77.7 for overall feel, 82.7 for needle driving, 75.6 for cutting, and 73.2 for visual representation. Between trials 1 and 4 there was a mean reduction of 3.26 minutes in renal artery clamp time, and a 75% reduction in positive margins. There was a reduced incidence of positive surgical margins with advanced training stage. Fellows, residents, and medical students had positive tumor margins in 25%, 50%, and 75% of their trials, respectively. We expect to recruit 15 additional subjects for this study. Upon completion of data acquisition, more robust statistical comparisons and measures will be reported. DISCUSSION/SIGNIFICANCE OF IMPACT: Face validity measures indicate the model adequately represents reality. Preliminary data suggest improved surgical performance over the course of the training and better performance in urologists of higher training levels. This model may have potential for broader application and integration into minimally invasive surgery training programs.

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A new framework for stakeholder engagement in early stage translational science

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OBJECTIVES/SPECIFIC AIMS: Stakeholder and community engagement (SCE) is a national priority for the National Center for Advancing Translational Science (NCATS). An established framework for stakeholder engagement exists for the latter stages (T2-T4) of translational, but no such framework currently exists for early stages of translational science (T1). Four Clinical and Translational Science Award (CTSA) hubs launched a collaboration to develop a new framework for engaging communities and stakeholders in T1 research. METHODS/STUDY POPULATION: We led structured individual and group discussions with T1 investigators to learn about: (1) the health decisions they seek to inform with research evidence, (2) the actors who make those decisions, and (3) the individuals and organizations that are affected by those decisions. In total, 18 individuals connected to 4 CTSA hubs participated in the

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