

Oral Presentations

Session Moderator: Fasika A. Woreta, MD, MPH

Oral Presentation 1: Virtual Clinical Elective in Equitable Healthcare: A Health Equity Curriculum for Visiting Medical Students During COVID-19

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Background: During the 2020-2021 academic year, the Johns Hopkins University School of Medicine suspended in-person rotations for visiting medical students, thus impacting residency recruitment from outside institutions. In response, medical students at the Johns Hopkins, in conjunction with the Office of Graduate Medical Education, developed a virtual 2-week elective for visiting students. In the morning, students participated in one of 11 specialty-specific curricula. In the afternoon, students engaged in a universal curriculum focused on equitable healthcare and professional development. Students had the ability to network with physicians and fellow students while discussing issues surrounding health disparities, equitable healthcare delivery, and Baltimore's patient population.

Aim: This "Virtual Clinical Elective in Equitable Healthcare," held in October 2020, was designed to stimulate discussion surrounding healthcare equity, while providing fourth-year, underrepresented in medicine (UIM) medical students the opportunity to virtually explore Johns Hopkins and the Baltimore community in an effort to recruit residency applicants.

Methods: Pre- and Post- course surveys were administered to all students. The pre-course survey focused on assessing demographic information, goals for the elective, and overall professional goals. The post-course student survey assessed whether students left the course with an enhanced understanding of social determinants of health and interest in Johns Hopkins for residency, as well as elicited feedback on student satisfaction with various aspects of the course.

Results: Out of 76 applicants, 42 students from 34 institutions were selected in this elective; of these students 27 (64%) identified as UIM and 41 (98%) had engaged in previous scholarship, service or advocacy in equitable healthcare. All 38 respondents of the post-course survey agreed that this elective provided a good overview of equitable healthcare and useful skills for professional development. Thirty-one (82%) stated that this elective increased their interest in working with underserved or marginalized patient populations in their future careers.

Conclusions: This elective demonstrates that a curriculum focused on equitable healthcare and professional development will attract UIM students as well as students with health equity experience. Importantly, providing a curriculum that stimulates discussions surrounding equitable healthcare is beneficial in promoting interest in careers focused on addressing these systemic issues in medicine.

Oral Presentation 2: AI for Video-based Assessment of Intraoperative Surgical Skill

Authors: Shameema Sikder, MD, Sanchit Hira, MS, Digvijay Singh, MS, Tae Soo Kim, MS, Gregory Hager, PhD, S. Swaroop Vedula, MBBS, PhD

Needs and Objectives: Videos of the surgical field are a rich source of information for skill assessment. Currently, use of videos for skill assessment is limited to review by expert peers or crowd raters. We hypothesize artificial intelligence (AI) methods can be developed to provide objective, unbiased video-based assessments. Creation of such a tool that uses AI methods for video-based surgical skill assessment will allow for objective feedback and change the way we train surgeons.

Setting and Participants: We analyzed 99 videos of capsulorhexis, a key step in cataract surgery, to estimate area under the receiver operating characteristic curve (AUC), sensitivity, and specificity using expert ratings as ground-truth and 5-fold cross-validation. These videos represent both training and attending surgeons at Hopkins.

Description: We developed two AI methods: first, we predict instrument tips as keypoints (KP), which we then analyze using a temporal convolutional network. Second, we directly analyze videos with a

neural network equipped with dependent attention modules (ATT). These modules localize parts of the input that are relevant for skill assessment.

Evaluation: AUC, sensitivity, and specificity were 0.79 (0.70 to 0.79), 0.80 (0.68 to 0.89), and 0.69 (0.55 to 0.80), respectively for KP, and 0.78 (0.69 to 0.78), 0.84 (0.72 to 0.92), and 0.75 (0.61 to 0.85), respectively for ATT.

Lessons Learned: Our findings show internal validity of AI methods for video-based intraoperative surgical skill assessment. This novel method can be applied to other areas for surgery to promote AI driven objective methods of assessment.

Oral Presentation 3: Addressing Trauma and Building Resilience in Children and Families During COVID: Virtual Standardized Patient Cases for Pediatric Residents

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Needs and Objectives: Adverse childhood experiences (ACEs) is associated with negative health outcomes.^{1,2} Trauma-informed care (TIC) uses trauma awareness to guide clinical interactions. While many patients have experienced trauma, most pediatric trainees do not currently receive training in TIC. Standardized patients serve as an effective teaching modality to improve pediatric trainees' knowledge of trauma and equips trainees with skills to support trauma-affected families.³ However, in the COVID era, resident training has shifted towards virtual learning, while patient encounters have transitioned to telemedicine visits. This study aims to evaluate the efficacy of a standardized patient curriculum using a virtual meeting platform in lieu of in-person training to teach pediatric trainees about TIC.

Setting and Participants: We conducted 3 workshops for a total of 18 pediatric residents via a virtual meeting platform.

Description: Participants engaged in 3 patient cases with trained standardized patients based on common clinical encounters related to ACEs, as well as a didactic and debrief session. Sessions were facilitated by 1 resident leader, a faculty advisor, and 1-2 simulation encounter facilitators.

Evaluation: Of the 18 participants, 11 had paired pre- and post-data. Paired one tailed t-tests were used for evaluation. Similar positive changes were found with the standardized patient virtual training as seen previously with in-person training. Participants responded favorably to case fidelity and pragmatic applicability to their clinical work. After the workshops, resident mean self-assessment scores improved significantly from baseline ($p < 0.05$). Specifically, we assessed learning objectives including comfort with inquiring about and discussing ACEs and trauma, explaining the impacts of trauma on health, identifying protective factors, resilience counseling, and de-escalating an escalated patient. Similar to in-person training, over 90% of responses indicated that residents trained virtually were likely to apply what they learned to their clinical practice.

Lessons Learned: These findings demonstrate that simulated telemedicine visits using standardized patient cases can be an effective training modality for pediatric residents to feel more prepared to address trauma and help children and families build resilience. This lower-cost format can be beneficial for low resource settings including those limited by COVID restrictions.

Oral Presentation 4: Knowledge and Attitudes of U.S. Medical Students Regarding the Care of Asian American Patients

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Background: Asian Americans are one of the fastest growing minority groups in the U.S. Few studies have analyzed medical students' cultural competency (CC) towards Asian American (AsAm) patients.

Hypothesis/Aim: This project surveyed U.S. medical students on their knowledge of and attitudes towards AsAm patients to assess predictors of CC and areas of improvement in medical training. We

hypothesized that increased exposure to AsAm culture and more in-depth CC training will predict more knowledge, comfort, and CC with AsAm patients.

Methods: This cross-sectional survey was adapted from previously tested surveys and distributed online to medical students who had completed at least one clinical rotation at nine medical schools throughout the U.S. The survey measured self-rated knowledge of, comfort with, cultural competency towards, and explicit biases towards AsAm patients. Scores from the first three domains were analyzed in a multivariate regression model, including sociodemographic characteristics and past clinical, curricular, and social experiences with AsAms. Responses about explicit bias were reported descriptively.

Results: There were 688 respondents. Asian race, AsAm-prevalent hometown, AsAm-related extracurricular activities, Asian language knowledge, and completion of a population health course predicted increased AsAm knowledge (all $p < 0.05$). Social interactions with AsAms increased comfort in working with AsAm patients ($p = 0.005$). Increasing year in medical school, more frequent exposure to AsAm patients on rotations, and prior travel to an Asian country were predictors of increased CC toward AsAms (all $p < 0.05$). Importantly, completion of a CC course was a significant predictor in all domains. In terms of explicit bias, students felt that AsAm patients were more compliant than Caucasian patients. Students also believed that Caucasian patients were generally more likely to receive perceived “preferred” versus “acceptable” care (74.7%, $n = 384$) than AsAm patients (4.7%, $n = 24$), but that in their own clinical experiences, neither group received preferred care.

Conclusion: Experience with AsAms prior to and during medical school and CC training may increase medical student knowledge of, comfort with, and CC towards AsAm patients. Possible curricular recommendations include standardized and longitudinal CC training and simulations with AsAm patients. Future research is needed to develop and implement curricular changes to improve student physicians’ ability and comfort to care for AsAm patients.

Oral Presentation 5: The Medical Education Surge of COVID-19: How to Ride the Wave – A Model for Virtual Clinical Training and Preliminary Validation Study

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Needs and Objectives: As the world of medical education began to unravel from the pandemic, medical schools across the country removed students from on-site clinicals. Although it was the safest approach, it had drastic & obvious impacts on training. The competing interests of safety & cultivation of the next generation of physicians resulted in a conundrum. Medical schools have scrambled to find adequate virtual educational offerings, for something that often requires direct patient interaction.

Setting and Participants: Tertiary medical center, specialty clerkship, associated medical trainees

Description: The Department of Rehabilitation Medicine at the University of Minnesota pivoted to create a novel virtual clerkship designed to simulate and approximate the value of in-person training.

Evaluation: A validation study was designed and implemented to compare the following domains through the respective method of inquiry:

- Anticipated versus actual value of the virtual clerkship
 - Students who had participated in the traditional PM&R clerkships from January 1, 2019 to March 9, 2020 were invited to review the virtual clerkship’s course design and curriculum. Afterwards, they completed a survey to discern its perceived prospective value and ability to reproduce their experience.
- Subjective value of traditional versus virtual PM&R training
 - An end of rotation survey, reviewing competencies, entrustable professional activities, milestones, interrelationships and specialty-specific objectives, was completed by the medical students who participated in the virtual clerkship. The results were compared to the prior in-person surveys.

- Efficacy of transmission of PM&R-relevant medical knowledge via the virtual training format
 - All students enrolled in the virtual clerkship were required to complete a 25-question multiple choice pre-test and post-test on PM&R medical knowledge weighted to reflect the American Board of PM&R's Part 1 Board Certification Outline, the core areas of PM&R as defined in the course curriculum, and the focuses of the United States Medical License Examinations Step 2 Clinical Knowledge and Step 3.

Lessons Learned: With an innovative design, virtual clerkships may act as an effective surrogate for in-person specialty clinical training. Our preliminary validation study indicates that participant satisfaction and transmission of knowledge can be preserved and even enhanced in such a setting. However, competencies that require a physical presence remain challenging.

Oral Presentation 6: The application of teleophthalmology in the diagnosis of ophthalmic emergencies among trainees: a pilot study

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Background: Emergency departments (EDs) face an ever-increasing burden of patients, resulting in unsustainable crowding and long patient wait times. Utilizing telemedicine is one approach to reduce this burden on EDs and consulting physicians. Furthermore, resident utilization of telemedicine services in the ED may benefit resident education by improving diagnostic accuracy, practice-based learning, and medical knowledge.

Hypotheses/Aim: To describe the implementation of a teleophthalmology tool in resident education in the ED setting.

Methods: Ten first-year ophthalmology residents were trained to use a TopCon 3D OCT-I Maestro System device to capture optical coherence tomography (OCT) images and fundus photos. The device was utilized to evaluate patients presenting to the ED. Findings were communicated to the supervising ophthalmologist. Retrospective chart review was conducted to obtain patient characteristics, ED diagnosis, and final ophthalmologist's diagnosis. Subjective image quality was graded by three independent graders on a scale of 1 (lowest) to 3 (highest).

Results: From December 1st, 2019 to December 1st, 2020, the device was used in 116 patient encounters, capturing 900 images (average 7.8 images per encounter). The average age of patients was 48.8 years old (SD 17.1, range 17-90) and 41% were male. 43% of patients were Caucasian, 39% were African-American, 8% were Hispanic/Latino, 4% were Asian, 1% were Native American, and 5% were other. The average logMAR visual acuity of patients was 0.50 (Snellen 20/63). Average subjective image quality was calculated for 56 patients at a 2 out of 3 between the three independent raters. The imaging device was utilized most commonly for evaluating for papilledema (n=23, 19.8%), new-onset visual acuity/visual field defects (n=14, 12.1%), retinal detachment/tear (n=9, 7.8%), trauma work-up (n=7, 6.0%), and visual changes due to diabetic retinopathy (n=7, 6.0%). Use of the TopCon device resulted in a change in diagnosis in 83 patients (72%).

Conclusion: Teleophthalmology tools were utilized by resident physicians most often in assessment of papilledema, non-specific visual changes, and retinal pathology. A majority of patients' diagnoses changed with use of the TopCon device, thus aiding residents in diagnostic accuracy and education. Future studies should evaluate the use of telemedicine in resident education in other specialties.

Oral Presentation 7: A Seat At the Table: Accomplishing Multidisciplinary Quality Improvement Through Resident Led Debriefing

Authors: Abby Schultz, MD, Tufts Medical Center, Department of Obstetrics and Gynecology 3rd year resident; Cassandra Trammel, MD, Tufts Medical Center, Department of Obstetrics and Gynecology 3rd year resident; Alexandra Spadola, MD Tufts Medical Center, Department of Obstetrics and Gynecology Department of Maternal Fetal Medicine Director of Labor and Delivery

Abstract: Post-event debriefs are widely recognized as good practice. Trainees, while often included in debriefing, rarely receive formal education on how to debrief critical events. After a multidisciplinary critical event and subsequent resident-led debrief, we sought to assess participants' impressions of the efficacy and utility of resident-driven debrief in quality improvement. IRB committee approval was waived for this study. All participants were invited to participate in an anonymous 12-item questionnaire created using CHERRIES criteria. The survey was sent through RedCap (a data capturing tool) to allow for anonymous collection and data storage. The data was then analyzed for significant trends. The questionnaire had an 80% response rate. 91% of respondents felt that residents played an important role in this debrief. 100% of respondents felt that the debrief allowed for a productive discussion of the case and identification of areas for improvement. 100% of respondents felt that residents were essential in completing actions items that resulted from the debrief. 100% felt that resident led debriefs are important for resident professional development. This study demonstrates that residents play a central role in debriefing complex cases and can facilitate effective multidisciplinary conferences despite their relative lack of seniority in the academic environment. Importantly, residents were seen as pivotal in completing quality improvement initiatives, which emphasizes the importance of including residents in all stages of the process. Finally, leading debriefs during residency is seen as building skills for lifelong engagement with improving the delivery of healthcare.

Oral Presentation 8: Medical Student Anxiety Levels and Wellness Resource Utilization

Authors: Ara Alexanian, David Lindars, Kate Wigginton, James Ziegenbein and Valerie Gerriets, Second-year medical students; Mentored by Valerie Gerriets, PhD, Student Wellness, California Northstate University, Elk Grove, CA 95759 USA

Background: A global meta-analysis estimated the prevalence of anxiety was 33% in the medical student population. Medical students with anxiety tend to show less enthusiasm and less empathy when caring for patients with chronic conditions. Many efficacious treatment strategies, such as visiting a mental health professional, have been identified; however, there is limited knowledge of the care-seeking behavior in persons with anxiety, especially at the medical school level.

Hypotheses/Aim: With the considerable rigor and stress of medical school, we have sought to better understand how medical students seek to address high/moderate anxiety levels by quantifying the utilization of counseling services and wellness events in medical students experiencing anxiety. This abstract describes the project and its outcomes.

Methods: Well-being data has been collected over three years. A 20-minute online survey has been provided to all medical students at the California Northstate University biannually. The survey includes demographic data, wellness events attended, and whether the student has seen a mental healthcare provider over various intervals. The bulk of the data are in the form of a Likert scale, or ordinal values, testing for levels of anxiety, burnout, etc. The anxiety quantifier used in the survey is the GAD-7 scale, the most commonly used self-reporting scale for generalized anxiety disorder.

Results: 248 students have completed the survey. Of those who answered the survey, 21 of 248 students (8.47%) reported high/moderate anxiety, and 15 of 21 (71.4%) students with high/moderate anxiety attended either counseling or wellness events, with 9 of 21 (42.9%) seeking counseling and 10 of 21 (47.6%) attending wellness events. When isolating for help seeking in the form of attending wellness events, there is no statistically significant correlation with high/moderate anxiety level; however, there is a statistically significant correlation with attending counseling and high/moderate anxiety level.

Conclusions: Determining how mental health services at medical school are utilized by students to either maintain or improve anxiety can encourage more educational institutions to provide such resources for their students, as more than 70% of students with high/moderate anxiety utilized wellness resources.