

VIRTUAL ROOM I

Faculty Moderators: Julia Shalen MD, MAEd, and Zainab Kahn, MD

Virtual Poster 1: Evaluating Medical Student Reaction and Learning in Response to Fellow-led Small-group Didactics During Neurology Clerkship

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Needs and Objectives: A subset of medical students completing their Neurology Core Clerkship (NCC) at an ambulatory site have hands-on learning opportunities during multiple clinics per week. However, due to the rotation's structure, exposure to certain common neurological symptoms and patient care scenarios may be limited. Our primary objective was to address potential knowledge gaps with neurology fellow-led small-group didactics, after preliminary data showed that these sessions were well received by students during a pilot assessment phase from March 2021-March 2022. I Secondary objectives were to evaluate teaching program quality and bolster fellows' skills as clinician-educators.

Setting and Participants: Clinical fellows administered virtual small-group didactic sessions to medical students during their NCC at Johns Hopkins University School of Medicine.

Description: The Osler Housestaff Preceptorship is a competitive experiential program that provides interested neurology fellows with the opportunity to develop essential clinician-educator skills. Three neurology clinical fellows from this program gave virtual small-group didactic sessions with interactive components. Each fellow administered one virtual session per clerkship 4-week block to 2-3 students (total three sessions/month). Session topics were variable but focused on core learning objectives: 1) localization principles; 2) neurologic emergencies; and 3) common neurologic presentations.

Evaluation: Participating medical students receive an online survey after each small-group didactic session. The survey questions evaluate the usefulness of didactic sessions in meeting students' learning needs (Kirkpatrick framework, level 1),² students' perceived confidence with the session material, and the perceived effect of the session on their "neurophobia." At the end of each session, we administer a three-question quiz to assess knowledge learning (Kirkpatrick level 2).²

Lessons Learned: Preliminary data suggests that students value fellow-led didactics; the small group format allows for precision education with customizable topics to meet individual needs. Fellows also benefit from experience with medical education leadership, teaching, curriculum design, and program evaluation.

References: 1. Paul A, Reyes M, Roy S, et al. Precision Learning in Neurology Medical Education. *Johns Hopkins University Institute for Excellence in Education [Conference and Celebration]*. Published online March 2022.

2. Frye AW, Hemmer PA. Program evaluation models and related theories: AMEE Guide No. 67. *Med Teach*. 2012;34(5). doi:10.3109/0142159X.2012.668637

Virtual Poster 2: Expansion of online clinical reasoning skills development in the Neurology Core Clerkship

Authors: Calvin J. Kersbergen, Ashley Paul, Rachel Salas, Doris Leung

Needs and Objectives: The development of clinical reasoning is a core tenet of medical school education that requires both experience in patient care and integrating clinical data to generate a differential diagnosis and formulate a care plan. A clinical reasoning skill set is critical for all subspecialties and represents core entrustable professional activities.

Setting and Participants: Within the Neurology Core Clerkship at Johns Hopkins, the development and assessment of clinical reasoning is supported through online "Virtual Clinic." Recent work suggests that online-based components of medical education promote greater self-directed learning amongst

students without compromising clinical knowledge development, emphasizing the importance of multiple education modalities. Here, we sought to expand the available cases for medical students to reflect better the wide range of specialty experience offered through the neurology clerkship.

Description: We developed a novel pediatric neurology case of “K. L.” set within the emergency room and established a grading rubric for assessment. We sought to integrate cognitive components reflecting core curriculum competencies from the American Academy of Neurology, including assessment and plan development, interpretation of the neurological exam, and lesion localization. Students will utilize an established epilepsy online module to support their clinical reasoning within the case. The case design was based on patients seen within the pediatrics, neurology, and otolaryngology rotations. During case development, we received feedback from Osler apprentices, residents, and neurology faculty.

Evaluation: By the time of the IEE conference, we will have integrated our case into the Neurology core clerkship curriculum and initiated data collection. Based on a pre-designed grading rubric, students will be assessed on their summative assessment of the case, their top three differential diagnoses, the lesion localization, and their first steps in patient management. We will correlate scores between cases currently used in the curriculum and our novel case and identify factors predictive of high scores.

Lessons learned: The further development of various online “Virtual Clinic” cases within the neurology core clerkship will likely enhance self-directed learning amongst students, enable cross-clerkship integration of clinical reasoning, and ease burden and increase sustainability for core clerkship educators.

Virtual Poster 3: Personal and Professional Factors and Association with the Mentorship Program in the College of Medicine at Qatar University: A Mixed Method Study

Authors: Mohammed Al-Hor; Manal Abdalla; Mohammed Al-Ansari; Noora Alkorbi; Noora Al-Sulaiti; Shaikha Al-Kuwari, Medical Students, Qatar University

Background: Mentorship programs have emerged as a crucial element within the realm of medical education, contributing significantly to the professional growth of students. However, despite its establishment in Qatar University, the mentorship program's efficacy remains unexplored. This study aims to address this gap through a mixed-method approach, investigating predictive factors associated with the utilization of the mentoring program, quantifying perceived academic benefits, and exploring mentors' perspectives within the College of Medicine at Qatar University.

Aim: The primary aim of this mixed-method study is to identify predictive factors independently associated with the utilization of the mentoring program and perceived academic benefits. We seek to validate the hypothesis that the specific factors play a pivotal role in possibly influencing students' active participation and academic outcomes from the program.

Methods: Year 2 to year 6 students (mentees) were evaluated using validated instruments, including the Munich Evaluation of Mentoring Questionnaire (MEMeQ), Strength of Motivation (SMMS-R), Rosenberg Self-Esteem (RSS), and Academic Stress Questionnaires, alongside active participation in the college mentoring program. A multivariable logistic regression model was employed to determine factors associated with program utilization and perceived academic benefits. The subsequent qualitative phase involved exploring mentors' perceptions through semi-structured interviews.

Results: Only one-fourth of the students actively met their mentors at least once per semester, with the quality of the mentoring program independently predicting active participation and perceived academic benefits. Mentors recommended mandatory first meetings and gender alignment as potential solutions to enhance participation, while students suggested multiple mentors and flexibility in mentor selection to improve the program.

Conclusion: With only a quarter of students actively participating, our findings underscore the need for considering mentorship program quality as a crucial variable influencing student engagement.

Recommendations for improvement include mandatory initial meetings, gender alignment, and flexibility in mentor selection.

Virtual Poster 4: A Low-Cost Flipped Classroom Ophthalmology Clinical and Surgical Skills Lab: Underrepresented in Medicine Undergraduate Students

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Background: In the United States, 7.5% of the population suffers from visual impairment, reflecting a need for early intervention and prevention led by primary care providers. In particular, underrepresented minorities (URMs) are disproportionately affected, with only 7.2% of URM ophthalmologists. As it is imperative that physicians are well-trained to meet the vision and public health needs of our growing and diverse population, we must innovate and evolve ophthalmology education to advance diversity and equity.

Hypotheses/Aim: To improve recruitment of underrepresented minority ophthalmologists by increasing early exposure through hands-on ophthalmology clinical and surgical skills workshop for URM undergraduate students

Methods: Before the workshop, pre-modules with instructional video on each stations were distributed to 28 URM undergraduates (86% female; 57% Black/African American, 43% Hispanic/Latinos, 3.6% American Indian/Alaskan Native, 3.6% Native Hawaiian, 3.6% Pacific Islander, and 3.6% Other).

Instructed by the physician preceptors, students participated in ophthalmology skills modules: 1) eye vitals examination, 2) direct ophthalmoscopy on eye model, 3) tonopen on tomato, 4) conjunctival suturing on a fabric-wrapped picture frame, 5) scleral pass on a silicon sphere, and 6) capsulorhexis simulation on a tomato. Interaction variables were measured before and after workshop engagement via 10-point Likert scales.

Results: After engaging in our ophthalmology workshop, paired t-test was conducted for pre- and post-engagement surveys. The mean students' confidence levels significantly increased ($p < 0.001$) for direct ophthalmoscopy ($+2.61 \pm 1.73$), tonopen ($+2.61 \pm 1.77$), conjunctival closure ($+2.75 \pm 2.41$), scleral suture ($+2.57 \pm 1.97$), capsulorhexis ($+2.64 \pm 2.13$) and increased understanding in eye vitals examination ($+2.43 \pm 1.55$). The lab increased interest in ophthalmology ($+1.36 \pm 1.59$, $p = 0.004$) while decreasing stress (-1.71 ± 1.92 , $p < 0.001$).

Conclusion: This ophthalmology skills workshop enhanced interest, understanding, and confidence levels and reduced stress in performing clinical and surgical procedures in URM undergraduates. This

URM ophthalmology workshop demonstrates the potential to diversify and improve the ophthalmology field to better meet the health and public health needs of diverse individuals and communities throughout the country.

Virtual Poster 5: Pushing into the Barrier: Investigating the Use of OMM Among 3rd and 4th year Medical Students

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Background: Osteopathic Manipulative Medicine (OMM) is a hands-on practice used by osteopathic physicians for diagnosing, treating, and preventing illnesses or injuries. Osteopathic medical students receive training in OMM in their preclinical years. However, upon transitioning into clinical rotations, students find themselves in clinical environments where OMM usage is influenced by external and internal factors. Despite its importance in osteopathic education, there is limited data on the utilization of OMM by students during rotations. Additionally, the barriers & facilitators students encounter on rotations is unexplored.

Hypothesis/Aim: This study's aim was to assess the frequency of OMM utilization during clinical rotations by 3rd

and 4th year medical students. The study also assessed facilitators & barriers to OMM usage while also measuring student's confidence in OMM usage.

Methods: The survey was released to 3rd and 4th year students on clinical rotations at Touro College of

Osteopathic Medicine - Harlem during the fall semester. A Likert scale ranging from 1 to 5 was utilized to gauge medical students' responses. This scale measured various aspects including their self-confidence in OMM skills, the significance of barriers to OMM practice, the frequency of positive and negative perceptions of OMM from medical professionals, and the effectiveness of facilitating factors.

Results: The findings revealed moderate self-confidence in OMM abilities among students; perceptions of OMM among clinical staff were more neutral than negative. Primary barriers included time constraints, inadequate treatment spaces, and brief patient interactions. Facilitators for OMM usage included assignments from attendings, ample time with patients, and encounters with patients familiar with or interested in OMM. Students felt that preclinical training effectively prepared them for diagnosing somatic dysfunctions and explaining OMM to patients.

Conclusion: Overall, this study highlights the need for clinically-based OMM training during preclinical years

and increased interprofessional advocacy to improve OMM usage amongst medical students during clinical rotations. For future research, comparative studies across various osteopathic medical schools are recommended. This will offer a broader understanding of OMM's perception and practice, informing potential enhancements in osteopathic medical education and advocacy strategies.

Virtual Poster 6: Optimizing the Flipped Classroom: Utility of Clinically Focused Online Learning Modules ("Rx Bricks") for the Neurology Core Clerkship

Authors: Mattea Miller; Rachel Salas; Doris Leung; Bernadette Clark; Ashley Paul

Background: In preparation for their patient care experiences, medical students rotating on the neurology core clerkship (NCC) at Johns Hopkins (JH) completed interactive learning modules "RxBricks", in collaboration with ScholarRx. To support the clinical learning of students, the NCC team designed clinically focused RxBricks to walk medical students through specific patient presentations in neurology. These NCC Clerkship Bricks may be advantageous over topic-based Company-Designed Bricks in improving students' educational experiences on the NCC.

Aim: To assess students' perceptions of the utility and quality of clinically focused Rx Bricks designed by the JHH neurology core clerkship team for the NCC. \

Methods: Starting in Quarter 4 of the 2021-22 academic year, NCC students were required to complete 17 company-designed Rx Bricks as part of the pre-clerkship exercises. The NCC team designed the following clinical Rx Bricks: “Approach to Tremor”, “I feel dizzy”- Approach to Vertigo”, “I’m feeling off balance”, “I can’t see out of my eye”, “My vision is not right, and my arm is tingling”, “I can’t walk and I can’t feel my legs!” which were implemented in Quarter 2 of the 2022-23 academic year. Students provided feedback on the Rx Bricks via anonymous online evaluations at the end of the clerkship.

Results:

- **Company-Designed Bricks**
Students (n=85) rated Rx Bricks with average scores of 3.5 (helpfulness as a resource) and 3.1 (would recommend to other students) (1=strongly disagree to 5=strongly agree). When asked whether they used the bricks beyond pre-clerkship requirements, 25/67 (37%) and 11/67 (16%) of students said they used the bricks for general learning and to study for the shelf exam, respectively.
- **JHH Neurology Core Clerkship-Designed Bricks**
Students (n=10) rated the pilot “Approach to Tremor” brick with average scores of 4.5 (well-organized), 4.3 (easy to understand), and 4.1 (kept me engaged) (1=strongly disagree to 5=strongly agree). Consistent data will be analyzed across all clerkship-designed bricks (Kirkpatrick Level 1).

Conclusion: Student feedback suggests that Rx Bricks are an average to above-average educational resource and satisfy pre-clerkship requirements for the NCC. Clinically oriented Rx Bricks could supplement faculty lectures in flipped classroom settings for students preparing for core clerkships.

Virtual Poster 7: Does AI has a beneficial effect on student performance? Evaluation of first-year medical students through administration of a USMLE-style practice examination with and without the assistance of GPT-4

Authors: PI - Jorge Lascano, MD; Brett Haefner; Jamie Harris; Petyer Sayeski, PhD, University of Florida College of Medicine

Background: Artificial intelligence (AI) systems have generated outputs which imply higher cognitive function. Recently, GPT-4 from OpenAI performed exceptionally on United States Medical Licensing Examination (USMLE)-style questions. It has been postulated that AI will revolutionize clinical practice and medical education.

Hypothesis/Aim: To understand if AI has a beneficial effect on student performance, we evaluated first-year medical students by administering a USMLE-style practice examination with and without the assistance of GPT-4.

Methods: We created a 36-item practice examination to assess knowledge of first-year medical students. Questions and answer choices were inputted into GPT-4. AI-generated responses were determined to be ‘correct,’ ‘incorrect,’ or ‘ambiguous.’ Two randomly-assigned groups of 68 (Group A) and 71 (Group B) students were created. Group A accessed GPT-4-generated responses during questions 1-18, while Group B accessed GPT-4-generated responses during questions 19-36. Performance was evaluated using confidence intervals and chi-squared tests.

Results: GPT-4 had a statistically significant ($p < .05$) impact on performance on 28 out of 36 questions (77.78%). AI harmed student performance in 10 instances and improved performance in 18 instances. For questions on which AI generated incorrect outputs (n=12), the AI intervention group achieved 32.8% accuracy, while the non-intervention group achieved 56.5% accuracy – a difference of -23.7%. For questions on which AI generated correct outputs (n=22), the AI intervention group achieved 92.1% accuracy, while the non-intervention group achieved 67.8% accuracy - a difference of +24.3%. The average score for all questions answered with AI intervention across Groups A and B was compared

with the average score for all questions answered without AI intervention across Groups A and B. AI intervention yielded a +8.1% difference in overall scores ($p < 0.05$).

Conclusion: The use of GPT-4 yielded statistically significant improvement in overall medical student exam performance. However, both correct and incorrect AI outputs yielded similar effects on answer accuracy. We conclude that medical students lack the ability to distinguish between high-quality and low-quality AI outputs. Given widespread efforts to integrate AI into healthcare, these findings are concerning. Medical students, educators, and clinicians should use this technology with caution. Future endeavors to integrate AI into medicine should employ strict quality control methods.