Medical Education Clinical Practice

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Transforming a clerkship with telemedicine

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Abstract: The coronavirus disease 2019 (COVID-19) pandemic had an overwhelming impact on both clinical practices and learning environments. On March 17th, 2020, the American Association of Colleges of Osteopathic Medicine and Commission on Osteopathic College Accreditation issued a statement recommending a "pause" in medical student participation in-person at clinical sites. In response, the Family Medicine Department at the Rowan University School of Osteopathic Medicine recognized the need to evolve the traditional curriculum and quickly transitioned to an online format, incorporating telemedicine into the clerkship. This new model enabled 44 third-year medical students to obtain high-quality, offsite, virtual education and learn new skills.

Keywords: coronavirus; COVID-19; medical education; telemedicine

Following the discovery of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in China in December 2019, the disease caused by it, novel coronavirus 2019 (COVID-19), spread rapidly via person-to-person transmission and, within weeks, cases were reported in the United States.[1,2] The COVID-19 pandemic overwhelmingly affected both clinical practices and learning environments, bringing a worldwide influx of hospitalized patients and a shortage of personal protective equipment (PPE).[3] Because of concern for student safety and the lack of PPE, on March 17, 2020, the American Association of Colleges of Osteopathic Medicine (AACOM) and the Commission on Osteopathic College Accreditation (COCA) issued a statement recommending a "pause" of in-person medical student participation at clinical sites.[4]

This pause led to questions surrounding how long it would take for students to return to curricular programming and how to maximize student learning opportunities during this period. Additionally, there was concern about how the pandemic would affect the students' Comprehensive Osteopathic Medical Licensing Examination (COMLEX) schedule, required clerkships, medical school graduation, and the possible "ripple effect" on the remainder of their medical training. To mitigate the potential effects on medical education, the Family Medicine Department at Rowan University School of Osteopathic Medicine (Rowan SOM) recognized a need to evolve our traditional curriculum to provide comprehensive, offsite, virtual education to 44 third-year medical students at Rowan SOM by incorporating telehealth while maintaining high quality patient care. In this article, we describe our experience transitioning to a telehealth model in rapid response to the current global pandemic and the ways in which we were able to incorporate students into that process.

Clinical summary

To continue providing patient care, the Rowan Department of Family Medicine shifted to a telehealth model that included provider training, virtual patient visits, and electronic information sharing to facilitate patient care.[5] During this transition process from bedside to "webside," Rowan SOM faculty made a conscientious effort to adapt the Family Medicine clerkship to include third-year medical students as a way to continue their education.

In the traditional clerkship paradigm, medical students often start by shadowing the attending or resident physician from start to finish of an office visit. This experience includes obtaining the patient's history of present illness (HPI), performing a physical examination, precepting, and discussing the management or treatment plan with the patient. By the second week of rotation, medical students are expected to progress to

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independently seeing patients before presenting to their preceptor and completing the visit with the attending or resident physician. Transitioning to a digital telehealth model presented barriers that needed to be surmounted (Table 1).

Switching to telehealth offered an opportunity to ensure continuity of education while minimizing patient care disruption. Students were given the opportunity to conduct telemedicine visits via real-time audiovisual meetings from their own homes instead of conducting in-person office visits. Rowan SOM had an existing business associate agreement with a video conferencing platform that allows for multiple parties to interact on web or mobile applications, in compliance with the Health Insurance Portability and Accountability Act of 1996 (HIPAA). If patients were unable to set up or log into this platform, the Centers for Medicare and Medicaid Services had issued guidance allowing for common "non-public facing" remote communication products to be used for patient encounters:

> *Nonpublic facing remote communication products would include, for example, platforms such as Apple FaceTime, Facebook Messenger video chat, Google Hangouts video, Whatsapp video chat, Zoom, or Skype. Such products also would include commonly used texting applications such as Signal, Jabber, Facebook Messenger, Google Hangouts, Whatsapp, or 5 iMessage. Typically, these platforms use end-to-end encryption, which allows only an individual and the person with whom the individual is communicating to see what is transmitted.*[6]

Given patients' varying levels of technological literacy, medical students leveraged their communication skills to walk patients through this process. If patients were still unable to connect or did not have access to a smartphone/internet, the interaction was switched to a telephone visit. Educating medical students on how HIPAA guides regulatory parameters of telemedicine exposed them to aspects of medical care they may not have appreciated or had access to in a normal physical context, such as directly observing a patient's living situation, home environment, or even the patient's pantry if nutrition was a concern.

Table 1: Barriers encountered while implementing telemedicine.

Barrier	Solution
Electronic medical record training and remote access	Remote access is not technically necessary; however, it helps implementation as students can conduct patient encounters from home rather than the office.
Video conference training	Most, if not all, programs have online tutorials.
Ability to react to changes	Be willing to adapt. Many small issues will likely arise as telemedicine is implemented.
Technological literacy of the students and the patients	Patience is necessary. Some patients, and students alike, will take longer to learn these new processes.
Access to technology	Students were provided with laptops if they did not have one. Patients without a smartphone or laptop were asked to do phone visits.

A timeline of these Rowan SOM's transition to telehealth visits is seen in Figure 1. Before starting the rotation, clerkship directors invested a significant amount of time training students to use the electronic medical record (EMR) and video conferencing platform over several hours through through multiple sessions. On March 23, students were oriented to the new curriculum via video conferencing in two sessions. The program was organized to gradually give students more responsibility across the four stages. Once a student demonstrated competence in Stage 1, they were graduated to Stage 2, which required incremental accountability.

- **Stage 1:** Students contacted patients one day before the appointment to orient them to the upcoming telehealth visit. The goal of this stage was twofold—to familiarize the student with the video conferencing platform and prepare patients for their telemedicine visit. Students were provided with access to the physician's patient schedule in the EMR, as well as a with a script to use when calling patients to assist with downloading the video conferencing platform on their phone or computer. The script also included a catalogue of helpful equipment and tools that could be utilized by patients during the telehealth visit (Figure 2).
- **Stage 2:** Students contacted patients 30 minutes before their appointment to help them install and log into the video conferencing platform to ensure no technical difficulties. Once the patient was set up, students notified the Certified Medical Assistant (CMA), who would join the call; the student then signed off to restart the process with the next patient.
- **Stage 3:** Students prepared patients for their appointments and notified the CMA. Once the CMA joined, students remained connected to the telehealth visit, observing the "rooming" process and physician interaction with the patient. "Rooming" in a telehealth environment mimics the process of bringing a patient back to the examination room. The "rooming" process included updating medical and social history, a medication list, and obtaining any recent vitals from home equipment (Figure 2).

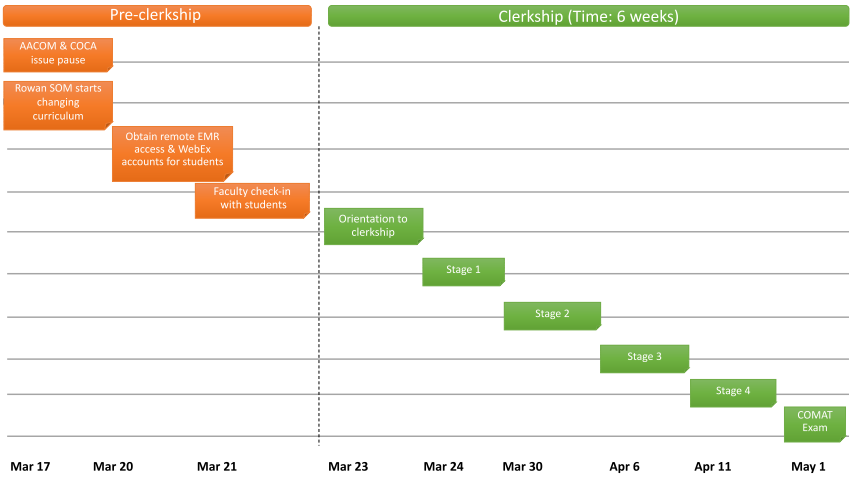

Figure 1: Timeline of events detailing clerkship milestones.
AACOM, American Association of Colleges of Osteopathic Medicine; COCA, Commission on Osteopathic College Accreditation; COMAT, Comprehensive Osteopathic Medical Achievement Test; Rowan SOM, Rowan University School of Osteopathic Medicine.

– **Stage 4:** Students prepared patients for their appointment in the video conferencing platform and "roomed" the patient in the EMR, per the previous description. Once the patient's personal health information was updated, students interviewed patients, documented HPI in the EMR, and presented the patient to the physician. Two or three students were assigned to each attending per four hour shift and students saw four to six patients per shift.

The "rooming" process not only accomplished data-gathering and physical examination components for presenting patients, but also also prepared students for future COMLEX-Performance Evaluation by teaching them fundamental skills such as physician-patient communication, professionalism, and interpersonal skills. This telehealth version of the clerkship program was made possible by technological capability, patient willingness to comply, and authorization of billing codes. Wireless monitoring, mobile health applications, and smartphone video capabilities, among other technology platforms, offer innovative possibilities to extend care relationships well beyond the traditional in-patient visit.[7]

The students also learned a new skill—conducting a virtual examination via video conference. This included, but was not limited to, checking patient pulse, obtaining data from patients' wearable devices, and asking patients to palpate problematic regions in the body to gauge tenderness. They also learned important patient interview skills such as maintaining eye contact and engaging effectively.

Prior to the COVID-19 pandemic, the Rowan SOM comprehensive clerkship curriculum included in-person lectures; two case presentations by students; subjective, objective, assessment, and plan (SOAP) note submissions with individual feedback sessions from course directors; and review of journal articles. Students were also required to complete virtual clinical learning modules and oral case presentations. During the COVID-19 pandemic, students were still able to complete all these milestones by interacting virtually with faculty members and submitting their assignments online. The Family Medicine clerkship is typically eight weeks in length; however, this was altered to only six weeks to allow for two weeks of in-person experience at a later date, as recommended by Rowan SOM's curriculum committee. At the end of this telemedicine clerkship, the Comprehensive Osteopathic Medical Achievement Test examination was administered remotely. Table 2 shows a direct comparison between activities in the traditional clerkship and those undertaken in the virtual model during the pandemic.

Thermometer
Flashlight/penlight
Home blood pressure cuff
Bathroom weighing scale
Home blood sugar meter and supplies
Smartwatch that captures heart rate
Pulse oximeter ("pulse ox")
Another person to help you hold the phone or move it around for the physical exam portion of the visit

Figure 2: A helpful list of equipment for patients during a telehealth visit.

Table 2: Comparison of clerkship curriculum items in traditional vs. telehealth models at Rowan University School of Osteopathic Medicine in 2020.

Clerkship curriculum item	Pre-pandemic traditional model	Pandemic telehealth model
Didactic lectures	– Approximately seven hours of in-person content – Approximately three hours of digital recordings accessed online	– Approximately four hours via teleconference – Approximately six hours of digital recordings accessed online
Case presentations	– Student formally presented patient to attending physician in the office including history, physical exam, assessment (with differential diagnosis) and plan – Students were graded on two separate patients	– Student formally presented patient to attending physician via teleconference including history, physical exam, assessment (with differential diagnosis) and plan – Students were graded on two separate patients
SOAP note feedback session	10 minute in person session with clerkship director	10 minute session via teleconference with clerkship director
Journal club session	Small group session in person; approximately 90 minutes	Small group session via teleconference; approximately 90 minutes
Total clerkship length	Eight weeks	Six weeks, with two weeks made up in person at a later date
Comprehensive osteopathic medical achievement test (COMAT) examination	Taken on campus	Taken remotely

Discussion

The family medicine specialty embraces continuity and patient-centered, competent care within the context of family and community.[8] This approach has proven to be paramount amidst the current public health crisis, when there is a need to decrease the spread of COVID-19 through measures like social distancing and quarantine. The emergence and integration of telehealth into care-delivery systems during this pandemic has lent itself to not only health promotion and disease prevention, but also continuation of medical education. Family medicine clerkships provide patient care knowledge necessary for all medical students, regardless of their ultimate career choice.[8] During this time, we feel that telehealth gave Rowan SOM a platform to expand these skills beyond traditional medical competencies to include active listening, expressing empathy, and working in teams that included certified medical assistants, residents, attendings, and technology support personnel.

Rowan SOM did not include telehealth as part of the traditional curriculum prior to the pandemic. However, this proved to be a relatively insignificant barrier because the existing tools are user-friendly; a redesigned workflow was quickly developed by the faculty. Replicating this program requires flexibility and a clear goal of how medical students would be integrated. Successful implementation of the six-week virtual family medicine clerkship model at Rowan SOM allowed students to seize a rare opportunity in the context of critical practical experience.

Although telehealth is useful, it is also important to recognize that there are elements of osteopathic medical education that cannot be replaced virtually. These elements include the ability to use our hands to not only diagnose structural and functional concerns but also to provide treatment with osteopathic manipulative medicine (OMM). Additionally, the doctor-patient connection can be enhanced with a physical presence to provide support and ensure that patients' concerns are eased. While telehealth cannot truly replace an in-person clinical experience, students can still gain invaluable clinical knowledge while learning a new modality for delivering healthcare that will likely remain a major part of medicine for years to come.

Conclusion

The clerkship team and the Department of Family Medicine at Rowan SOM executed a substantial overhaul to the clerkship curriculum to implement telehealth and continue osteopathic medical students' education during the COVID-19 pandemic. While seemingly daunting, it is possible for other clerkship sites to use similar changes, especially for office-based rotations. Students should stay

involved in patient care during this pandemic so they can see how public health crises can affect a medical practice and how physicians can respond. The profound effects of COVID-19 will impact medical education for years to follow. The key learnings from this worldwide pandemic can be distilled into a necessity for academic communities to prioritize a forward-thinking approach. Digital literacy is a critical aspect of future medical pedagogy. Telehealth has shortcomings such as limited physical examination capability and lack of options for hands-on management like OMT, but mastering telemedicine early in training will prepare future physicians for known and unknown challenges their patients will face.

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