PERSPECTIVE

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Telehealth: from the abstract to necessity to competency

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Abstract

The COVID-19 pandemic caused significant disruption in medical education. With disruption comes the opportunity for innovation. Telehealth had been growing rapidly in many fields of medicine prior to the pandemic; however, the necessities of social distancing, scarcity of personal protective equipment, and mandates to prevent unnecessary exposures for healthcare workers and patients alike, brought opportunities for the exponential expansion of telehealth. With the expansion of telehealth services came the need to expand the curriculum in telehealth to prepare medical students to return to vastly transformed clinical settings as well as prepare them for a future clinical landscape likely to incorporate telehealth to a much greater degree. The University of Colorado School of Medicine (CUSOM) rapidly developed a course in telehealth to prepare students for this changing clinical environment. Simultaneously, a faculty development curriculum was created to support clinical faculty new to telehealth in basic skills and teaching in a virtual environment. Lastly, adaptations were made to the summative Clinical Practice Exam administered to students at the completion of clerkships to incorporate telehealth. Recognizing the importance of achieving competence in telehealth, the CUSOM has taken steps to invest in the development of comprehensive and integrated telehealth curricula. Many creative and innovative solutions have been adopted in the wake of this pandemic to allow medical education to continue despite many hurdles and barriers; many of these will not persist past the pandemic. However, we expect telehealth clinical skills and the curricula developed to support them to remain relevant long past the time when the COVID-19 pandemic has faded into history.

KEYWORDS

competency, COVID-19, curriculum, medical education, telemedicine

1 | BACKGROUND

In March 2020, the coronavirus (COVID-19) pandemic brought about major disruptions in medical education. Given steeply rising cases in Colorado and hospital concerns related to shortages of personal protective equipment (PPE), the University of Colorado School of Medicine (CUSOM) decided to remove all medical students from the clinical environment several days before the American Association of Medicine Colleges (AAMC) called for medical schools to

suspend all student clinical rotations.[1] The subsequent months were filled with a flurry of activity aimed at designing and implementing online curricula, organizing student service work to support COVID-19 care and research, restructuring student schedules, and providing emotional and academic support to students facing unprecedented uncertainty. At the same time, devising a plan to safely return medical students to meaningful clinical learning experiences became of utmost importance. Discussions with CUSOM's clinical partners highlighted student access to PPE as the most critical limitation resuming their involvement with in-person clinical care; in the height of the crisis, students were not prioritized for this very limited resource. Until adequate PPE could be secured for frontline healthcare workers, students could not safely return to the clinical environment as this would have siphoned PPE away from those who needed it most.

As communities remained on lock-down and PPE shortages continued, systems of care rapidly evolved in our hospitals in response to the pandemic. Students, eager to reengage with patient care, were quickly integrating into virtual patient care in creative and innovative formats through service and online course work. Students assisted with the post-discharge care of patients that had been hospitalized with COVID-19, connected with elderly community members experiencing loneliness and isolation, and provided emotional support and linkage to care for healthcare workers in need. These examples are not unique to the CUSOM; similar stories of student activism and service were well-described around the world.[2,3] Many of these responses illustrated ways in which students could engage remotely with care teams, teaching faculty, and patients.

Simultaneously, clinical systems around the country rapidly developed and expanded telehealth systems, which allowed healthcare providers and patients to interact safely. Prior research revealed practicing physicians may be reluctant to adopt telehealth due to concerns related to a decrease in quality of care, loss of personal connection with patients, privacy concerns, liability concerns, and shortfalls in reimbursement mechanisms.[4-6] Yet the COVID-19 pandemic called for rapid adoption of new systems of care. Suddenly, telehealth proficiency became an essential clinical skill for practicing clinicians and trainees alike; however, our students lacked any formal training. Similarly, our cadre of clinical faculty largely lacked telehealth training themselves, much less faculty development in how to effectively engage remote learners during telehealth encounters. Therefore, it was in this environment of necessity that the CUSOM curriculum in telehealth was born. It derived from our students' valuable experiences and was designed to meet the needs of learners, faculty, healthcare systems, and patients.

Telehealth in the United States is not new and encompasses a wide range of specialties and clinical practice settings,[7] yet its adoption into routine clinical practice has been variable, and less than half of US medical schools incorporate this training into their clerkships.[8,9] There have been calls to develop training to ensure graduates are prepared to meet the needs of the increasingly digital clinical care environment where care is being transformed to include video, telephone, and email communication.[10] Several medical schools and graduate medical training programs have reported on the successful development of curricula aimed at teaching core telehealth skills, many developed rapidly in response to acute training needs during the pandemic.[11-13] An international review published in 2019, prior to the pandemic, demonstrated the growing integration of telehealth training into undergraduate medical education with diverse offerings spanning case-studies, clinical rotations, and tele-assessments.[8,9] Recognition of the need to incorporate telehealth competencies into medical education across the continuum was tangible nationally in the publication of the AAMC's telehealth competencies developed to guide curriculum development across specialties and at all levels of training on September 14, 2020.[14] The COVID-19 pandemic has hastened progress in building and integrating curricula in telehealth to best prepare medical trainees for a future in which telehealth will most certainly remain prominent in clinical practice.[7]

Here we describe the approach, intermediate outcomes, and planned next steps in our fast-paced journey to develop, implement, and assess a meaningful telehealth curriculum. The CUSOM adopted the American Academy of Family Practice definition: Telehealth refers to a broad collection of electronic and telecommunications technologies and services that support at-a-distance healthcare delivery and services. Telehealth technologies and tactics support virtual medical, health, and education services.[15] Prior to March 2020, at the CUSOM, telehealth was often thought of in the abstract; a clinical skill adopted by few teaching faculty in our clinical training environment and not taught to our students with intentionality. Over the following six months, telehealth became a necessary clinical skill adopted by almost all clinical practitioners and medical students, and this necessity born of the pandemic was met with a rapidly developed minimalistic curriculum. Looking forward, an opportunity exists to carefully define competencies and integrate a telehealth curriculum with other core clinical skills. We are thoroughly evaluating the needs of our learners and faculty, while planning for the future of telehealth at the CUSOM. Concurrently, the CUSOM is undergoing a curriculum reform, which will provide an opportunity for the seamless integration of new telehealth competencies and curricula.

2 | PRE-CLERKSHIP PREPARATION

The University of Colorado School of Medicine has a robust, longitudinal clinical skills course, which spans the two-year

pre-clerkship phase of the curriculum. This curriculum encompasses communication and interpersonal skills, physical examination, and clinical reasoning skills, as well as a continuity preceptorship experience. By the end of the first year, students are expected to demonstrate patient-centered communication and interpersonal skills to obtain a comprehensive medical history, perform a core physical exam, and apply initial clinical reasoning skills. The second year introduces advanced clinical skills and challenges students with patient encounters of increasing complexity, requiring the synthesis and application of these skills. All modes of training, practice, & assessment traditionally occurred during face-to-face sessions with both patients and standardized patients. In March 2020, the COVID-19 pandemic necessitated a pause to this in-person curriculum and adaptation to a virtual format.

For the Class of 2023, our first-year students, the clinical skills curriculum, and student assessment were rapidly transitioned to a video conferencing platform to continue uninterrupted student training. The communication skills curriculum continued in virtual classrooms with coaches facilitating small groups of students, who interviewed standardized patients. It immediately became apparent that students, faculty, and standardized patients would require essential skills training for the virtual environment. In addition to technologic training, some foundational face-to-face communication skills (i.e., skills used to begin the encounter as well as those used to build rapport and sustain the relationship and flow) were added and adapted in order for students to meet a rudimentary level of success when communicating with a patient via a video conference platform. We were conscious to not conflate the adjustments to the traditional communication curriculum for a telehealth communication curriculum, as the later certainly requires a distinctly modified set of communication competencies to ensure quality and safety.[10]

Physical examination teaching and learning via a video conferencing platform posed additional challenges. Just as in-person learning activities were suspended, the Class of 2023 was poised to learn and practice additional cardiovascular and pulmonary physical examination maneuvers critical for investigating abnormal pathophysiology (i.e., assessing jugular venous pressure and auscultating abnormal heart and lung sounds) with standardized patients. Employing a video conferencing platform, these skills were taught in small groups by Standardized Physical Exam Teaching Associates (SPETAs), who utilized various interactive instructional methods including illustration, demonstration, Socratic questioning, and teach-backs. While 81% of the class felt the objective of the session were met and 98% of the class felt engaged throughout the session, only 68% of the class felt the session improved their ability to perform these physical examination maneuvers. Of note, the Class of 2022 had been able to participate in this session with traditional face-to-face

instruction by SPETAs during the prior academic year, and 98% of the class felt the session improved their ability to perform these physical examination maneuvers. Given these student responses, this session was repeated for the Class of 2023 once in-person learning activities were resumed with similar results to prior in-person offerings.

Interestingly, the Class of 2024 was taught a core head and neck exam by SPETAs utilizing a video conferencing platform and the aforementioned methods due to ongoing COVID-era restrictions for this examination, and students did not report the same degree of concerns as had been expressed by their peers regarding the additional cardiovascular and pulmonary video conference-based teaching sessions. It should be noted that the majority of the core head and neck exam maneuvers rely upon inspection and palpation. These findings suggest that certain physical examination maneuvers are better suited for video-based teaching and learning than others, and this likely mirrors straightforward, patient-assisted maneuvers that can easily be employed during a telehealth encounter.[16] While this rapid transition for first-year students was underway, and needs were being recognized and adjusted in real-time, the Class of 2022, our second-year students, was engaged in a dedicated USMLE Step 1 study period. This two-month window prior to the start of their clerkships presented an opportunity to plan and deliver a skeleton telehealth curriculum, with aims to provide basic background information and support the development of telehealth skills prior to the start of clerkships. This curriculum aimed to prepare our students to engage with patients and preceptors in a virtual environment to provide safe and effective care, while simultaneously reassuring clinical partners that students had telehealth skills training prior to their start date.

A select group of faculty and students formed a Telehealth Task Force charged with performing a needs assessment, determining the goals of the telehealth curriculum, and developing curricular materials for students and faculty. The task force consisted of clerkship directors, communication skills faculty experts, faculty representatives from each of our primary clinical partners, faculty with information technology (IT) expertise, and student volunteers. This group participated in telehealth training and webinars as available and completed a literature review related to the telehealth curriculum in undergraduate medical education (UME). The group conducted interviews with students, clerkship directors, and clerkship faculty to determine the areas of greatest need for training.

From this needs assessment emerged core content areas prioritized for the development of online modules that could be completed by students asynchronously prior to beginning clerkships. Five modules were developed: (a) Web-side manner: etiquette for virtual phone or video visits, communication skills required to develop rapport with patients, and situational awareness, while maintaining

professionalism during a virtual visit; (b) Physical examination: discussion and demonstration of observations and physical examination maneuvers by body system that might be possible during phone or video encounters; (c) COVID-19 care by telehealth: basic information about the clinical presentation and virtual care for patients with COVID-19 as well as instructions for the initial management of patients with a suspected COVID-19 diagnosis via telehealth; (d) Learning and succeeding virtually: tips and strategies to engage meaningfully in the virtual environment with faculty including seeking feedback and requesting direct observation of telehealth skills; (e) Health equity: introduction of concepts surrounding the benefits of telehealth in improving access to care and the challenges related to technology access, using a medical interpreter in a virtual encounter, and patient comfort and familiarity with virtual care. Completion of the course modules and earning a passing grade on associated quizzes was necessary for students to pass the telehealth pre-clerkship course prior to the start of clerkships.

3 | VIRTUAL CLERKSHIPS

The Class of 2022, our third-year medical students, was nearing the end of their clerkships in March 2020 when they were removed from the clinical environment. During the subsequent three months, this class participated in a COVID-19 service-oriented elective allowing students to creatively meet the needs of local hospitals, communities, and patients. In May 2020, student resumed their clinical clerkship training via newly designed, virtual clerkships. These virtual experiences consisted of online synchronous and asynchronous didactics, case-based virtual simulations, reading assignments, and in some courses, participation in telehealth. Clerkships that were successful in the early integration of telehealth utilized ambulatory clinical settings and had students observe encounters as a third party. For example, the neurology clerkship allowed students to observe telehealth appointments in which all three parties (patient, physician, and student) were remote and debrief visits with teaching faculty afterward. The clerkships that were able to integrate telehealth into their virtual courses required students to complete the telehealth modules described above.

Evaluation of this course demonstrated that 74% of students found the telehealth clinical skills training (communication skills, practical tips for managing a visit, and physical examination skills—Modules 1 and 2) to be mostly or very useful. Seventy-five percent of students rated modules on student learning success in a virtual environment to be mostly or very useful (Module 4). Students were provided with site-specific guides across all third-year clerkships and fourth-year rotations to assist with the technology interface and support

telehealth functionality. Fifty-six percent of students found these guides to be mostly or very useful.

4 | STUDENT AND PATIENT DISPARITIES

The transition to online curriculum and patient care brought to the forefront challenges students may face related to virtual environments and challenged the CUSOM to support students in developing equal opportunity for learning. Students experienced inadequate internet connections, concerns about visibility in their homes, and social isolation. These issues are not unique to medical education and are well-described in the lay press as well as scientific scholarship related to K-12 education.[17,18] The CUSOM worked to maintain student access to the campus library and other private administrative space with adequate spacing and cleaning to ensure all students could access stable internet. This proved essential for students participating in pre-clerkship courses and patient care by telehealth. The CUSOM provided IT support for virtual platforms, specifically teaching how to create backgrounds. As is true across all swaths of our society, the COVID-19 pandemic exposed disparities among our student body as we worked to engage students in the telehealth curriculum. We continue to strive to mitigate these and support our students in achieving an equitable educational experience.

Similarly, the COVID-19 pandemic has both exposed and exacerbated disparities among patient populations.[19] Telehealth may decrease barriers in access to care by relieving challenges related to transportation, child care, and time off work, which may disproportionately impact populations prone to health inequity. However, telehealth's inherent reliance on technology may further increase barriers to accessing care among vulnerable populations such as those of low socioeconomic status, patients with disabilities, patients experiencing homelessness, those living in rural areas without reliable internet access, and the elderly.[20-23] As medical educators, attention was paid to how these challenges and opportunities could alter the variety of patients cared for by medical students, as well as the importance of simultaneous discussion of disparities in the context of COVID-19 and telehealth. It is too early to tell if the case-mix experienced by our students will be significantly impacted by these factors. Furthermore, in most training settings at the CUSOM, students were exposed to a mix of in-person care and telehealth, mitigating some of the potential impact of this shift in care delivery.

5 | FACULTY DEVELOPMENT

Although the majority of our faculty in ambulatory settings were seeing patients exclusively or primarily by telehealth,

often from their own homes, there was initially some reluctance by individual faculty members to accept medical students into their virtual practices. Faculty reported high levels of stress in learning to care for patients and provide high-quality care through this unfamiliar modality. They described a lack of tools and time to consider how a student might be integrated into the virtual environment. Many felt as though they did not have the bandwidth to add teaching to their already overfilled plates.

Thus, a high priority for the Telehealth Task Force was the creation of faculty development and resources to support faculty and enable the return of learners to this very different and challenging clinical environment. The Task Force prioritized its work in three major areas. First, the Task Force generated IT guides for each of the CUSOM's major hospital system partners. These guides included detailed instructions on how to add third parties to telephone and video visits, expectations for student documentation of telehealth visits, and quick tips for students to independently and securely access electronic health records from their own homes. Next, the Task Force created a two-page tip sheet on strategies to actively engage students in virtual patient care. We aimed to encourage faculty to work with students in a precepting model, in which students had an independent role when interacting with patients and then deliver oral presentations to faculty similar to an in-person encounter. Providing specific strategies to achieve this model empowered faculty to transition from students simply "shadowing" telehealth visits as a third party to having an active, defined role during encounters. Finally, the Task Force authored a one-page tip sheet on remote teaching, which included suggestions on how to provide topic-specific teaching as well as learner assessment and feedback to students, with whom faculty may never meet in-person.

6 | IN-PERSON CLERKSHIP INTEGRATION

Much of the telehealth curriculum developed for students and faculty prior to the return of students to clinical environments had focused on ambulatory settings, especially primary care. However, in July 2020, when our students returned to their in-person clinical rotations, students continued to engage in telehealth across all specialties, who were utilizing telehealth in very diverse ways. For example, pre-natal visits were being performed virtually in OB/GYN clinics using remote monitoring technology, inpatient rounding was occurring through telephone communication with the patient, while observing through windows to prevent unnecessary patient exposure, and ambulatory psychiatry encounters were exclusively delivered by telehealth. As a result, clerkship directors engaged with their faculty to understand what additional telehealth

skills were necessary for students to be successful in those specific environments. Clerkship directors and teaching faculty have demonstrated incredible flexibility and tenacity in the face of a rapidly evolving curriculum and training opportunities designed to meet the needs of students throughout the COVID-19 pandemic.

7 | CLINICAL PRACTICE EXAMINATION ADAPTATIONS

The Clinical Practice Exam (CPE) is a 10-station Objective Structured Clinical Examination (OSCE) administered at the end of the clerkship year. The exam roughly follows the format of the United States Medical Licensing Examination Step 2 Clinical Skills (USMLE Step 2 CS), during which students are required to obtain a focused, patient-centered clinical history, perform a directed physical examination, communicate effectively with a variety of patients, generate a prioritized and supported differential diagnosis, recommend appropriate next steps in the evaluation of the patient, and document the clinical encounter. The CPE reflects core clinical conditions and competencies of the clerkship year. Students receive individualized feedback on their clinical skills, specifically communication & interpersonal skills, physical examination, clinical reasoning, and post-encounter documentation. This assessment allows for students to improve and reinforce clinical skills as they transition to their final year of schooling, prepares students for the format and expectations of the USMLE Step 2 CS, and evaluates the effectiveness of the CUSOM's clinical curriculum. The exam is criterion-referenced, which determines the level, if any, of additional required student remediation. The CPE exam is typically administered to students in May through August following students' clerkship year, and, thus, was significantly impacted by the pandemic.

Shortly after in-person learning activities were paused due to the COVID-19 pandemic, USMLE Step 2 CS (Clinical Skills Evaluation Collaboration) test centers closed for testing. In early May, 2020, the USMLE announced plans for a modified Step 2 CS examination that would employ a telehealth model whereby examinees and standardized patients would interact via a web-based platform. Given that one of the goals of the CPE is to prepare students for the USMLE Step 2 CS, the CPE underwent a rapid cycle needs assessment, goal revision, and redesign that anticipated the most likely modifications and permutations that the Step 2 CS would deploy. The CUSOM felt these changes in the CPE were essential as most students had limited experience with telehealth up to this point in their training, and we were concerned that a high-stakes summative assessment in an unfamiliar, novel format would disadvantage students. Additionally, with the changes in the pre-clerkship and clerkship curricula, we felt these modifications to the CPE

would serve as an opportunity to obtain baseline data on how traditional clinical skills competencies translate to a virtual environment, better understand the training and assessment needs for a telehealth encounter from the perspective of learners, standardized patients, and the administrators of the exam.

To achieve these goals, the decision was made to transition half of the CPE encounters a video-conferencing platform and maintain half of the encounters in the traditional format. For additional safety and in addition to PPE, task trainers, or partial manikins, were added for any in-person exam maneuvers that would place the learner in close proximity to a standardized patient's face to decrease the risk of coronavirus transmission. For the virtual encounters, after obtaining the focused, patient-centered history, students completed a checklist of physical examination maneuvers they would have chosen to perform had the patient been available for an in-person examination. Thereafter, students were provided documentation of a complete physical examination, including abnormal findings, of the simulated patient. This eliminated our ability to assess performance of physical examination skills for virtual encounters; however, students could be assessed on their selection of physical examination maneuvers relevant to patients' histories and presentations. In addition, based on the provided description of physical exam findings, students could be assessed on their recognition of pertinent examination findings and how the interpretation of these findings impacted their clinical reasoning. Students were prepared for this exam by written, recorded, and live instructional sessions; however, students did not have the opportunity to practice this new format in a formative simulation session prior to the CPE. Given minimal student and rater training for the modified portions of the exam and time constraints, which limited the ability to perform robust standard setting, some of the CPE's domain pass points were modified to include norm-referenced elements. It is likely that some of these same concerns led to the USMLE's announcement to suspend the Step 2 CS for a minimum of 12 months, which came only a few weeks prior to the CPE administration. Despite the USMLE's decision, we proceeded with the CPE to achieve the other key goals of this examination beyond USMLE Step 2 CS preparation.

Fifty-nine percent of students felt prepared to complete the tasks required of the CPE, and, interestingly, the same percent reported preparing less for the CPE than they would have upon learning of the USMLE Step 2 CS suspension. Students had mixed reactions to this format. While they appreciated the exposure to virtual encounters, they felt the flow of the virtual encounters was awkward and were frustrated about being assessed in an unfamiliar format. Students consistently requested additional training in virtual encounters and telehealth. Aggregate and comparative analyses of the hybrid and traditional CPEs are underway, and these findings will help to inform future iterations of the School's telehealth curriculum, competencies, and assessments. Recognizing the clinical importance of telehealth, the expectation that the USMLE will incorporate telehealth cases into the Step 2 CS exam in future iterations, and the value the CUSOM is placing on the telehealth curriculum, we plan to develop assessment cases for future exams that more accurately assess competency in telehealth.

8 | LOOKING AHEAD

Now well into our academic year with students fully engaged in clinical rotations, it is clear that telehealth is a dynamic and pervasive field of medicine, in which our future physicians need unique skills to be successful clinicians. It is also clear that while our first iteration of a telehealth curriculum, built from necessity and urgent need, filled an important gap, it fell far short of what is demanded by society, our students, and our faculty. Thus, we look forward to 2021 with aspirations for telehealth to become a fully integrated component of the CUSOM curriculum and assessment plan, guided by the recently published AAMC Telehealth Competencies.[14]

Our first step has been to secure funding for a Telehealth Curriculum Director, who will evaluate the training needs of students and faculty and guide the development of a longitudinal, integrated curriculum aimed at developing competency in providing and teaching virtual healthcare. We hope to leverage the CUSOM's ongoing curriculum reform, which creates an opportunity for intentional integration and creative development as we prepare our students to practice medicine today in the midst of the COVID-19 crisis, tomorrow when the true benefits of telehealth can be realized for all members of our society, and in the more distant future when our graduates will be fully prepared for the next pandemic or national emergency requiring rapid adaptability in our health care delivery system.

CONFLICTS OF INTEREST
None.

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