

Blending Virtual and In-Person Simulation Encounters to Teach Clinical Skills to Preclerkship Medical Students during the COVID-19 Pandemic

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The coronavirus disease 2019 (COVID-19) pandemic has required significant innovation because of the physical distancing requirements and decreased in-person activities. Creative solutions were needed throughout medical education, but particularly in courses teaching students history taking, communication, and physical examination skills. These unique adaptations to delivering education have advanced the understanding in medical education of how to use technology, expand pedagogical skills, and create new opportunities for students to learn.^{1,2} We share our experience innovating in this perspective to highlight lessons learned.

Problem

COVID-19 has had an enormous impact on medical education. Curricula have been forced to change and clinical experiences truncated.³ This strain has greatly affected those in the preclerkship years as medical schools eliminated or adapted in-person experiences.⁴ In addition, students who normally spend time shadowing at clinical sites, engaging in community service, and volunteering with free clinics have seen their opportunities dwindle. Reduced clinical exposure has highlighted the importance of teaching the fundamental clinical skills to ensure that students in the preclerkship years are adequately prepared.⁵

The University of Cincinnati College of Medicine Clinical Skills (CS) course teaches students the clinical skills of history taking and physical examination during the first 2 years of medical school, using standardized/simulated patients (SPs). Students work in groups of three or four to gather a history, perform

a physical examination, order and interpret diagnostic data, and communicate a plan to SPs. These encounters take approximately 60 minutes and include debriefing and teaching afterward with faculty. This experiential course occurs every week and provides an opportunity for students to practice important skills in a low-stakes environment, work and learn from one another, and develop their professional identity.

When the pandemic started in Spring 2020, the course was forced to convert to a virtual platform; however, this was not a sustainable solution for students to learn these fundamental clinical skills. As the University of Cincinnati College of Medicine prepared to bring preclerkship students back to campus in Summer 2020, there were many problems to address in the CS course: physical distancing would not allow students to continue working in small groups in person, converting completely to a virtual (“telehealth”) format would not allow students to practice performing the physical examination, minimizing risk was necessary to make students and SPs feel comfortable returning to the Simulation Center, and maximizing limited faculty time was needed to effectively debrief with groups of students.

Solution

We transformed the CS course into a “hybrid” model, in which students continue to work in small groups, but some are virtual and some are physically present in the Simulation Center. One student per group comes to the Simulation Center with a mask and face shield and their teammates log into Zoom (Zoom Video Communications, San Jose, CA) from any location. The SP (with mask) is in an examination room in the Simulation Center and logged in to the same Zoom session. The in-person student is also logged in to Zoom on a computer in the hallway outside their SP examination room. The encounter starts as a completely virtual encounter where students take a history from the SP, simulating a “telehealth” encounter. After the history is taken, students inform the SP that someone will be in shortly to examine him/her. The SP turns off his or her webcam, allowing students to plan for the examination by discussing their differential diagnosis and examination maneuvers that may help in their evaluation of the patient. Examination rooms are recorded via CAELearningSpaceEnterprise, with two video feeds available, so SPs use the share screen function on Zoom to show the live feed of the examination room when the in-person student enters the room. Remote students are able to observe their classmate’s physical examination and the SP’s reaction, as well as communicate additional thoughts to their classmates.

When the physical examination is complete, the student exits the examination room to rejoin the Zoom encounter in the hallway, where all of the students discuss any changes to their differential. The SP (not in character) then uses the share screen function again to share a PowerPoint created for each case. The PowerPoint (Microsoft, Redmond, WA) contains the physical examination findings that can and cannot be simulated and hyperlinks to various diagnostic tests. Students decide what laboratory values, imaging, and so forth that they want to obtain

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The authors did not report any financial relationships or conflicts of interest.

Accepted May 25, 2021.

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0038-4348/0-2000/114-815

DOI: 10.14423/SMJ.0000000000001323

in their workup of the patient. Once students have seen all of the diagnostic tests they want and have discussed their diagnosis and plan, the SP stops sharing the PowerPoint and returns to character. Students then have an opportunity to communicate the diagnosis and plan to the patient over Zoom. Once the encounter is complete, the SP shares feedback on various skills such as communication, teamwork, and empathy. Finally, those students who are in-person move to a large debriefing room, where they can debrief with faculty, physically distanced, wearing masks and face shields. The virtual students are moved to Zoom breakout rooms, where they have time to debrief with faculty members after the encounter.

Lessons Learned

We found this hybrid format a good way to address the challenges imposed by COVID-19 while preserving many of the positive learning experiences from the CS course and creating new opportunities. This format allowed students to still work in teams, allowing for collaboration and learning from one another, while still practicing the physical examination with SPs. In addition, students gained new communication skills from the “telehealth” environment, and because the in-person student practiced the physical examination while peers watched, this allowed students to provide one another dedicated feedback. The PowerPoint with hyperlinks to many diagnostic studies has allowed for unique opportunities to discuss the value and evidence-based workup of patients.

The unique flow of the encounter and dependence on technology requires dedicated training of the SPs. Overall, SPs have adapted easily to this new format while developing new skills themselves, and sessions flowed smoothly within the first couple of weeks. We have one simulation staff member fully present to manage Zoom and help SPs with screen sharing or other

technology issues. The learning curve was steep for this simulation staff member, but the skills gained have been deployed in many other simulation activities.

Students have been engaged throughout these hybrid encounters, and formal and informal feedback has been universally positive as students crave clinical experiences. Students are extremely active in the chat function, communicating their thought processes with one another and offering suggestions to peers. This offers a unique opportunity for students to refine their clinical reasoning skills in real time. Finally, because groups are combined virtually and in-person after the case, this new format has created more time for in-depth discussion with faculty about various aspects of the case. Since teaching can be virtual, we also have been able to recruit new volunteers (fourth-year students, residents, other junior faculty) to teach and have them record their teaching for review and faculty development. Teaching virtually has taught all of us new ways to engage students and preserve interactivity, which we hope will expand pedagogical practice when returning to more in-person activities.

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