Video in situ simulation for medical student education during the COVID-19 pandemic
La simulation in situ par vidéo dans l’enseignement aux étudiants en médecine pendant la pandémie de la COVID-19

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Article abstract

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Video *in situ* simulation for medical student education during the COVID-19 pandemic

La simulation in situ par vidéo dans l’enseignement aux étudiants en médecine pendant la pandémie de la COVID-19

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**Implication Statement**

The COVID-19 pandemic has limited in-person experiences for medical students, especially in situations involving aerosol-generating procedures. We designed a video *in situ* simulation to orient students to critical steps in COVID-19 intubation algorithms. Small groups of students were paired virtually with facilitators (faculty and residents) and watched a video of an *in situ* simulation of emergency staff performing a protected intubation, with discussion points appearing on screen at discrete times. The simple design drives engagement, discussion and allows for scheduling flexibility with no risk to the learners. It can be adapted to several different scenarios or levels of training.

**Innovation**

In small groups, students viewed a video-recorded *in situ* simulation via teleconference under the guidance of a resident or staff physician. The nine-minute video followed a patient with respiratory failure secondary to COVID-19 requiring intubation. It was recorded *in situ* with clinicians, including nurses, respiratory therapists and physicians, in their native environment and without interruptions or prompting. Integrated within the video were six-freeze frames with discussion points aligned with video content. For example, the first point pertains to team members involved in protected intubations and appears on the
screen as the team lead assigns roles (Figure 1). This encourages students to reflect on what they had seen in real time while providing opportunities for discussion. Teaching points were tailored to medical students, and included: protected intubation principles, crisis resource management principles including closed-loop communication, and use of negative pressure rooms and personal protective equipment.

This session was integrated into the emergency medicine core clerkship at McMaster University, in part replacing in-person simulation sessions that were limited by distancing requirements. While medical students are currently not participating in the care of COVID-19 patients at McMaster, they will rapidly transition to residency where they will be expected to care for these patients. Therefore, this simulation served as a key introduction to the principles of resuscitation of COVID-19 patients.

Conclusions
This student-led initiative represents a novel and low-stakes means of introducing junior medical learners to simulation and protected intubations, while circumventing issues related to the COVID-19 pandemic. Preliminary data suggest that the session provided a safe and effective learning environment. Compared to the benefits of traditional scripted education videos on learning and motivation, this offers the additional advantage of increased interactivity and exposure to unscripted errors and debriefs unique to simulation. Limitations to implementation relate to technical requirements and the ability to facilitate the initial simulation. Interpretation of results is limited by their subjective nature, thus necessitating future evaluation of objective learning outcomes. Given the ease of use and safety for learners, this design can be expanded to other topics.

Evaluation
We collected feedback assessing learner comfort from two cohorts of students using pre- and post-session surveys. McMaster HiREB granted an ethics exemption for this data collection. Of the 45 participants, 15 paired surveys were returned, representing a response rate of 33%. Most survey respondents (14/15, 93%) either agreed or strongly agreed that the learning atmosphere was comfortable, and 67% (10/15) either agreed or strongly agreed that it was easy to get actively involved in the session. When comparing pre-and post-session surveys, 93% of respondents reported an increased level of comfort with protected intubation following the session.

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References