Hybrid-virtual simulations for Canadian medical students during the COVID-19 pandemic

Riley M Reel,1 Kevin I Gunther,1 Samuel R Kirk,1 D Graham Oliver Landells,1 Anne L Theilmann,1 Morgan J Haines1

1Faculty of Medicine, University of British Columbia, British Columbia, Canada
Correspondence to: Riley M. Reel, Institution: Island Medical Program, University of Victoria, Victoria, BC; Institution Address: PO Box 1700 STN CSC, Victoria, BC, V8W 2Y2; email: rreel@student.ubc.ca
Published ahead of issue: April 20, 2021; CMEJ 2021 Available at http://www.cmej.ca
© 2021 Reel, Gunther, Kirk, Landells, Theilmann, Haines; licensee Synergies Partners
https://doi.org/10.36834/cmej.71744. This is an Open Journal Systems article distributed under the terms of the Creative Commons Attribution License. (https://creativecommons.org/licenses/by-nc-nd/4.0) which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is cited.

Introduction
In response to public health guidelines for physical distancing during the COVID-19 pandemic, in-person learning transitioned to virtual formats.1 This resulted in the cancellation of an existing in-person simulation program for University of British Columbia medical students.2 Early in the pandemic we offered fully virtual simulations. However, these lacked the fidelity of real clinical environments using mannequins, monitors, and medical equipment.3,4 We began offering a novel form of hybrid simulation. Hybrid simulation is defined as two or more simulation modalities used simultaneously with the intention of creating a more realistic experience.5 In this case we combined virtual and in-person simulation modalities. This allowed participants to join simulations via video conference and direct an in-person assistant (as shown in this video: https://youtu.be/xM8LIPWC_OM). To our knowledge, this is the first program offering this novel form of hybrid simulation to Canadian pre-clinical medical students.1,6,7

This was a quality improvement initiative per TCPS2 Article 2.5 and was exempt from review by the UBC Ethics Review Board.
Innovation
Using Zoom™ (Zoom Video Communications Inc, USA), medical students attended simulations held in the Centre for Interprofessional Clinical Simulation Learning in Victoria, BC. The centre has high-fidelity mannequins, cardiac monitors, medical equipment, and multiple camera angles which were crucial for participants to visualize all simulation details (Figure 1).

Two in-person simulation assistants ran the sessions. One assistant controlled the mannequin and cardiac monitors using the Laerdal Learning Application (Laerdal Medical, Canada) and communicated information requested by participants; the other assistant performed physical examinations and interventions on the mannequin as directed by participants. A medical resident attended virtually to facilitate and lead debrief discussions. The cases were written by medical students, reviewed by medical residents, and based on UBC’s MD Undergraduate Program curriculum.²

During the simulations, pre-clinical students discussed differential diagnoses, ordered appropriate investigations, and initiated medical management. This offered an opportunity to practice clinical reasoning in a remote, high-fidelity environment. The Zoom™ chat function was used to record case details, which supported effective communication and limited multiple participants speaking simultaneously.

Outcomes
Medical resident facilitator feedback indicated that hybrid simulations offered an “excellent education modality” for students to engage in simulations during the COVID-19 pandemic. Facilitators did not need to control the mannequin and, therefore, were able to pay closer attention to students’ clinical reasoning during hybrid simulations, which enabled them to lead more comprehensive debrief discussions. Hybrid simulation required participants to demonstrate advanced verbal communication to clearly direct the in-person assistant. Limitations of hybrid simulation included the lack of hands-on skills acquisition for participants, the time required for setup, and access to a simulation centre with integrated audio-visual equipment. Facilitators suggested this simulation method could be adapted for rural healthcare workers.

Next steps
Hybrid simulations combine virtual and in-person simulations, allowing students to practice history-taking, physical examinations, and procedures, while also abiding by public health guidelines for physical distancing during the COVID-19 pandemic. This model could be expanded to train allied health professionals from multiple geographic locations. Future steps include offering hybrid simulations to interdisciplinary healthcare learners, including rural healthcare professionals, and obtaining ethics approval to assess participant learning outcomes.

Conflicts of Interest: The authors do not have any conflicts of interest to declare.
Funding: The authors received no financial support for this project.

Acknowledgements: We would like to thank the Centre for Interprofessional Clinical Simulation Learning for providing their expertise, simulation centre, and audiovisual equipment. We would also like to thank Nick Slater, Erin Chahley, Lisa Hackett, Anthony Hinde, and Robin Stone for their participation in the Hybrid Simulation video. As well, we want to thank Sarah Douglas, the founder of the Island Medical Program Simulation Team.

References
   https://doi.org/10.1002/msj.20127
   http://dx.doi.org/10.1016/j.ecns.2014.02.004
5. Agency for healthcare research and quality. *Healthcare simulation dictionary.* Rockville, MD; 2020; 
   https://doi.org/10.23970/simulationv2
   https://doi.org/10.1111/medu.14245