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care of hospitalized patients has changed greatly around the world with the novel coronavirus pandemic. New protocols have been created to prioritize the safety of healthcare professionals while optimizing care for patients with coronavirus disease 2019 (COVID-19). Simulation has proved to be an effective modality in shaping new practice guidelines and disseminating information. At both academic and community hospitals within our institution, COVID-19 intubation and cardiopulmonary resuscitation (CPR) guidelines were introduced to pediatric intensive care unit (PICU) faculty and staff in March 2020. A video simulation and socially distanced just-in-time (SD-JIT) simulation based on these guidelines were implemented to provide safe and efficient interdisciplinary training.

The video simulation enacted a truncated clinical team’s response to a deteriorating COVID-19 patient with acute hypoxemic respiratory failure and pulseless electrical activity arrest. We embedded pauses throughout the video and posed questions before key steps to encourage viewer engagement. The 16-minute video included scenario introduction and critical steps to minimize aerosols during intubation (13 minutes), followed by an uninterrupted CPR demonstration (2 minutes) and summary (1 minute).

Socially distanced just-in-time simulation of these scenarios (see Figure, Supplementary Digital Content 1, simulation scenarios of child with COVID-19 in respiratory failure and pulseless electrical activity arrest, http://links.lww.com/SIH/A733) was implemented using on-duty faculty who facilitated 30-minute sessions (3-minute introduction, two 10-minute scenarios, 7-minute debrief). All participants in attendance were scheduled to work a full shift, went through their respective hospital screenings, and wore procedural masks throughout the simulation according to institutional policy. Learners remained socially distanced by at least 6 ft during introduction and debrief, but not during the simulation. Each session was limited to a maximum of 5 learners and 2 simulation facilitators. The mannequin and all equipment used in simulation were disinfected between each learner group.

At the academic hospital, participants were asked to complete a 5-question survey before and after SD-JIT simulation that addressed their anxiety level and feeling of preparedness toward performing intubation and CPR on a COVID-19 patient.

### Video Simulations

The video simulation was viewed 176 times within 1 month of publishing and 356 times at the time of article submission. There were 21 respondents (residents, fellows, advanced practice practitioners, and faculty) to the embedded questions within the video. When surveyed 8 months after the initial training, 7 providers of 15 survey respondents reported accessing the video independently or before their scheduled shift. Twelve respondents reported continued confidence in safe intubation of these patients. Four faculty shared the videos with colleagues.

### In Situ Simulations

At the academic hospital, 35 SD-JIT simulations were performed with 131 participants. Responses to questions regarding level of anxiety and feeling of preparedness are in a table in SDC 2 (see Table, Supplementary Digital Content 2, table of responses to questions regarding level of anxiety and feeling of preparedness, http://links.lww.com/SIH/A734). There were 232 responses, 108 before and 124 after simulation. Participants felt less anxious and more prepared to safely perform intubation and CPR after simulation. Participants were also more confident about donning and doffing personal protective equipment. Workflow and communication barriers were

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**Summary Statement:** Respiratory failure and cardiopulmonary arrest in patients with SARS-CoV-2 infection require life-saving procedures that aerosolize virus and increase risk of transmission. To educate faculty, trainees, and staff on safe practices, a video with embedded questions was created demonstrating intubation and cardiopulmonary resuscitation in pediatric SARS-CoV-2+ patients. Just-in-time in situ simulations of these scenarios were also carried out while adhering to isolation and social distancing protocols. We demonstrated that use of simulation to train physicians and staff during the COVID-19 pandemic is possible and effective in improving confidence in performance of the procedures.

**Key Words:** COVID-19, Just-in-Time simulation, in situ simulation, video simulation.

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reviewed and addressed during debriefing (see Table, Supplementary Digital Content 3, issues and solutions discovered during simulations in the academic and community hospitals, http://links.lww.com/SIH/A735).

At the community hospital, 8 SD-JIT simulations were performed with 37 participants. Each new session incorporated changes discussed and the process was re-evaluated until workflow improved (see Table, Supplementary Digital Content 3, http://links.lww.com/SIH/A735).

With relatively low patient volumes in community PICUs, keeping a consistent level of skill and workflow with constant changes in staffing and fluctuation in patient acuity is difficult. During the pandemic, the patients in our community PICU were moved to the pediatric acute care unit and the new setting required adjustment to a new workflow and the presence of non-PICU personnel.

Before this project, medical staff had received multiple daily electronic briefings, but none addressed the details of performing high-risk aerosolizing procedures with a focus on ensuring PICU staff safety. Our video simulation minimized unnecessary exposures and optimized overall safety by demonstrating correct steps in accordance with the new guidelines and providing interactive materials to those not on duty. In addition, the video with embedded questions placed the remote learner in the role of a leader. Obtaining written responses of the leader’s actions was helpful to identify knowledge gaps and inform methods to minimize variation when implementing a new procedure. Videos that pause for a learner response may serve as a research tool to assess learner knowledge and as a method to improve training quality.

Use of video and SD-JIT simulation to train staff in safe practices during the COVID-19 pandemic is possible and effective at both academic and community PICUs. Video demonstrations can provide learners with details necessary to effectively perform high-risk procedures, while minimizing staff exposure to a novel coronavirus. Embedded questions engage learners and inform the launch for a new procedure. Lastly, SD-JIT simulation identifies best workflow and communication modalities before the real clinical event with improved team member confidence and preparedness.