

Background

- This novel approach to aerosolization of simulated viral spread allows for continued natural interactions and maneuverability within team-based respiratory and cardiopulmonary arrest scenarios
- To mimic viral spread, our simulated model emanated GloGerm from the respiratory tract.
- Our unique model allowed for realistic team responses such as bag-mask ventilation, endotracheal intubation, and Cardiopulmonary Resuscitation (CPR) allowing for observation with a blacklight at simulation conclusion of particle containment or spread in true arrest scenarios

Method

- We modified a Laerdal® ResusciAnne QCPR mannequin (Stavenger, Norway) to emanate simulated virus particles (GloGerm®, Moab, UT) from the oropharynx (Figure 1)
- Vyair AirLife Nebulizer was retrofitted to emulate the powdered GloGerm (Figure 2)
- This allowed the powder to emanate from the mannequin's mouth, but remained 'invisible' to mimic viral shedding
- Slow continuous emanation of simulated virus from the oro- and nasopharynx was used to replicate aerosolized respiratory particles without the need for a human subject.

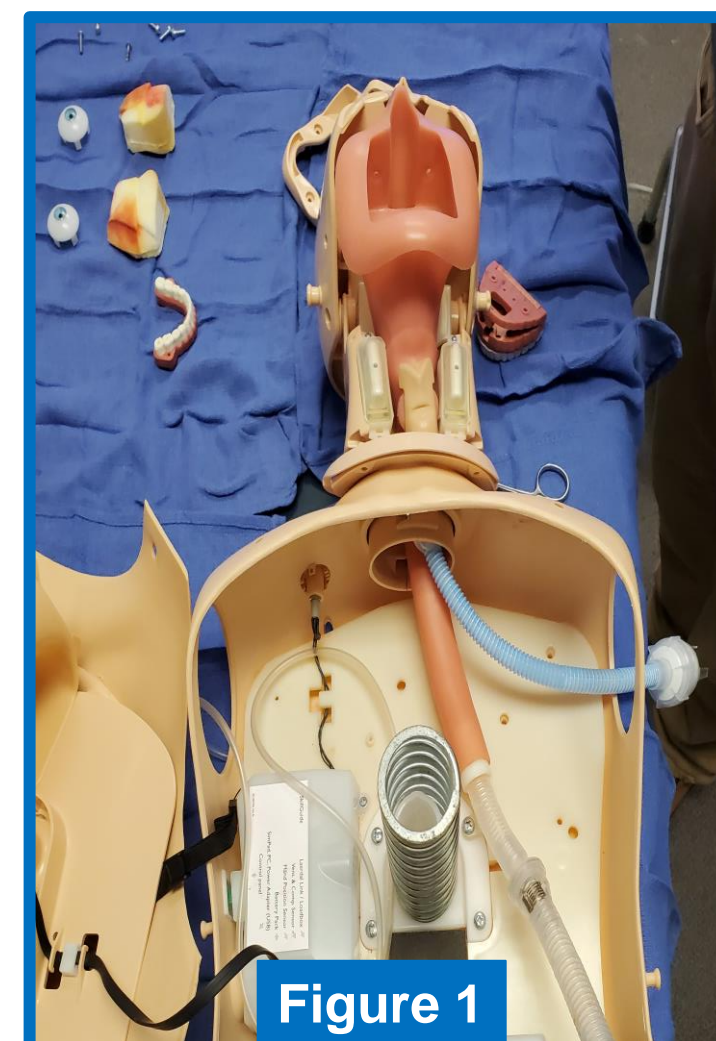


Figure 1

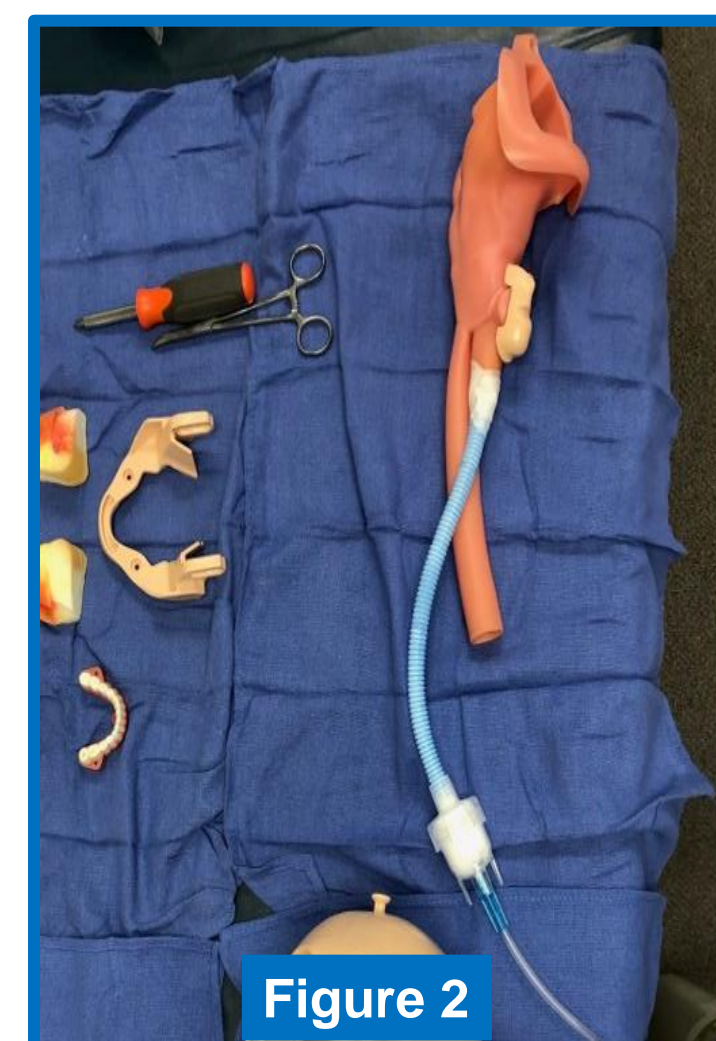


Figure 2

Results

- Contamination outcomes include the number of contaminated protective equipment and distance of furthest contaminated object (Table 1)
- Out of n= 43 respondents from 13 scenarios, the feedback for this mannequin embedded simulation is shown (Table 2)
- The team and the room were evaluated for contamination there after using a blacklight to expose fluorescent simulated virus particles (Figure 3-5)

Table 1

Contamination Rate	Participants n=43 (One Data Point Missing)
Head (Cap, Hair)	26/42
Mask (With Face Shield)	19/42
Gloves, Gowns, Environment	42/42
Furthest Distance:	
103 inches/8.58ft./ 2.61m	

Table 2

Likert Scale Survey Question Strongly Disagree=1; Disagree=2; Neutral=3; Agree=4; Strongly Agree=5	Score
Pre-Brief	
There was a clear understanding of participants' expectations during the in-situ simulation	4.39
I was adequately introduced to the simulator and its capabilities	4.50
The simulation objectives were clearly defined	4.56
Scenario	
The subject matter content was presented clearly in the scenario	4.58
The simulation was realistic and made sense	4.34
The simulation scenario was applicable to my practice	4.67
The simulation was an appropriate amount of time	4.50
The facilitators allowed me to feel comfortable during the simulation	4.63

Conclusion

- Our model was successful in visualizing particulate spread Pre & Post CPR
- Unlike other models, our simulation allows for full team-based CPR simulations to occur creating a more realistic simulation during the COVID-19 pandemic
- While some participants felt protected from the contamination due to their PPE, other participants focused on strategies to further minimize future contamination
- Future innovations of a simulated virus could be replicated for further research studies and projects in a modified mannequin limiting live test subjects.

Figure 3

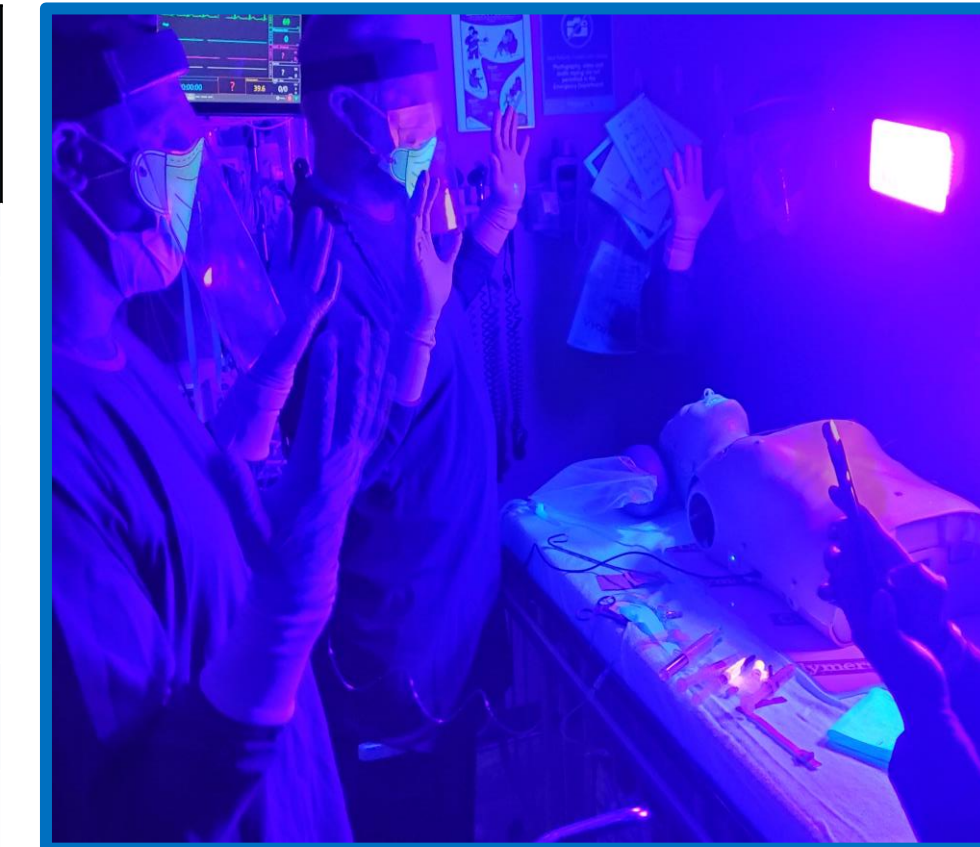


Figure 4



Figure 5

