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Expanding the Fidelity of Standardized Patients in Simulation by Incorporating Wearable Technology

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In previous columns in this series on standardized patients (SPs), we have explored creative uses for this simulation modality for a variety of clinical scenarios, including care of gerontology patients, managing large-scale disaster drills, and special circumstances related to pediatric patients. For this column, I interviewed two individuals who have partnered to develop wearable technology for SPs to increase the fidelity of their educational efforts.

Amy Cowperthwait, MSN, CNS, is Co-Director of Healthcare Theatre, Simulation Faculty in the College of Health Science at the University of Delaware. Amy Bucha, MS, is a mechanical engineer and serves as the liaison between the College of Health Sciences and Engineering at the University of Delaware, and is both a researcher and a simulation technician. Amy Cowperthwait and Amy Bucha have partnered to develop technological devices that SPs can wear to increase simulation fidelity, including a chest vest for tracheostomy care. The vest is not seen by the learner as a gown is placed over it, yet it has sensors in it that trigger the SP to initiate a severe reaction when the learner touches the carina during suctioning.

MEH: Please describe your experience with SPs and how you are incorporating technology use.

AC: I have worked with both high-fidelity manikins and SPs and have always incorporated patient-centered care into simulations. I appreciate the ways that SPs can provide verbal feedback to learners and help them with their communication skills. I also appreciate how SPs can display nonverbal behavior in how they react to what learners do and say. Even though they can enhance learning, they have limitations in critical care scenarios. For example, I find it frustrating to have a SP portray a critically ill patient, but yet have to put an artificial IV arm in the bed with them. Implementing this so-called hybrid simulation is not very realistic and can detract from the learning. I found this also to be true with tracheostomy care, as low-fidelity task trainers, and even high-fidelity computerized manikins, do not provide feedback on how deep the learner suctions. In order to help solve this pain point, I consulted with Amy Bucha to see if we could develop a device to help increase the fidelity of our tracheostomy care scenarios.

AB: As a mechanical engineer with a focus on biomechanics, I work as a simulation technician and researcher and thus deal with a variety of technology. I am taught to look at issues with technology and help solve problems. When Amy Cowperthwait identified that tracheostomy care on a low- or high-fidelity manikin does not provide adequate feedback to the learner, we developed a chest piece that can be put on a SP. It is essentially a tracheostomy teaching device that actually interacts with the SP and is not seen by the learner. If the learner suctions too deeply, it sends a buzz signal to the SP that tells the SP how to react.

AC: One thing we learned during this process is that SPs do not know how to react to suctioning that is too deep unless we properly train them. So, we interviewed former tracheostomy patients so that SPs can hear firsthand about the patients' thoughts, feelings, and emotions. We have found that this training has been helpful to the SPs in performing their role and giving objective feedback during the debriefing. In addition, we train the SPs to remain nonverbal throughout the simulation. Many of them have to work on their improvisation skills as they are used to being verbal in most other types of simulations.

MEH: It sounds like the two of you have partnered well to develop a useful, high-fidelity device that a SP can wear. What other devices are you implementing?

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AC: We took everything we dislike about simulation manikins and tried to address that in our product development! We are working on several other wearable devices, including IV arm sleeves and genitalia devices. Our devices are created to remove the barriers for SP usage and to create an environment where learners can do assessments and interventions on critically ill patients. It is important to remember that, even though SPs can provide excellent learning experiences, they have a variety of limitations. For example, you cannot put a hole in a SP's neck and have them be a realistic tracheostomy patient all day! Hence, having a wearable device opens up many avenues for learners to practice critical care interventions.

We also are working on incorporating diversity into our devices. One problem with many of the manikins currently on the market is that they have Caucasian features but have black skin, which is not realistic. Our devices allow the SP to be whoever they are. So, you can use a diverse population and allow them to speak for themselves.

MEH: What other points have you both learned during your experiences together?

AC: When I first started using SPs in my simulations, I looked at SPs as only benefiting our learners. I have come to find that SPs also benefit as they become better patient advocates when they and their family members receive health care. Through their work with our learners, SPs learn advocacy, increased comfort in giving objective feedback, and an overall understanding that healthcare providers are human. Mutual respect is key, and the relationship is mutually beneficial.

AB: When I was trained as an engineer, we were taught to identify problems and come up with a solution; however, it was not emphasized that it was important to focus on problems identified by the end users themselves. Amy Cowperthwait came to me with problems that she saw over the years, and we worked on products that were relevant and would make a difference. The idea of her coming to our engineering department made the design process totally different because we got direct feedback on how we needed to have the products developed and could test our design in the simulation lab right away.

MEH: How have users reacted to your products?

AC: We started showing our products to users at the National League for Nursing (NLN) conference in 2015. We received much positive feedback and are continuing to seek input from end users. One thing that I have noticed is that not all schools of nursing and other practice environments use SPs, so they might just put the tracheostomy vest on a student or other volunteer without any training. This is not ideal, so we are trying to support end users with education on how to optimally use the device.

AB: The device can also be used to help family members and all levels of caregivers learn how to help patients. Maria Colandrea, DNP, NP-C, CORLN, CCRN, a nurse practitioner of otolaryngology at the Durham, North Carolina Veterans Affairs (VA) Health Care System and an adjunct professor at the Duke University School of Nursing, is one of the end users of this device. According to her, ''Tracheostomy suctioning is an important skill nurses and family members need to know. Currently, the practice modality consists of suctioning a plastic manikin, which does not translate to real life. This device allows for valuable feedback not offered by the manikin, and can increase competency while preparing both staff and family members for patient reactions when performing tracheostomy suctioning.''

MEH: What are your next steps?

AC and AB: We are applying for grants to develop more products. The students are developing prototypes and researching it at the university. We are working hard to address end user needs in the simulation environment and welcome hearing from others what their pain points are. Our ultimate goal is to improve health care.

MEH: What advice do you have for nursing professional development practitioners who would like to use SPs?

AC: Do not be afraid to use SPs and explore the opportunities to make them realistic and patient centered.

AB: Reach out from the healthcare group to engineers to help solve real-world problems either in practice or in the simulation labs. Solve a problem with a purpose.

My interview with Amy Cowperthwait and Amy Bucha shed light on ways to integrate technology with SPs and how to appreciate the mutual respect and mutual benefits that SPs bring to not only our simulation programs but also the broader patient care environment. This column concludes our yearlong series on exploring SPs and ways to creatively use them in the clinical arena. As we conclude this series, what insights on using SPs have you discovered? Have you started using SPs to help make your scenarios more realistic and believable? Please email me at mary.holtschneider@va.gov to continue the conversation.

Resources

Cowperthwait, A. L., Campagnola, N., Doll, E. J., Downs, R. G., Hott, N. E., Kelly, S. C., … Buckley, J. M. (2015). Tracheostomy overlay system: An effective learning device using standardized patients. *Clinical Simulation in Nursing*, *11*, 253–258.

Simon, E. L., Lecat, P. J., Haller, N. A., Williams, C. J., Martin, S. W., Carney, J. A., & Pakiela, J. A. (2012). Improved auscultation skills in paramedic students using a modified stethoscope. *Journal of Emergency Medicine*, *43*(6), 1091–1097. doi:0.1016/j.jemermed.2012.01.048