Increasing performance in high-stress environments with EFFECTIVE SIMULATION
Cortisol, the infamous stress hormone often associated with the well-known fight-or-flight response, plays a major role in the emergency medicine profession. A 2012 study published in Prehospital and Disaster Medicine examined the impact of stress on paramedic performance in a simulated environment. This study had two groups: high-stress and low-stress simulations. Results indicated that paramedics in the high-stress group had poorer performance overall, with higher cortisol levels and a greater likelihood of commission memory errors (i.e., recalling that you did something you didn’t).¹

Acute stress is an inevitable reality for emergency responders, which is why training is so critical. This research wouldn’t have been possible without the use of simulation to begin with, but it also illustrates the underlying importance of training and preparation for high-stress environments, where performance is already at risk from the nature of the profession alone. The question is: “What is the most effective way to train?”
LIMITATIONS OF CLASSROOM TRAINING

Eastern Kentucky University conducted a retrospective analysis study on simulated stress training and paramedic student performance. The National EMS Academy in Lafayette, Louisiana, had a program called Trauma Lanes from 2009–2012. The chief purpose of the program was to better equip paramedic students to handle the stress of their profession. A retrospective analysis measured the effectiveness of the program and found that students showed “significant improvements in performance after 12 simulations and continued improvement through the end of 19 simulations” with a need for additional simulations for “optimal” performance. Another one of the key findings of this study was that desensitizing paramedics to stress wasn’t enough. The real value was in combination with overtraining, hence the previously mentioned finding that more simulations would provide optimal performance results.

More training seems like an obvious conclusion. But how you train is just as important as frequency. Without the use of high- or mid-fidelity manikins in the classroom, how realistic does a scene feel for the student? How does the instructor pull quantitative, detailed analysis on their students’ performance? And without countless extra hours to creatively write scenarios, how can instructors keep up and write increasingly complex and rare scenarios that better equip students for any possibility they’d see in the real world?

Those low-frequency, high-acuity events are excellent training events that can be achieved through simulation without ever jeopardizing the health and safety of both patients and providers. But instead of having to program these scenarios themselves, many manufactured devices come with software aimed at making this process seamless if the instructor finds limitations in the many scenarios provided.

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For an EMS student, doing is better than saying. Having a student talk through the steps they would take is not the same as actually performing the task. “As an example, actually have them draw up the dose of epinephrine in a pediatric anaphylaxis case rather than just saying how much of the drug they would administer. You will find that a substantial number of learners who can tell you the right dose struggle to actually administer it properly,” said Kim McKenna, MEd, RN, EMT-P, and lead author of the position paper on EMS simulation from the National Association of EMS Educators’ (NAEMSE).
The benefits to using simulation over traditional classroom educational methods have been proven countless times. In 2015, NAEMSE published a paper specifically advocating for expanded use of simulation in EMS education.\(^5\) Simulation in the classroom overcomes challenges with limited data and realism, but there’s many more benefits to how its use can enhance the educational experience for both the trainer and the student.

### BENEFITS OF SIMULATION

Beyond complex scenarios and better performance data, there are many other ways simulation training enhances the educational experience. One of those ways is psychological fidelity—or the concept of creating realism around such psychological factors as “emotions, beliefs and self-awareness of participants in scenarios.”\(^5\) Non-technical skills like psychological emotions or communication are just as critical as technical skills for the student’s learning experience and overall competence development in preparation for the field.

For these reasons, many professions in the medical field have been using simulation training and explored additional benefits around communication and teamwork, enhanced through the debriefing process in team scenarios.

The *Journal of the American Medical Association (JAMA)* published a study in 2017 looking at how much realism is needed in simulation training for surgeons.\(^3\) This study correlated simulation with non-technical skills like “teamwork, leadership, situational awareness, and decision-making,” which were found to be essential skills for overall mastery of the craft. In fact, these non-technical skills were tied to better overall proficiency and positive patient outcomes, and the study suggested these non-technical skills were further enhanced by the use of simulation training.\(^3\)

A pediatric dental clinic also used situ simulation to test their emergency preparedness, as well as team and system process.\(^6\) The high-fidelity simulations identified the following vulnerabilities: team communication, equipment availability, dosing errors, and role assignment. As a result of the study findings and based on participants identifying the simulation as a learning experience, the dental clinic immediately incorporated mandatory simulation training.\(^6\)

Communication in and around the simulation itself is critical for the EMS provider as well. This skill is an important part of the profession, not only in working with fellow providers on scene, but also for a vital part of the patient experience, such as the handoff to other care providers. Lacking communication skills for proper handoff puts patient care at risk and has even been linked to medical errors.\(^7\) The inclusion of a briefing prior to simulation start, as well as a
facilitated debriefing afterward can highlight “individual knowledge/skill gaps and those of the system or team.”

Simulation technology allows instructors to design scenarios that require effective team collaboration and communication to encourage those skills to develop. Simulation technology allows instructors to design scenarios that require effective team collaboration and communication to encourage those skills to develop. Two examples of real patient encounters that could require effective team communication are treating a cardiac arrest or any scene with multiple patients. Test the student not only on their individual skills, but also their ability to work in a team.

Knowing communication is important is one aspect, but how can instructors measure it? Like all parts of the simulation, creating specific objectives are part of the process. Strong objectives should follow the S.M.A.R.T. philosophy and be “specific, measurable, achievable, relevant, and time-oriented.”

It’s possible to tie these objectives directly to communication with some of the following activities: introduction of crew to the patient, explanation of care provided to the patient, delivering news about patient outcome, and patient handoff communication with additional professionals.

With specific and measurable objectives in place, post-simulation debriefing and delivering feedback is one of the last steps in conducting a valuable simulation. Team members participate in the debriefing by discussing their perspective on the events that occurred and actions taken. It’s helpful for the facilitator of the discussion to be external to the team, and passive feedback in place of guided conversation is not effective.

In addition to objective observations about events that took place during the scenario, “use of behavioral-based measurement enhances feedback by directly linking scenario events and team behaviors.”

Using simulation to enhance the learning experience for EMS providers is not just supplementary but paramount. But knowing how to use simulation is only half the equation. Selecting the right simulation partner for your training needs is the other half of the practice.
CAE began in the 1950s with a start in another high-pressure discipline known for their use of simulation: military aviation. The company evolved to expand their practice into healthcare.

The CAE Ares mid-fidelity manikin is specifically designed around ALS and ACLS emergency team training. Ares features interactive realism with bilateral chest rise and fall for spontaneous breathing, and performance metrics for educators that can be easily tracked on the accompanying Maestro software. The software tracks rate and depth of compressions, chest recoil, compression fractions, ventilation, and ventilation to compression ratio. The wireless and tetherless convertible manikin provides patient gender flexibility, and the manikin demonstrates pupillary responses such as jaundice, hemorrhage, ptosis and more.

Ares is incredibly portable and versatile. EMS providers can auscultate the heart, lungs and bowels, obtain vascular access, and perform CPR with defibrillation and cardioversion pacing. CAE offers streamlined simplicity without sacrificing unrivaled patient physiology, positioning them as an ideal partner for your simulation use in the classroom.

SUMMARY

Simulation in the healthcare setting isn’t a luxury but rather a methodology becoming commonplace, if not mandatory. It offers a way to standardize training in a controlled setting to adapt to a shifting healthcare paradigm that focuses on innovative technology and increased emphasis on patient safety. Simulation training with mid- to high-fidelity manikins has shown to improve stress handling and increase performance in real life situations.
Outcomes can be measured, and non-technical skill competencies can be developed. Leveraging the technology of simulations helps educators create better EMS providers for the field, further elevating the care delivered by the EMS profession and ultimately, the patient experience.

**REFERENCES**


