

Prehospital Provider Training with Augmented Reality Simulation: A Prospective, Mixed Methods Study

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ABSTRACT

Background: Pediatric emergencies challenge prehospital clinicians and require regular training among these clinicians to maintain competence. However, municipal fire services and other EMS organizations often have limited funding, time, and other resources to devote to training. We aimed to determine the acceptance and learning efficacy of Augmented Reality (AR) simulation training, specifically the Chariot Augmented Reality Medical (CHARM) simulator, among EMS providers.

Methods: We developed an AR pediatric seizure response simulation after learning of the EMS providers' training needs and challenges. We conducted focus group interviews after the EMS providers completed the AR simulation. Secondary outcomes explored the usability of the system with the System Usability Scale and ergonomics with the ISO 9241-400 six-item scale. Thematic analyses were performed on transcriptions of the interviews. Descriptive statistics were used to report the secondary outcomes.

Results: The AR simulator had an overall favorable assessment. It was considered effective for learning and for practicing critical communication. The software also adds an element of realism and stress that current training does not replicate. However, participants reported that there was a learning curve for the technology and almost half thought they would require technical support. The participants also suggested developing additional scenarios common in the pre-hospital setting.

Conclusions: By improving training of local EMS agencies, we can improve local communities' effectiveness when responding to pediatric emergencies. The CHARM software is being expanded to incorporate additional scenarios for EMS provider training.

The Chariot Program is a clinical research group within pediatric anesthesiology at Stanford Children's Hospital. They develop immersive technology software using projectors, virtual reality, and AR to reduce pediatric anxiety and pain, educate providers and patients, and supplement rehabilitation. The Chariot Program supplied AR headsets and access to the CHARM simulator for this project.