

PEDIATRIC ECMO CANNULATION TRAINER PROOF-OF-CONCEPT DESIGN AND IMPLEMENTATION

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Background: Background: Extracorporeal membrane oxygenation (ECMO) is a high-risk low-frequency emergency procedure. A significant need exists for low-cost and realistic Pediatric ECMO cannulation trainers that enable more versatile training options. Our goal was to create an inexpensive, reproducible standard for Pediatric ECMO cannulation simulation that can be distributed nationally and internationally.

Materials/Methods: The project team incorporated innovation processes, end user feedback, and quality improvement tools (4 PDSA cycles) to develop and finalize the new design and prepare for a new product evaluation pilot.

Results: The Pediatric ECMO Cannulation Trainer is an anatomically accurate model designed by front-line innovators at TCH to simulate all steps for cut down (not percutaneous) Pediatric ECMO neck cannulation in an 18-25kg patient. The model includes two major components; Neck simulator (single use) and heart (reusable). The clear 3D printed heart provides visualization during insertion of the wire/cannula. The neck simulator consists of; right neck with anatomically accurate landmarks, realistic tissue layers for cutting and spreading to expose the vessels, correct vessel (IJV/Carotid) positioning, color, and feel for cutting, suturing and cannula insertion. An ECMO cannulation tips and techniques skills video demonstrating cannulation and connection to the ECMO circuit was developed to complement the task trainer.

Conclusions: Design, development and implementation of the Pediatric ECMO Cannulation Trainer has produced valuable outcomes and opportunities to share lessons learned. The project demonstrated a multidisciplinary approach to develop novel simulation training opportunities for front-line staff. The realistic, versatile, cost-effective and reproducible Pediatric ECMO Cannulation Trainer design partnered with the tips and techniques skills video sets it apart from existing ECMO trainers. We anticipate the trainer will positively impact our pediatric patients and staff as well as learners in the US and other countries.

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