

**A comparative analysis of pediatric resident
performance during high-fidelity simulated
cardiopulmonary arrests**

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ABSTRACT

Background: The quality of basic and advanced life support delivered is directly associated with survival rates for victims of cardiopulmonary arrest. However, in a previous study of simulated cardiopulmonary arrests (sCPAs) pediatric residents performed poorly, with no clear improvement between first and third year residents. We designed an enhanced pediatric resuscitation curriculum (EPRC) focused on identified deficiencies.

Participants: Pediatric residents from an academic, tertiary care medical center.

Design: Prospective pre-post interventional study of residents managing an sCPA of a high-fidelity mannequin simulator.

Main outcome measures: Interval between the onset of pulseless ventricular tachycardia (PVT) to initiation of compressions and successful defibrillation, pre-shock pause interval, no-flow fraction and no-flow fraction.

Results: One hundred twenty-one pediatric residents participated. There were no significant differences in the baseline characteristics of the two cohorts. The EPRC was associated with a significant decrease in the median (inter-quartile range-IQR): *pre-shock pause*: [pre: 84 sec (26-162) vs. post: 8 (4-18); $p < 0.001$], *no-flow fraction*: [pre: 39% (22%-64%) vs. post: 30% (22%-41%); $p = 0.01$], and *no-flow fraction*: [pre: 74% (5%-100%) vs. 34% (26%-53%); $p < 0.001$]. Multivariable survival analysis revealed that the EPRC was associated with an increased likelihood of starting compressions within 1 minute of onset of PVT: [Hazard Ratio: 3.8 (95% CI: 2.0 – 7.2)] and defibrillating within 3 minutes of onset of PVT: [HR: 1.7 (95% CI: 1.03-2.65)]. In addition, third year residents are now significantly more likely to defibrillate within 3 minutes of onset of PVT than first year residents: [HR: 2.8 (95% CI: 1.5-5.1)].

Conclusions: Implementation of the EPRC was associated with improvement in performance across virtually all measures of quality CPR evaluated in our study. More research is needed to determine feasibility and generalizability of this curriculum to other settings and whether improved performance in a simulated setting translates into actual clinical practice.

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