In-Situ Simulation of In-Hospital Cardiac Arrest

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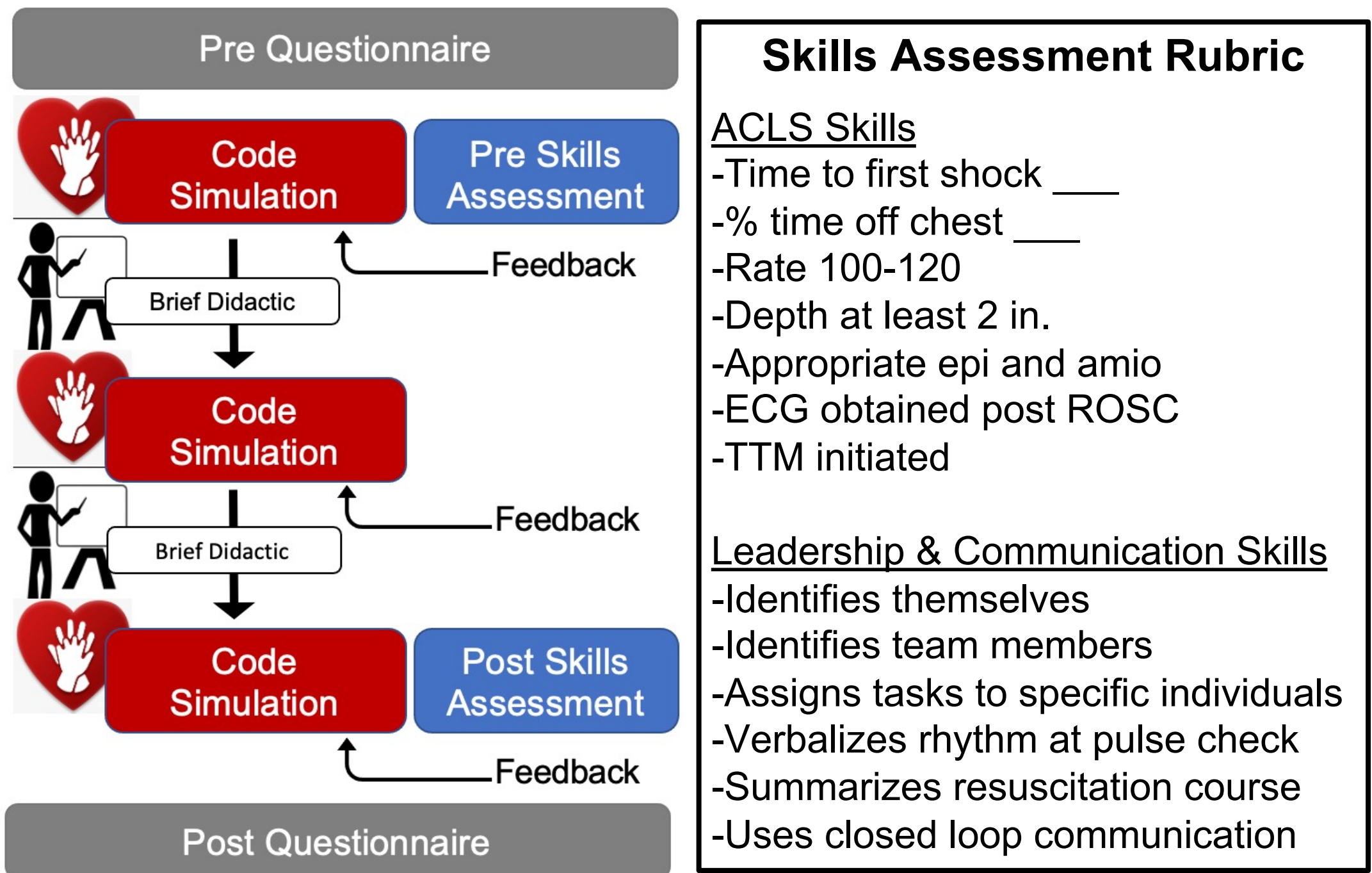
BACKGROUND

- In-hospital cardiac arrest (IHCA) resuscitations are frequently led by resident physicians, called upon to implement infrequently used, non-technical skills in an emergent situation
- Reinforcement of ACLS skills every two years is likely insufficient
- Cardiac arrest simulation is a well-established educational strategy

METHODS

- Needs assessment demonstrated that 95% of rising PYG 2 internal medicine residents feel unprepared to lead an IHCA resuscitation
- A one-hour, monthly educational intervention was developed for residents rotating in the cardiac ICU
- Prestan Series 2000 CPR Manikin and Simpl app were purchased for use in the cardiac arrest simulations

CURRICULUM OVERVIEW

Pre Questionnaire

Code Simulation → Pre Skills Assessment
↑ Feedback
Brief Didactic

Code Simulation
Feedback
Brief Didactic

Code Simulation → Post Skills Assessment
Feedback

Post Questionnaire

Skills Assessment Rubric

ACLS Skills
-Time to first shock ____
-% time off chest ____
-Rate 100-120
-Depth at least 2 in.
-Appropriate epi and amio
-ECG obtained post ROSC
-TTM initiated

Leadership & Communication Skills
-Identifies themselves
-Identifies team members
-Assigns tasks to specific individuals
-Verbalizes rhythm at pulse check
-Summarizes resuscitation course
-Uses closed loop communication

- Self-assessment of resident confidence was obtained using a 5-point Likert scale questionnaire
- Skill performance was assessed using a standardized rubric

Brief, in-situ cardiac arrest simulation improved resident confidence and performance
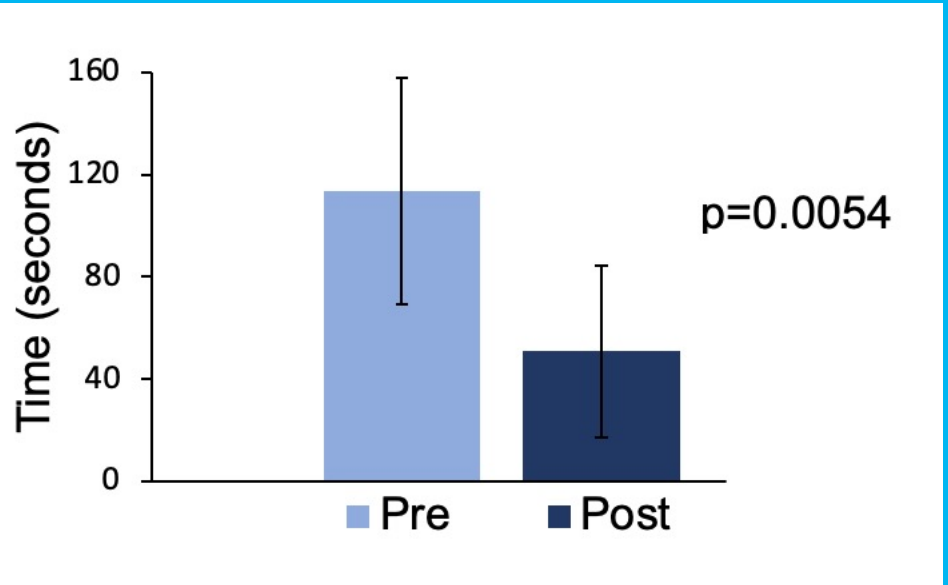
Fig 1. Time to First Shock

p=0.0054

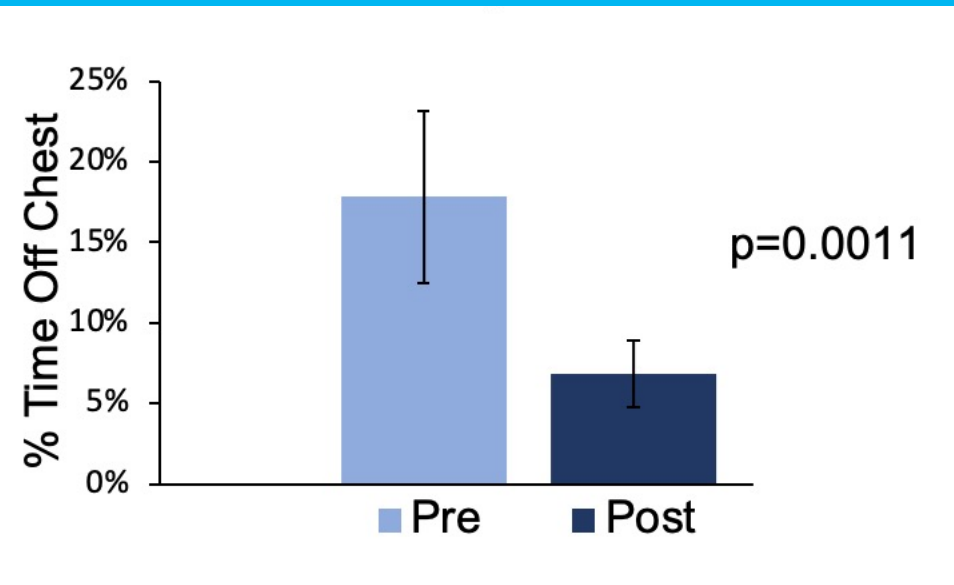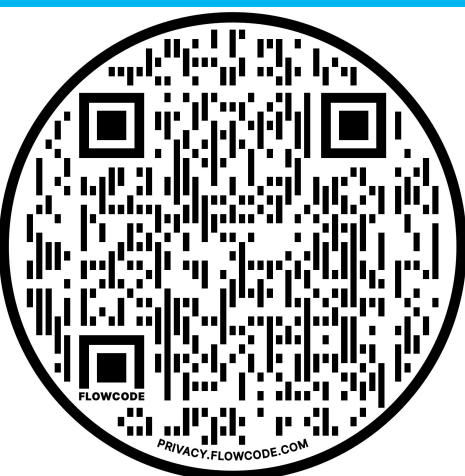### Fig 2. Interruptions in CPR

p=0.0011

Fig 3. Resident Confidence to Lead a Cardiac Arrest Resuscitation

1 2 3 4 5
Not confident ← → Very confident

Post
Pre

Percent of Residents
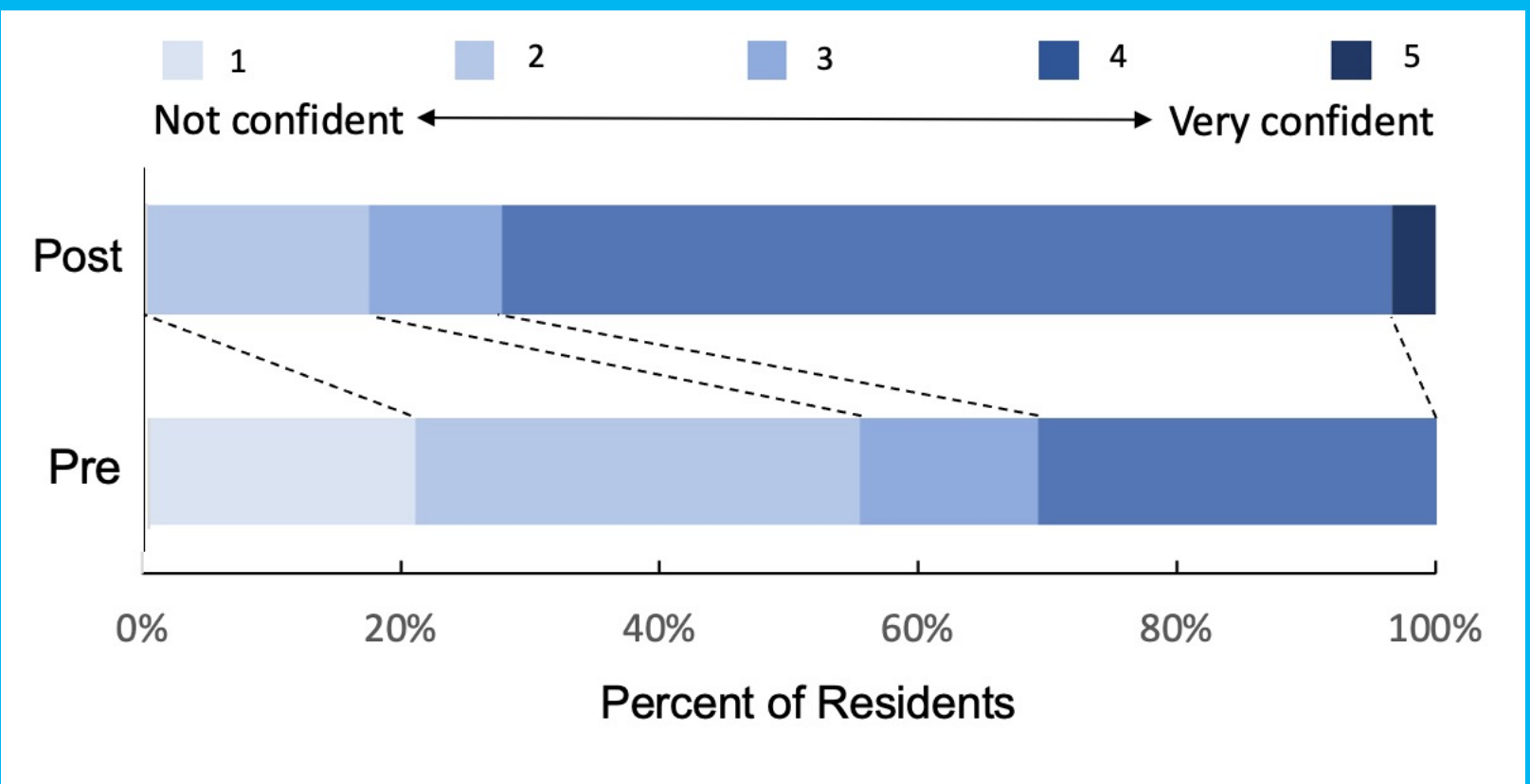
For more information, including skills assessment rubric, questionnaire and didactic slides, scan the QR code

RESULTS

- 7 sessions involving 42 residents completed to date
- There were statistically significant improvements in:
  - **Fig 1.** Time to first defibrillation (114±44 vs 50±33 sec)
  - **Fig 2.** Interruptions in CPR (18±5 vs 7±2 percent)
- Resident leadership and communication score improved, from an average of 3 to 6 on the standardized rubric
- On the Likert scale questionnaire, more residents reported feeling "somewhat confident" or "very confident" to:
  - A. Lead cardiac arrest resuscitation (**Fig 3**. 31 vs 72%)
  - B. Provide feedback on CPR quality (41 vs 69%)
  - C. Order appropriate medication and dose (38 vs 62%)
  - D. Provide high-quality post-ROSC care (34 vs 76%)
  - E. Stop resuscitation for futility (14 vs 69%)
- 100% of respondents reported the simulation curriculum improved their understanding of cardiac arrest resuscitation

DISCUSSION

- After the one-hour, in-situ cardiac arrest simulation, there were improvements in resident performance:
  1. Shorter time to first shock, <60 seconds
  2. Fewer interruptions in CPR, <10% of CPR
  3. Higher leadership and communications skill score
- There were qualitative improvements in resident confidence as evaluated by a Likert scale questionnaire
- This curriculum describes an effective low-cost alternative to high-fidelity simulation
- Further studies are needed to evaluate retention of performance gains over time

DISCLOSURE INFORMATION

The authors have nothing to disclose