

Cardiopulmonary Resuscitation (CPR) by EMS Personnel:

Measuring Performance, Reducing Errors and Improving Patient Safety

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BACKGROUND

- The likelihood of surviving a sudden cardiac arrest is increased if the victim receives properly performed CPR.
- Historically, however, CPR skills acquisition and retention has not been adequate, resulting in performance errors and patient safety concerns.
- The 2005 American Heart Association (AHA) Guidelines for CPR attempted to address these deficiencies by emphasizing the importance of uninterrupted high quality chest compressions.
- How well EMS personnel meet the 2005 AHA CPR Guidelines is unknown.

OBJECTIVE

- To measure adequacy of chest compression depth (1.5-2 inches), rate (100/min), and recoil (full).
- To evaluate the performance improvement impact of debriefing and real-time visual feedback training in EMS personnel.

VENTURA COUNTY EMS

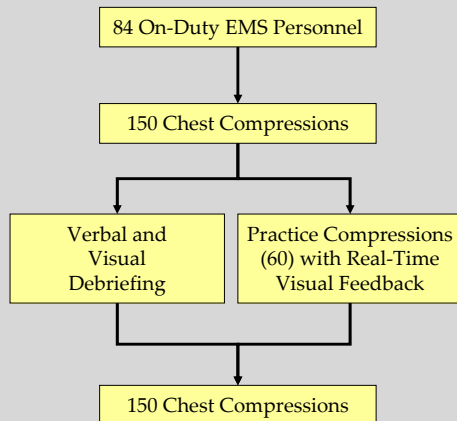
Population	813,000
Cardiac Arrests (Annual)	930
EMS Personnel	975
EMT-B	730
Paramedic	245
Fire Departments	6
Ambulance Companies	3
Hospitals	8

METHODS

- Subjects:* Eighty-four on-duty EMTs and paramedics performed chest compressions on a SmartMan© adult CPR manikin system from Ambu, Inc.
- Subjects were divided into two groups:
 - 69 subjects viewed their performance on the manikin systems' on-screen display and received guidance for improvement.
 - 15 subjects practiced 60 compressions (2 sets of 30) using the SmartMan© real-time on-screen feedback for each compression.
 - A second assessment was done for both groups after the specified intervention.

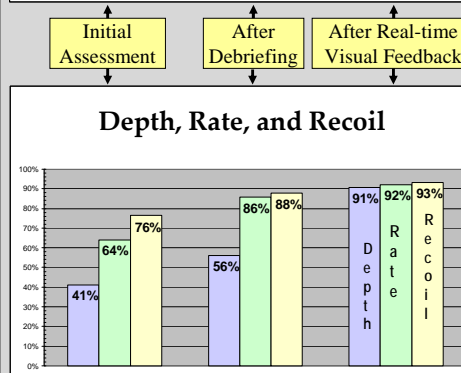
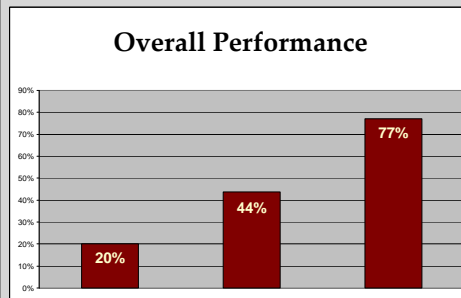
Outcome measures:

- Adequacy of depth, rate, and recoil of chest compressions.
- Performance differences before and after training intervention.
- Comparison of debriefing to real-time visual feedback training.



RESULTS

- Each assessment spanned five cycles of 30 chest compressions for a total of 150.
- At baseline, 20.2% (95% CI 14.1-26.3%) of the compressions met the 2005 AHA Guidelines for all three components: depth, rate, and recoil.
- This improved to 43.7% (95% CI 34.8-52.7%, $p < 0.0001$) after post-assessment debriefing.
- There was a greater improvement - to 77.1% (95% CI 68.7-85.4%, $p < 0.0001$) - after real-time visual feedback training.



AMBU SMARTMAN©



CONCLUSIONS

- Despite the 2005 AHA Guidelines emphasizing chest compressions, only a small minority of chest compressions done by this cohort of EMS personnel achieved the correct depth, rate, and release during an initial assessment.
- There is accumulating evidence that deficiencies in CPR skills worsen patient outcomes and negatively impact patient safety.
- Given the importance of correct chest compressions, there should be greater emphasis on improving and maintaining competency.
- A debriefing session significantly improved subsequent performance.
- Real-time visual feedback practice was superior to debriefing in improving performance.