Background

• Without bystander CPR, cardiac arrest survival decreases 7%-10% for every minute of delay until defibrillation
• Dispatcher-assisted CPR has been shown to increase the rates of bystander CPR and cardiac arrest survival
• Rapid delivery of uninterrupted chest compressions is a key component of successful resuscitation
• Changes to recent versions of the Medical Priority Dispatch System (MPDS) emergency medical dispatch (EMD) protocols have altered the pathway for cardiac arrest pre-arrival instructions
• The effect of these changes on time to first compression is

Setting

• Wake County, NC, is a mixed urban/suburban county encompassing 831 square miles with a population near 897,000.
• 75 emergency medical dispatchers
• 225 advanced life support personnel
• Trained emergency medical dispatchers utilizing the MPDS EMD protocol process all medical emergency calls
• Raleigh-Wake Emergency Communications Center (RWECC) is sole ambulance dispatch center for county.

Objective

To quantify the time to first compression for all cardiac arrest calls to a 911 center utilizing MPDS EMD protocol versions 11.2, 11.3, and 12.0.

Methods

• All calls identified as cardiac arrest at case entry by dispatchers at RWECC were eligible for inclusion
• Each cardiac arrest call is reviewed by a specially trained emergency medical dispatcher who serves as the quality improvement (QI) coordinator
• QI coordinator records specific event times for these calls, including time of chest compression initiation
• MPDS versions 11.2, 11.3, and 12 were in use by RWECC during the data collection period: October 2005 - March 2010

- Excluded calls:
  - Initially identified as another chief complaint
  - Dropped calls requiring dispatcher callback

- Any cardiac arrest calls requiring mouth-to-mouth ventilation prior to chest compressions
- Calls with barriers to effective communication (language issues, difficulty positioning the patient, emotional distress, etc.) not excluded

Data Analysis

• Time to first compression for adult cardiac arrest cases across MPDS protocol versions was primary outcome measure
• Kruskal-Wallis test used to examine differences in TTFC across the three protocol versions
• Under the assumption that EMD experience may potentially confound the TTFC, the overall relationship between TTFC and months of EMD experience was analyzed using Pearson correlation.
  - Differences in TTFC between novice (12 months experience or less) and experienced dispatchers were compared using Student’s t-test

Results

- 778 cases identified
  - 259 excluded
    - met exclusion criteria, missing data, etc.
- Overall Mean for time to first compression
  - 240.8 (±68.8) seconds
- No significant variation across protocol versions
  - $p = 0.08$, see Table 1 below
- Dispatcher experience also shows little variation
  - No difference in mean time to first compression between novice and experienced dispatchers
  - $p = 0.97$


<table>
<thead>
<tr>
<th>MPDS Protocol Version</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
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<th>Maximum</th>
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<td>238.5</td>
<td>81.8</td>
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</tbody>
</table>

Table 1

Limitations

• Outcome data unavailable, thus time to first compression effect on survival unknown
• QI compliance scores for individual calls not considered
• Demographic data for callers not available

Conclusions

• Overall mean time to first compression approximately 4 minutes with little variation across protocol versions
• Improvement over earlier MPDS protocol version that included pulse check and mouth-to-mouth ventilation instructions
• Does not compare favorably with older, non-MPDS protocols that included pulse checks and mouth-to-mouth ventilation
• Data suggest that the current MPDS D-CPR protocols have not yet been fully optimized with respect to minimizing time to first compression in cardiac arrest calls