Performance Goals for Dispatcher-Assisted CPR

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An estimated 600,000 Americans are victims of sudden, unexpected, out-of-hospital cardiac arrest (OHCA) each year.\textsuperscript{1} Emergency Medical Services (EMS) providers attempt resuscitation in 360,000 of these "EMS-treated" individuals. EMS crews declare another 240,000 victims dead on arrival because the cardiac arrest was un-witnessed and the victim’s body shows physical signs that death has not just occurred. Approximately 9.5% of EMS-treated cardiac arrest victims survived to hospital discharge. However, if one includes the 240,000 victims in whom EMS doesn’t even attempt resuscitation, the likelihood of surviving an out-of-hospital cardiac arrest in the United States is only 5.7%. Stated differently, only 1 in every 18 OHCA victims in the United States will survive to hospital discharge.

Despite these grim statistics, there are things that can be done to better the odds of survival for at least some of the victims. The likelihood of a favorable outcome increase substantially if the event is witnessed, occurs in a public place, bystanders call 911 and initiate chest compressions promptly, the initial rhythm is ventricular fibrillation, an automated external defibrillator (AED) is applied and used, and there is a prompt EMS response. Most of these variables are not under any one’s direct control but are merely subject to chance. A notable exception is bystander chest compressions that, on average, are being performed in only approximately one third of EMS-worked cardiac arrests but their frequency can be increased two-fold when 911 dispatchers issue instructions that are carried out promptly and effectively.\textsuperscript{2-4} Omission of instructions for mouth-to-mouth ventilation, which many laypersons are unwilling to perform on strangers, does not affect survival adversely due to the presence of agonal respirations and because the lung alveoli contain sufficient oxygen to maintain the arterial oxygen saturation >90% for at least 5-6 minutes with chest compressions alone.\textsuperscript{5-7} In short, early provision of effective chest compressions can continue to deliver life-saving oxygen to vital
organs such as the brain and “buy time” for EMS crews to arrive on scene.

911 dispatchers can only issue chest compression instructions to a caller who is next to a victim if the dispatcher recognizes that a cardiac arrest has likely occurred. It is well recognized that emergency medical dispatchers can be misled by layperson callers thinking that an unconscious person has simply fainted because the caller misinterprets agonal respirations or a brief period of grand-mal seizure activity that can occur after the onset of cardiac arrest due to cerebral anoxia. 8-11 Until now, little has been known about how frequently these, and other, factors affect cardiac arrest recognition or provision of dispatcher-assisted chest compression instructions by 911 dispatchers. Understanding more about these factors, and how to mitigate them, can help dispatchers develop better interrogation strategies that can improve recognition and shorten the time to initiation of life-preserving chest compressions.

In this issue of Circulation, Lewis et al. 12 report on their analysis of dispatch recordings and EMS records from 476 OHCA cases in King County, Washington during 2011. The authors sought to determine the type and frequency of factors that affected dispatcher 1) recognition of cardiac arrest and 2) provision of timely chest compression instructions. Not surprisingly, since this community and EMS system are world-renown for their excellence in emergency care, 911 dispatchers were able to recognize the presence of cardiac arrest in 80% of the cases in a median of 75 sec from call receipt. Dispatchers were unable to assess whether the patient was conscious or breathing normally in 13% of cases because of such factors as the caller was not at the scene (i.e., medical alarm company notification), loss of phone contact, emotional state of the caller, etc. Thus, when able to assess patient consciousness and breathing adequately, the dispatchers were able to identify >92% of the arrests.

As in previous studies8,10, agonal respirations caused confusion, particularly when the
arrest occurred and was witnessed in a public place because gasping is most obvious in the first few minutes and declines rapidly thereafter. The authors identified three different types of factors that delayed dispatcher recognition of cardiac arrest: dispatcher related (e.g., asking unnecessary or inappropriate questions), caller related (e.g., emotional state, vague or misleading answers to questions), and call circumstance (e.g., language barriers, time spent moving the patient) related. For the 381 cases in which the dispatcher recognized that a cardiac arrest was present, the median time from 911 call receipt to start of chest compressions was almost 3 minutes. Delays defined as deviation from protocol causing a time lapse of ≥5 sec related to dispatchers, callers, or circumstances accounted for a median increase in the time to start of chest compressions of 28, 26, and 38 sec, respectively.

The majority of the delay was due to caller and circumstance factors that were not modifiable, which begs the question of what might be done differently by dispatchers to further decrease “modifiable” delay. Based on the data presented, common reasons for such delay was due to the dispatcher asking unnecessary or inappropriate questions. This is intriguing in light of the long-standing debate in the emergency medical dispatch community as to the relative merits of two differing approaches to caller interrogation: protocol-guided (criteria-based) vs. protocol-scripted (i.e., the Medical Priority Dispatch System® or “MPDS®”). In the former, which King County employs, dispatchers receive didactic and practical experience on interrogation following a protocol, but are allowed to tailor their questioning to some degree based on their judgment and the call circumstances. In the latter, dispatchers receive similar training and practical experience using a scripted interrogation approach. Minimal deviation from the script is tolerated and, as in criteria-based dispatch systems, intense quality improvement call review is provided at certified dispatch centers to ensure that there is little opportunity for the dispatcher to ask unnecessary or
inappropriate questions.

Based on this, one would surmise that the scripted approach should result in fewer dispatch delays leading to a shorter time from 911 call pickup to start of chest compressions and a higher likelihood that bystanders will perform chest compressions. As noted by the authors, the only published study from an accredited MPDS® system (Wake County, NC) in which ventilation instructions were not given (similar to the King County protocol) reported a 4 min time interval from 911 call pickup to first chest compressions – roughly 1 min longer than in the present study. 13 The Wake County study was conducted when their dispatch center was using MPDS® Protocol versions 11.2, 11.3, and 12.0. The latest version (12.2) allows dispatchers to jump directly to pre-arrival chest compression instructions earlier in the call for a suspected cardiac arrest and, when there are multiple rescuers, some of the instructions are delayed until after compressions begin.

At the MPDS® accredited Richmond Ambulance Authority dispatch center in Richmond, VA, the time from 911 center call pickup to the start of dispatcher-assisted chest compressions was reduced by 50 sec after implementation of version 12.2, documenting the near-equivalence of the two approaches in the hands of highly trained, professional medical dispatchers. 14 Hardeland et al. 15 compared both types of dispatch systems with respect to cardiac arrest calls and found that, although each offered dispatch-assisted CPR instructions to 86% of callers and the time from call pickup to start of chest compressions was similar, fewer bystanders actually began delivering chest compressions in the MPDS® vs. the criteria based system (32 vs. 70%). This occurred because, in this particular comparison, the dispatch center using the MPDS® system was much more efficient at dispatching paramedics, who arrived on scene 3 min sooner than providers in the criteria based system – in many cases before bystanders could even begin
chest compressions. The important point is that either approach, in the hands of highly-trained, skilled dispatchers can achieve comparable results but, as pointed out by the authors of the present study, any further improvement is limited by primarily non-modifiable variables. Nonetheless, this study now provides a potential benchmark target recommendation for EMS systems to use in evaluating their own performance. Because the number of lives at stake from OHCA is so large, any “tweaks” in dispatch center pre-arrival instruction performance that can lead to a higher number of bystanders starting chest compressions earlier will be meaningful from a public health standpoint.

**Conflict of Interest Disclosures:** Dr. Ornato is the Operational Medical Director of the Richmond Ambulance Authority and Cardiac Co-Chairman of the NIH-sponsored Resuscitation Outcomes Consortium

**References:**


4. Benditt DG, Goldstein M, Sutton R, Yannopoulos D. Dispatcher-directed bystander initiated cardiopulmonary resuscitation: A safe step, but only a first step, in an integrated approach to


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