The Role of Medical Direction in Systems of Out-of-Hospital Cardiac Arrest

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KEYWORDS

• Out-of-hospital cardiac arrest • EMS • Quality assurance • Medical direction

KEY POINTS

- The variability in observed survival rates for out-of-hospital cardiac arrest (OHCA) among emergency medical services (EMS) systems is largely due to differences in system performance rather than patient characteristics.
- Basic life support care during OHCA has the greatest impact on survival and should be the cornerstone of quality assessment of EMS system performance.
- Data collection and comparison used to target specific interventions, along with continuous feedback, shape the quality-assurance process and reduce variability.
- Process improvements can yield significant improvements in outcomes for OHCA, but these require the concentrated efforts and vision of a dedicated medical director.

BACKGROUND

Emergency medical services (EMS) are a vital part of the emergency and trauma care infrastructure in the United States. Dedicated men and women respond each day to more than 240 million calls for help received through a universal emergency response (9-1-1) telephone number.[1] And yet, EMS is still in its infancy, having only been established in the past 60 years through a piecemeal legislative and grant process involving federal, state, and private initiatives. Given the haphazard nature of EMS development and historic underappreciation of its role in the larger health care system, variability in the scope and quality of prehospital care have been such defining characteristics[2] as to inspire the saying, "If you've seen one EMS system, you've seen one EMS system." Approximately half of all EMS systems are fire-based, resulting in a sometimes uneasy alignment of modern prehospital care with the traditional paramilitary and rescue culture of the fire service. Other systems run as dedicated third service government programs (separate from police and fire), hospital-based services, or third-party contractors. Regardless of the type of EMS system involved, EMS medical directors play a vital role in assuring that the systems over which they have oversight adhere to the highest standards of medical care. A 2017 National Association of EMS Physicians position statement makes it clear that "The primary role of the EMS medical director is to promote continuous quality improvement and patient centered care delivery of medical care by

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the EMS service."[3] Unfortunately, in many communities the medical directorship of the local EMS agency is an unpaid position delegated to an untrained junior partner of a local emergency medicine physician group. Such positions often involve little more than titular duties: the "signing off" on protocols developed by subordinates or the making of ad hoc decisions as problems arise.[4]

IMPORTANCE

Of the many types of emergencies to which EMS personnel are dispatched, a minority (<5%) are for patients who have experienced out-of-hospital cardiac arrest (OHCA). Yet, although representing a small fraction of the annual call volume of an EMS agency, OHCA is a condition for which the quality of EMS care literally means the difference between life and death. More than 347,000 adults experience OHCA in the United States each year,[5] with an average survival of approximately 10%. But survival varies widely between communities, from a dismal less than or equal to 2% in some of the nation's largest municipalities[6–8] to 21% in Seattle, King County, Washington.[9] Differences in arrest characteristics, as summarized by the so-called Utstein elements, account for less than half of the observed variation in cardiac arrest survival and only 22% of the between-site differences in survival of bystander-witnessed arrests with an initial shockable rhythm,[10] all suggesting that EMS performance accounts for a large proportion of the disparity in outcomes.

GOALS OF THIS CONCEPT ARTICLE

The goals of this article are to explain the role of the EMS medical director in overseeing the quality of prehospital resuscitation of OHCA, to examine specific care parameters worthy of time and attention, and to review the quality-improvement process in OHCA.

THE MEDICAL DIRECTOR'S ROLE IN ASSURING QUALITY

It is worthwhile to conceptualize the medical director's role according to domains of control and influence (**Fig. 1**), a framework popularized by the organizational behavior expert, Stephen R. Covey.[11] For example, the medical director should have direct control over EMS protocols, training programs, and the collection, review, and dissemination of provider performance metrics. Although a medical director does not have direct control over the quality of post–cardiac arrest care delivered at receiving hospitals, the director often has influence over hospital destination protocols. These destination protocols should be informed by hospital capacity and performance characteristics, such as the willingness to provide EMS with feedback on patient outcomes, the performance of targeted temperature management for comatose patients, and the use of angiography for patients with shockable rhythms. In addition, the medical director can meet directly with heads of intensive care, emergency medicine, cardiology, and even the hospital chief executive officer in a collaborative fashion, ultimately exerting considerable influence over the quality of OHCA care across the care continuum.

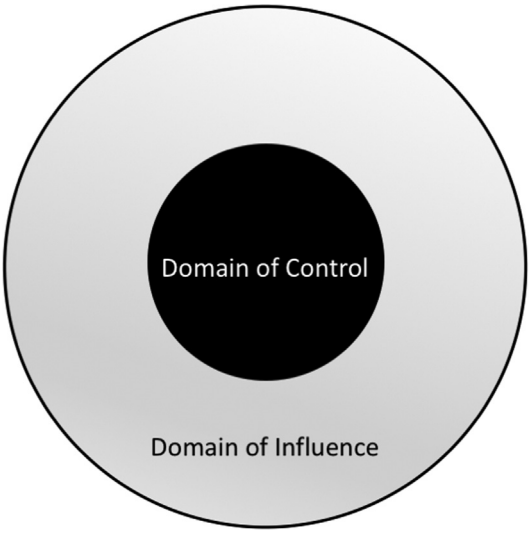

Fig. 1. A conceptual framework for the medical director's domains of control and influence in OHCA.

DEFINING QUALITY IN CARDIOPULMONARY RESUSCITATION

Quality of care in cardiopulmonary resuscitation (CPR) may be measured by both process and outcomes. Processes of care center on EMS provider adherence to protocols because EMS provides protocol-driven medical care. Such protocols should be informed by international guidelines for basic life support (BLS) and advanced life support (ALS)[12] and tailored to the unique response configuration of the local EMS agency. Within guideline recommendations, considerable uncertainty exists regarding the optimal use and effectiveness of many ALS interventions (such as placement of an advanced airway). Nevertheless, these evidence-based guidelines, now updated nearly continuously, summarize the best available science in resuscitation and should be referred to