

## VIEWPOINT

# Fulfilling the Promise of “Anyone, Anywhere” to Perform CPR

**Mickey S. Eisenberg, MD, PhD**

Department of Medicine, University of Washington, Seattle, and King County Emergency Medical Services, Seattle, Washington.

**Bentley J. Bobrow, MD**

Department of Emergency Medicine, Maricopa Medical Center, University of Arizona College of Medicine, Phoenix, and Arizona Department of Health Services Bureau of Emergency Medical Services and Trauma System, Phoenix.

**Tom Rea, MD, MPH**

Department of Medicine, University of Washington, Seattle, and King County Emergency Medical Services, Seattle, Washington.

**Corresponding**

**Author:** Bentley J. Bobrow, MD, Arizona Department of Health Services Bureau of Emergency Medical Services and Trauma System, 150 N 18th Ave, Ste 540, Phoenix, AZ 85007 (bentley.bobrow@azdhs.gov).

**Closed-chest cardiac massage** for the treatment of cardiac arrest was first described in the medical literature in 1960.<sup>1</sup> The report provided the basis to revolutionize care for one of the leading causes of death. In a statement filled with hope and promise, the authors wrote that “Anyone, anywhere, can now initiate cardiac resuscitative procedures. All that is needed are two hands.” Prior to closed-chest massage, the only recourse to achieve artificial circulation was open-chest massage involving emergency thoracotomy. Today the procedure widely known as cardiopulmonary resuscitation (CPR) has been shown to double or triple the odds of survival from cardiac arrest.<sup>2</sup>

Initially CPR was the exclusive domain of the physician. However, CPR—like other therapies for resuscitation—is critically time-dependent; earlier CPR can provide significantly greater clinical benefit. Estimates indicate that the chance of survival declines by about 5% for every minute that elapses between patient collapse and the start of CPR.<sup>3</sup> Based on this understanding, CPR training efforts expanded to other medical professionals such as nurses and emergency medical services (EMS) personnel and ultimately to the general public.

To expand access to early CPR in the United States, the traditional, time-intensive training curriculum has been simplified to stress recognition, calling 911, and initiating chest compressions and hands-on motor skills. In some states, CPR training has been mandated as part of the secondary school education requirements. Additionally, the Internet and other electronic technologies have substantially expanded opportunities for CPR awareness and training.

Despite these efforts, most individuals who experience out-of-hospital cardiac arrest do not receive bystander (layperson) CPR prior to the arrival of EMS. Now, more than 50 years since the first scientific publication that championed the broad appeal and potential of CPR, bystander CPR is provided in only an estimated one-third of arrest cases in the United States.<sup>2</sup> There is an increasing understanding of the real-life obstacles that prevent bystander CPR. In many instances, laypersons simply do not recognize cardiac arrest even in patients with witnessed sudden collapse, often because during cardiac arrest agonal gasps may occur and may be misconstrued as a sign of life.<sup>4</sup> Even when cardiac arrest is suspected and bystanders are previously trained, laypersons are often reluctant to provide CPR because they lack confidence. They may ask: Is this person really in cardiac arrest? What if I perform CPR incorrectly? Will I hurt the person?

These and other challenges have repeatedly thwarted resuscitation—even among trained layper-

sons. Efforts aimed at training laypersons are worthwhile, and innovative approaches that engage laypersons in awareness, training, and practice opportunities should continue to be a cornerstone. However, because cardiac arrest is such a randomly occurring event and only a minority of the public are formally trained and proficient in CPR, this approach alone will never achieve the promise that “anyone, anywhere” can save a life with CPR.

Is there an efficient, relatively low-cost, and safe strategy using existing resources that could translate broadly across communities and socioeconomic groups and make bystander CPR the rule rather than the exception? Effective approaches can be identified when comparing variation across communities. Communities with the highest rates of bystander CPR have the best survival rates. In Seattle and greater King County, Washington, for example, 72% of witnessed arrests receive bystander CPR prior to EMS arrival, and survival from bystander-witnessed cardiac arrest with ventricular fibrillation is 46%.<sup>5</sup> What has become apparent is that in communities with the highest rates of bystander CPR, well-orchestrated telecommunicator CPR (T-CPR) is often a major factor that can increase bystander CPR rates and in turn further increase survival.<sup>6</sup> This strategy empowers the telecommunicator—who is also referred to as the “emergency dispatcher” or “911 operator”—to systematically and quickly identify the presence of cardiac arrest and help the unconfident caller perform CPR and possibly become a lifesaving rescuer.

For multiple reasons the telecommunicator is ideally positioned to address the common challenges of arrest identification and bystander confidence. Two priority sequential questions—“Is the patient conscious? Is the patient breathing normally?”—can provide the basis for rapid arrest identification. A “no” response to both questions triggers the telecommunicator to assertively coach the caller to initiate chest compressions. The approach can increase community bystander CPR rates and is associated with a meaningful increase in cardiac arrest survival across distinct communities and emergency response systems.<sup>6,7</sup> For example, a program of dispatcher-assisted CPR in Seoul, South Korea, was associated with a doubling of bystander CPR rates from 6% to 12% and a corresponding near doubling of favorable neurologic survival from 2% to 3.6%.<sup>7</sup>

The potential public health benefit of T-CPR is increasingly appreciated. A scientific consensus statement was endorsed by resuscitation stakeholders including major telecommunicator organizations and established a common conceptual strategy and opera-

tional framework for an effective T-CPR program.<sup>8</sup> Recent publications provide a tangible set of goals for operational performance that include the domains of arrest recognition (telecommunicator identifies 90% of arrests within 1 minute) and CPR coaching (telecommunicator coaches chest compressions in 75% of arrests within 2 minutes of call receipt).<sup>9</sup> As real-world experience indicates, these are achievable goals.<sup>9</sup>

With these cornerstones of common concepts and clinical metrics now in place, what must occur to achieve broad and consistent implementation of T-CPR? First and foremost, the leadership of telecommunication organizations must commit to programmatic efforts that prioritize T-CPR care. Telecommunication centers serve a variety of needs related to police, fire, and medical emergencies, which collectively can challenge programmatic focus and spread resources thin. As a consequence, many telecommunication agencies "maintain" a T-CPR program, but the large variability in bystander CPR across communities indicates that advice effected by T-CPR is not consistent. Telecommunicators are an important resource for many different emergency circumstances, but cardiac arrest is the single condition for which the telecommunicator can directly make a life-or-death difference, not just through effective dispatch but also via arrest identification and CPR coaching. A successful T-CPR program will save lives but requires steadfast and accountable programmatic leadership and commitment.

What are the components of an effective T-CPR program? Although cardiac arrest is an important public health condition, a telecommunicator may encounter such an event only once a month. As

a consequence, awareness, training, and practice are integral. Fortunately, low-cost and accessible training curricula for the telecommunicator are now available and provide for awareness and practice.<sup>10</sup>

A core domain of most successful public health programs is to identify opportunities for improvement and measure progress. Telecommunicator CPR is no exception. The domains of identification and coaching can be readily measured to provide individual and organizational performance metrics that can be used as the basis for improvement.

A well-functioning T-CPR program requires collaboration. Resuscitation is the ultimate team activity and must involve a broad spectrum of rescuers to consistently achieve success. Other resuscitation stakeholders such as EMS and hospitals need to partner with telecommunication agencies that invest in T-CPR efforts to link and share data for continuous quality improvement purposes. Information from EMS and hospitals can help with case identification and review.

Layperson CPR has helped save countless lives in the past 50 years, but the promise of CPR has not yet been achieved. Telecommunicator CPR provides a promising strategy to directly address this shortcoming, but the challenge now is comprehensive and consistent implementation. More than ever, the framework is strengthened by programmatic tools that can support community T-CPR efforts. Broad and effective T-CPR implementation will bring CPR much closer to "anyone, anywhere" a cardiac arrest occurs and in turn could translate to thousands of additional lives saved each year.

#### ARTICLE INFORMATION

**Conflict of Interest Disclosures:** All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Dr Bobrow reported receiving a grant from the Medtronic Foundation. Dr Rea reported serving as medical director for the Association of Public Safety Communication Officials and receiving a grant from the Medtronic Foundation. Dr Eisenberg reported no disclosures.

#### REFERENCES

1. Kouwenhoven WB, Jude JR, Knickerbocker GG. Closed-chest cardiac massage. *JAMA*. 1960;173:1064-1067.
2. Sasson C, Rogers MA, Dahl J, Kellermann AL. Predictors of survival from out-of-hospital cardiac arrest: a systematic review and meta-analysis. *Circ Cardiovasc Qual Outcomes*. 2010;3(1):63-81.
3. Valenzuela TD, Roe DJ, Cretin S, Spaite DW, Larsen MP. Estimating effectiveness of cardiac arrest interventions: a logistic regression survival model. *Circulation*. 1997;96(10):3308-3313.
4. Bobrow BJ, Zuercher M, Ewy GA, et al. Gasping during cardiac arrest in humans is frequent and associated with improved survival. *Circulation*. 2008;118(24):2550-2554.
5. Rea TD, Helbock M, Perry S, et al. Increasing use of cardiopulmonary resuscitation during out-of-hospital ventricular fibrillation arrest: survival implications of guideline changes. *Circulation*. 2006;114(25):2760-2765.
6. Rea TD, Eisenberg MS, Culley LL, Becker L. Dispatcher-assisted cardiopulmonary resuscitation and survival in cardiac arrest. *Circulation*. 2001;104(21):2513-2516.
7. Song KJ, Shin SD, Park CB, et al. Dispatcher-assisted bystander cardiopulmonary resuscitation in a metropolitan city: a before-after population-based study. *Resuscitation*. 2014;85(1):34-41.
8. Lerner EB, Rea TD, Bobrow BJ, et al; American Heart Association Emergency Cardiovascular Care Committee; Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation. Emergency medical service dispatch cardiopulmonary resuscitation prearrival instructions to improve survival from out-of-hospital cardiac arrest: a scientific statement from the American Heart Association. *Circulation*. 2012;125(4):648-655.
9. Lewis M, Stubbs BA, Eisenberg MS. Dispatcher-assisted cardiopulmonary resuscitation: time to identify cardiac arrest and deliver chest compression instructions. *Circulation*. 2013;128(14):1522-1530.
10. Resuscitation Academy. Resources. Resuscitation Academy website. <http://www.resuscitationacademy.com/index.php/resources/>. Accessed February 11, 2014.