

## Protocol or Performance

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Out-of-hospital sudden cardiac arrest (SCA) is a leading cause of mortality in industrialized societies (1). Thus, even modest improvements in collective survival could meaningfully advance public health. Despite this realization, evidence suggests that SCA survival has not improved in many communities over the past several decades, despite “advances” in resuscitation technology and repeated efforts to assimilate evidence for best practice (2,3).

There are likely multiple explanations for the poor progress: a lack of a uniform national and international reporting system to enable benchmarking, an inadequate research infrastructure to test and provide rigorous and generalizable evidence, a lack of a system of emergency care in some communities that integrates across the links in the chain of survival, and insufficient accountability regarding SCA care and outcome.

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Some of these challenges are being addressed. For example, Japan's national SCA registry, a European international registry, and the CARES (Cardiac Arrest Registry-Enhanced Survival) have provided a registry foundation for programmatic improvement through user-friendly measurement and benchmarking (4–6). Although clinical resuscitation is still relatively underfunded, major funding partners such as the National Heart, Lung, and Blood Institute, the American Heart Association, the Centers for Disease Control, and Health Canada have provided critical support for resuscitation research and programmatic improvement during the past decade, although future research funding will certainly continue to be challenging (7). There is an increasing appreciation that SCA resuscitation is the quality measure for emergency medical services (EMS) and an important quality domain for hospital care (8,9). Such an appreciation can compel performance and, in turn, necessitate accountability. The appreciation has facilitated a cooperative and even coordinated approach by resuscitation stakeholders across the links in the chain of survival to improve care.

The Arizona SCA resuscitation experience—reviewed in this issue of *JACC* by Ewy and Sanders (10)—illustrates

some of the benefits of these developments (10). In 2004, the Arizona Department of Public Health designated SCA as an important public health problem; the initiative enabled resuscitation stakeholders to more easily work together to share information about SCA (11). Importantly, this top-down action was supported in part by new opportunities for local stakeholders to collect data through a common registry and to interpret SCA information about care and outcomes. The result was the SHARE (Save Hearts in Arizona Registry and Education) registry that has provided the data resource for programmatic evaluation (12).

The Arizona initiative required leadership so that resuscitation stakeholders would commit and persevere to the quality assurance process to measure and improve. The leadership is the essential “glue” that must engage community, emergency dispatch, EMS, and hospital stakeholders (13). Successful resuscitation is a team sport unlike any other, and often is where the most important care occurs before the patient arrives at the hospital—a circumstance that can distinguish SCA from acute stroke, myocardial infarction, or congestive heart failure. Thus, the choice for leadership may not always be obvious, although physician medical leadership that appreciates the interdependence of the links in the chain of survival—the basis for the team approach—can foster community, dispatch, EMS, and hospital efforts. Just as important, this leadership can provide accountability. This accountability means asking tough questions across all stakeholders and providing the rationale for improvement.

The Arizona experience—where survival from shockable rhythm SCA has doubled during the first 5 years of the SHARE program—also illustrates the expectation that most suburban and urban communities should not be satisfied with the SCA status quo. Long-standing resuscitation meccas such as Rochester, Minnesota, and Seattle, Washington, are instructive examples but should not be unique (14,15). The “secrets” in these communities are leadership, perseverance, and accountability to measure and improve SCA care—a recipe for performance being realized in Arizona. The recipe produces an expectation for resuscitation success rather than a passive resignation to expected death.

On the basis of the Arizona experience, Ewy and Sanders (10) advocate the cardiocerebral resuscitation (CCR) protocol as a strategy for communities to improve SCA care and outcome. Certainly, animal and human observational evidence can support the assertion that the transition from the

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Manuscript received July 10, 2012; accepted July 17, 2012.

guideline-based cardiopulmonary resuscitation (CPR) protocol to the CCR protocol is responsible for the substantial improvement in survival (10). And indeed, there may be some survival advantages (or disadvantages) of CCR compared to CPR.

As Ewy and Sanders (10) point out, however, the interpretive challenge is that the implementation of Arizona's CCR "protocol" coincides with its concerted investment in its quality assurance initiative. Is the survival improvement a result of the specific CCR protocol or a product of the impressive effort to measure and improve? The Arizona experience should be interpreted in the context of other community experiences. One can find a number of communities that practice guideline-based CPR rather than CCR and achieve similar or even better SCA survival—these communities typically also invest in a measure-and-improve quality assurance program (16). Moreover, a close examination of current CCR and CPR protocols indicates that they are more alike than different (17). Early defibrillation is a cornerstone of both protocols. Both CPR and CCR emphasize early and persistent chest compression, starting with laypersons and continuing through resuscitation by EMS and hospital personnel. Advanced care needs to be integrated in a manner that facilitates near-continuous, effective chest compression.

Thus, when considering CCR versus CPR, the major influence determining resuscitation success is likely performance rather than protocol. The CCR protocol enabled Arizona stakeholders to get interested and stay interested in performance. No doubt the debate will continue; future study may help attribute the relative benefit of protocol versus performance as it relates to the question of CPR versus CCR. Until then, the citizens of Arizona should thank their community stakeholders and resuscitation leadership who decided to explicitly engage in continuous quality improvement. Their team effort has saved hundreds of lives. The challenge for Arizona is to sustain this effort. For other communities, the Arizona SCA experience should compel stakeholders to measure and improve SCA care and outcome, with the attainable goal of improving their community's health.

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**Key Words:** cardiac arrest ■ cardiopulmonary resuscitation ■ resuscitation ■ ventricular fibrillation.