



RESUSCITATION ACADEMY

Improving cardiac arrest survival rates, one community at a time

10 STEPS

for Improving Survival from Cardiac Arrest

SECOND EDITION
BROUGHT TO YOU BY
THE RESUSCITATION ACADEMY



The Resuscitation Academy logo is symbolic in several ways. The red background depicts a heart, the four stars denote the original four links in the chain of survival (911, CPR, defibrillation, advanced cardiac life support), and there are 10 branches (like the 10 steps to improve survival) that comprise the tree of knowledge.

Table Of Contents

TEN STEPS FOR IMPROVING SURVIVAL FROM SUDDEN CARDIAC ARREST

Can We Do Better?	3	10 Steps:	
Improvement is Possible	4	Reach for the Higher Hanging Fruit - Steps 5-10	47
A Few Words of Wisdom - The Seven Mantras	6	• Step 5 - Measure Professional Resuscitation	
• 1. Measure, Improve		• Step 6 - Begin an AED Program for First Responders	
• 2. If You've Seen One EMS System...		• Step 7 - Use Smart Technology to Extend CPR and AED	
• 3. It's Not Complicated, But It's Not Easy		• Step 8 - Make CPR and AED Training Mandatory	
• 4. Change Occurs Step by Step		• Step 9 - Work Toward Accountability	
• 5. Performance, Not Protocol		• Step 10 - Work Toward A Culture Of Excellence	
• 6. Everyone in VF Survives		- The Medical Model	
• 7. It Takes a System To Save a Victim		- Continuous Quality Improvement	
		- Improve Skills	
The Perfect Resuscitation	14	Implementation:	
Embracing the Challenge	17	Make It Happen	59
• Life or Death		1. Select program or programs to implement	
• The Chain of Survival		2. Form a team or advisory board	
• The Frame of Survival		3. Determine how to make it happen in your community	
• Public Expectations		4. Set specific goals	
• Leadership		5. Achieve buy-in from agency personnel	
• The Will & The Way		6. Establish performance standards	
• Alumni Reflections		7. Consider a pilot program	
10 Steps:		8. Communicate progress within the agency	
Grab the Lower Hanging Fruit - Step 1-4	26	9. Communicate with the public and EMS personnel	
• Step 1 - Establish a Cardiac Arrest Registry		10. Support, Advocate, Celebrate	
• Step 2 - Begin Telephone-CPR			
• Step 3 - Begin High-Performance CPR		The Resuscitation Academy	66
• Step 4 - Begin Rapid Dispatch		EMS System Assessment	70
		RQI Program: Bringing the 10 Steps to Life	71
		The Global Resuscitation Alliance	75
		Acknowledgements & Resources	76

NOTE: A PDF copy of this book may be obtained at resuscitationacademy.org/ebook.

The PDF has active links to the videos – look for these icons.



Can We Do Better?

A BRIEF INTRODUCTION BY MICKEY EISENBERG, MD



Mickey Eisenberg, MD, PhD

Director, Medical QI, King County EMS,

Professor of Emergency Medicine, University of Washington

To view this video visit resuscitationacademy.org/ebook

As a medical emergency there is nothing more dramatic than sudden cardiac arrest. A person at home or in the community suddenly (*often with no symptoms*) collapses. Consciousness is lost in a matter of seconds and there is instantaneous loss of pulse and blood pressure. At the moment of cardiac arrest the person is clinically dead. Within 10 minutes clinical death will progress to irreversible biological death and another statistic will be notched in the tally of deaths from heart disease. This cold “statistic” cannot possibly reveal the reality of a vital person engaged in the community, with family and friends, children and grandchildren. Yet there is a small window of opportunity, measured in minutes, for life literally to be snatched from the closing jaws of death. If CPR, defibrillation, and advanced medical care can arrive at the scene quickly, there is a decent chance of successful resuscitation. Though the national survival rate for cardiac arrest is in the single digits, some communities are able to achieve a survival rate of 50% or higher from cardiac arrest associated with ventricular fibrillation – the rhythm with the best chance of resuscitation.

How these communities do it, and how your community can do it, is what this guide is all about. Achieving success in resuscitation does not entail an understanding of quantum physics – the factors leading to success are known. This has been the constant refrain of the Resuscitation Academy since its founding in 2008. Lives are saved not just by highly trained EMS professionals, but also by highly efficient EMS systems. Individuals and systems save people. And both can perform smarter and better. This guide lays out 10 steps that will lead to an increase in cardiac arrest survival in your community. It is a practical guide, full of concrete suggestions and specific training tools.

The faculty of the Resuscitation Academy and I hope you embrace these ideas and steps. Though each step may require some adaptation so that it can fit and work in your community, we have little doubt that these steps can transform your system.

For those of us in the emergency medical services business, ***there can be nothing more gratifying than saving a human life.***

Note on the second edition: This edition updates the 10 steps and aligns the terminology with that of the Global Resuscitation Alliance. We include new information on implementation and several new videos.

Improvement is Possible

IMPROVING CARDIAC SURVIVAL RATES, ONE COMMUNITY AT A TIME



This guide is intended for EMS directors, medical directors, fire department chiefs, EMS service officers, EMS training officers, and dispatch center directors. It is written specifically for you, and with that in mind, jumps right to the practical information. There is little in the way of background or scholarly discussions of the latest scientific finding. We have come to appreciate the importance of implementation and thus have added 10 Actions of Implementation to assist leaders in implementing each of the 10 steps.



Ann Doll

Executive Director, Resuscitation Academy Foundation
To view this video visit resuscitationacademy.org/ebook

Not every step in this guide will apply to your community, but many of them will. Think of this guide more as a menu, from which you can choose practical programs that (we believe) will improve cardiac arrest survival in your community. There are 10 steps and they are divided into low-hanging and high-hanging fruit. The 4 steps designated as low-hanging fruit are those that can deliver the biggest bang (*in terms of improved cardiac arrest survival*) with the least expenditure of resources. The 6 steps designated as higher-hanging fruit will also improve survival but may require more resources to implement. Whatever step(s) you choose to implement in your community, realize that these are called steps for more than metaphorical reasons. One step at a time, so long as you are on the right path and however long it may take, will get you to your goal.

10 STEPS

to Improve Cardiac Arrest Survival

1. Establish a cardiac arrest registry
2. Begin Telephone-CPR with ongoing training and QI
3. Begin high-performance EMS CPR (HP-CPR) with ongoing training and QI
4. Begin rapid dispatch
5. Measure professional resuscitation using the defibrillator recording (and voice if possible)
6. Begin an AED program for first responders, including police officers, guards, and other security personnel
7. Use smart technologies to extend CPR and public access defibrillation programs to notify volunteer bystanders who can respond to a nearby arrest to provide early CPR and defibrillation
8. Make CPR and AED training mandatory in schools and the community
9. Work toward accountability – submit annual reports to the community
10. Work toward a culture of excellence

10 ACTIONS

for Successful Implementation of Resuscitation Programs

1. Select a program or programs to implement
2. Form a team or advisory board
3. Determine how to make it happen in your community
4. Set specific goals
5. Achieve buy-in from agency personnel
6. Establish performance standards
7. Consider a pilot program
8. Communicate progress within the agency
9. Communicate with the public and EMS personnel
10. Support, Advocate, Celebrate



A Few Words of Wisdom

THE SEVEN MANTRAS



Tom Rea, MD MPH

*Medical Program Director,
King County Emergency Medical Services,
Professor of Medicine, University of Washington/
Harborview Medical Center*

To view this video visit resuscitationacademy.org/ebook

This guide gives you ten steps to improve cardiac arrest survival in your community. These steps comprise the core teachings of the Resuscitation Academy. At every Academy class the faculty sets the stage with a few pithy expressions which we hope encapsulate a tiny bit of wisdom. We call them ‘the Resuscitation Academy Mantras.’



1

Measure, Improve

“Measure, improve, measure, improve...” defines the essence of ongoing quality improvement. If you don’t measure something you can’t improve it. And once you measure it you will reveal things that need improving. And once you improve the system, measure it again to see if it has improved. And so on, and so on. Measurement and improvement can apply to many elements of an EMS system. First and at the most basic level, it refers to measuring cardiac arrest events and outcomes (death, survival, neurological recovery). But it also applies to components of the EMS system such as time metrics (time for dispatch, time for response, time for scene arrival, time for patient arrival), high-performance CPR metrics (CPR density, depth of compression, full recoil, duration of pauses), and Telephone-CPR metrics (recognition of agonal breathing, time to recognition of cardiac arrest, time to delivery of chest compression instructions).

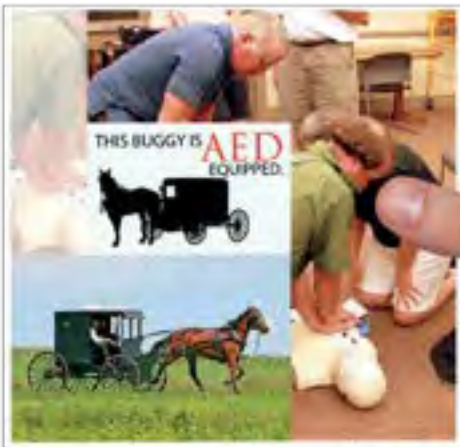


2

If You've Seen One EMS System...

"If You've Seen One EMS System, You've Seen One EMS System"

There exists incredible variety and diversity among EMS systems. No two systems are the same. What may be easy to accomplish in one system may be difficult if not downright impossible in another. One example – in some Washington State counties, the EMS medical director has no authority in setting dispatch standards or guidelines for dispatching of EMS. Thus, even if the medical director wishes to establish a Telephone-CPR program it would be impossible without the full cooperation of the dispatch director. If the dispatch center does not welcome physician involvement (unfortunately too commonly true), an impasse exists, unlikely to be brokered. But that same community may have a mandatory CPR training program for high school students – a program other EMS systems wished they had. The differing strengths and limitations of every EMS community are legion.



3

It's Not Complicated, But It's Not Easy

The science behind the steps to improve survival is not difficult to understand and the program requirements are fairly straight-forward. An understanding of nuclear physics is not required. But there may be logistical, cultural, political, resource, union and a variety of other obstacles that block easy implementation. We believe very strongly that change must start at the local level. It is the local medical, administrative, training, operations, and other personnel who are most accountable and can best decide how to bring about change. Ultimately, they must decide first what is doable and second how much effort it will take.



4

Change Occurs Step-By-Step

EMS systems are complex organizations and not likely to be transformed overnight, no matter what the leadership may wish. A good analogy is that of not trying for a home run on your first time at bat in the Majors. A single would do just fine. Even a walk will move the effort forward. With each change (improvement), one should remember the first mantra and continue to measure to see if the change really improved matters.

Step by step also refer to the steps in this guide. Don't try to take on everything at once. Start with one step, gain some success and confidence, and then move on to another.



5

Performance Not Protocol

What counts during a resuscitation is the actual performance of the dispatchers, EMTs, and paramedics. A perfect example is Telephone-CPR. Most dispatch centers claim to have protocols for Telephone-CPR, but in fact when you measure their performance they come up lacking. There is either infrequent recognition of cardiac arrest, or delay in its recognition, or both. The bottom line is that these dispatch centers may have the protocols, but are lacking in performance. Another example might be EMS systems that have protocols defining a standard of high-performance CPR. But unless the system trains and requires its EMTs to achieve letter-perfect performance, the protocol will be just so many empty words. Of course the best way to identify and correct poor performance is through ongoing QI – which circles back to the first mantra: Measure, Improve.



6

Everyone in VF Survives

Expectations become reality. Of course not everyone in VF will survive out of hospital cardiac arrest, but if there is a mindset that they will, behavior will subtly be altered to make it happen. The crew will work a little harder and not give up. They will assume the patient will make it to the hospital alive. In our EMS system, losing a patient in VF is simply unacceptable. We have seen patients receive over 20 defibrillatory shocks with the resuscitation lasting over an hour before achieving a sustaining pulse and blood pressure. A cardiologist once quipped that VF is a benign rhythm. His tongue was in his cheek, since VF means a patient is clinically dead. But he was also making the important point that all that is needed to treat this rhythm is quickly applied electricity. Therein lies the challenge. Quickly applied defibrillation is easy for a cardiologist in a cath laboratory, but a bit more difficult in the community. Nevertheless, if one keeps the mantra in mind – everyone in VF survives – it will create an expectation, a kind of self-fulfilling prophecy. Another aspect to this slogan is that medical directors and EMS directors will begin to scrutinize cases more closely, particularly those in which survival did not occur. The relevant question to ask is: Why did this patient in VF not survive? Asking the question in this way forces one to look at the system factors that may have contributed to the patient not surviving. Was there a delay in responding? Was there a delay in dispatcher recognition of cardiac arrest? Were Telephone-CPR instructions provided? Was there bystander CPR? Were there excessive pauses in chest compression? Were there delays in defibrillation?



7

It Takes a System to Save a Victim

Given the unpredictable and catastrophic nature of sudden cardiac arrest, not to mention the brief therapeutic window of opportunity, it is remarkable that anyone can be resuscitated. It is amazingly complicated and difficult to save a victim of sudden cardiac arrest. Though it may be individuals who perform CPR, attach the defibrillator, secure the airway, and administer medications, it is a system that makes it all possible. The system is comprised of numerous agencies - dispatch centers, fire departments, paramedic programs, EMS agencies, and hospitals – and literally hundreds of dispatchers, EMTs, paramedics, fire chiefs, medical services officers, medical services administrators, training officers, QI staff, medical directors, hospital nurses, doctors, and support staff. The complex web and interaction of all these agencies and staff comprise the system. Implied in this mantra is the modifier “excellent”. It takes an excellent system. Every part of the Resuscitation Academy, directly or indirectly, is about building an excellent system.



The Perfect Resuscitation



Peter A. had been doing fine, considering. He and his wife, Joanna, had been enjoying his retirement. Their yard was big enough for Joanna to pursue her hobby of butterfly- and bird-attractive gardening.

For Peter, on this afternoon, lifting heavy bags of steer manure for Joanna's garden had triggered another episode of the vague, intermittent ache that he had been experiencing in his upper left arm, mostly when he climbed stairs. This episode, though, was more severe than previous ones, and Peter felt somewhat nauseated. He also felt the ache radiating into the left side of his jaw. But it was his overwhelming sense of fatigue that

prompted him to go back inside and lie down on the couch in the living room.

One month before, Peter's doctor had told him that his cholesterol had crept up to the "needing treatment" point, and that his blood glucose now placed him in the prediabetic range. But more disturbing had been his doctor's concern that the ache in Peter's left arm might be related to his heart. Peter's cardiogram had been normal, a result in which he had taken some solace, so he had continued to put off the treadmill test recommended by his doctor.

He wanted to believe that the statin medication he had started taking to lower his cholesterol must be working - it certainly cost enough! And though he hadn't lost any weight, as his doctor had also recommended, it seemed to him that the ache in his arm had become less frequent.

Joanna, from her vantage in the den, saw Peter enter the house, and she knew from his slow gait and the way he half collapsed into the couch that something was wrong. She rushed to his side and tried to control her panic as she noted his limp body, the pasty coloring on his face and the bluish cast of his lips.

"Peter!" she shouted, shaking him by the shoulders.

He didn't respond.

With great presence of mind, Joanna brought the portable phone to Peter's side as she called 911.

"911 operator," came the voice on the other side of the line. "What are you reporting?"

"My husband has collapsed. He's not moving."

The emergency dispatcher quickly asked Joanna where she was calling from. Thanks to his training, he knew right

The Perfect Resuscitation

away that he should send a full medic response, which he accomplished by typing the directions to Peter's house into his computer console and pressing several buttons on a "tone out" dispatching machine. As he did all this, the dispatcher continued to ask questions.

"Is he conscious?" "No," Joanna replied.

"Is he breathing normally?"

Joanna looked at her husband. Peter was taking breaths that were more like slow grunts - definitely not normal. She told the dispatcher what she was seeing and hearing. From Joanna's description, the dispatcher knew that she was reporting agonal respirations - the kind of breathing associated with cardiac arrest, a sign of the brain's last-gasp effort to send breathing signals to the lungs. He also knew that there was little air moving in or out.

"Do you know CPR?" he asked Joanna. "Cardiopulmonary resuscitation?"

Joanna did not.

"OK," the dispatcher said. "Get him flat on his back on the floor. Put your hands on the center of his chest, one hand on top of the other, and press down firmly. I'll count for you. 1, 2, 3, 4. That's it. Keep doing it, now. Count with me, 1, 2, 3, 4."

In the background, over the phone, the dispatcher heard the fire department's sirens, and he told Joanna to open her front door. She did, and she saw three firefighters already running up the driveway, carrying heavy suitcases. A large fire department vehicle was parked on the street.

It had seemed like an eternity to Joanna, but the three firefighter-emergency medical technicians, or EMTs, had

arrived within four minutes of the dispatcher's "tone out." The regional Medic Unit, staffed by paramedics, was also on the way.

It was obvious to the EMTs that Peter was in cardiac arrest—the pulse check confirmed the situation. The EMTs placed their cases next to Peter and knelt down, one on each side. One of the EMTs started ventilations. He positioned Peter's head, placed a face mask attached to an air bag over Peter's mouth and nose, compressed the bag to push two breaths into Peter's lungs, while his partner positioned himself to deliver thirty chest compressions. Meanwhile, the third EMT unzipped the automated external defibrillator (AED) case and attached two pads to Peter's chest. After the thirty compressions he told his partners he was ready to analyze. The AED "spoke" in a firm, but not harsh voice.

Assessing rhythm. Do not touch the patient.

Both EMTs moved back. After ten seconds, the voice spoke again.

Shock required. Stand back. Press the flashing orange button.

An orange button, labeled with a bolt of lightning icon, began to flash insistently.

Again the EMT followed the instructions. Joanna was startled to see her husband's chest jump up an inch as electricity flowed from the AED and passed between the two pads. Immediately the EMTs resumed CPR and continued for two minutes. The EMT asked his partners to stop and the AED assessed the rhythm again. This time the machine's message was different.

No shock required. Check pulse. Check breathing. If needed, begin CPR.

The Perfect Resuscitation

The EMT who had been doing CPR placed his fingers on Peter's neck. "I've got a pulse," he said.

Joanna finally allowed herself to take a breath. One minute later, two paramedics arrived, and the EMTs briefed them on what had happened. The paramedics began an intravenous line and, because the patient was still comatose, they inserted an endotracheal tube. After the intubation the paramedics contacted the ED doctor at the control hospital and relayed what had happened.

Later the same day the EMT crew and the paramedic crew uploaded via computer the rhythm and voice recordings from their respective AED and manual defibrillators to the King County EMS Division along with copies of their run reports. The information was logged into the cardiac registry system and along with the dispatch voice recording, formed the case file for

the event. This information was used by staff at the EMS Division to provide a quality improvement summary to the firefighters, paramedics, and dispatchers. This report contained performance standards on the time to recognition of cardiac arrest and delivery of chest instructions for the dispatchers and summaries of CPR percentage (for every two minute interval) and pauses in CPR for the EMTs. There was also a clinical summary from the paramedic's medical director with feedback. In this case it was all laudatory.

Ten days later Peter was discharged home with a brand new implantable cardioverter defibrillator (ICD) in his left upper chest. He made a full neurological recovery. And two weeks later an email was sent from the EMS Division to the EMS crews and the dispatchers with the good news.



Embracing the Challenge

KEY CHALLENGES

Why Do Some Communities Succeed In Treating Cardiac Arrest While Others Fail?

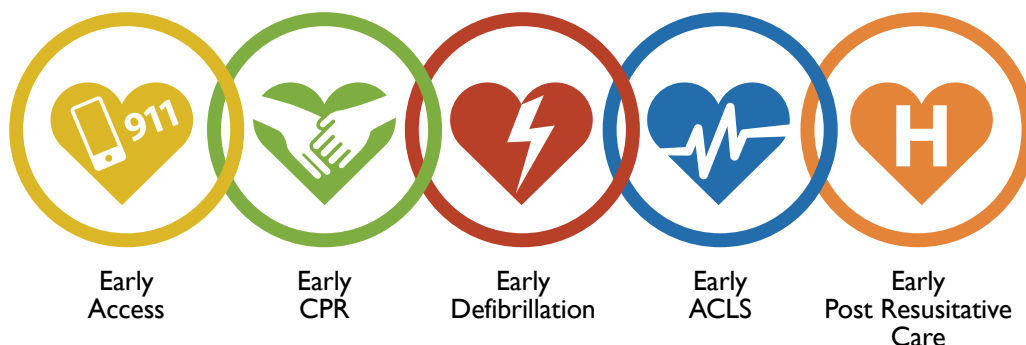
The survival rate from cardiac arrest in the United States and Canada varies all over the map – literally. In some communities the rate is zero (yes, no one survives) and in others it is as high as 60% for ventricular fibrillation. Most communities are on the low end of this range with survival rates in the single digits. Why do some communities succeed in treating cardiac arrest while others fail? It would be convenient if one variable could explain the wide difference in survival rates for cardiac arrest between those communities that are most successful in treating this major public health problem and those that are least successful. But that would imply an easy fix, or at least clarity of direction about what needs to change. Regrettably, there is no single variable and no easy fix. Instead there are multiple variables, each important in itself but insufficient as a single explanation.

Life or Death

The many factors which determine whether a patient lives or dies following cardiac arrest may conveniently be divided into patient factors, event factors, EMS system factors, and therapy factors. Certainly patient factors, such as age and co-morbidity, and event factors, such as witnessed collapse and cardiac rhythm, are strongly associated with outcome. But the patient factors and the event factors, although they are undoubtedly important in determining who will live and who will die, cannot be altered by changes made to an EMS program or to the types of therapy it delivers. They are powerful factors, but they are factors of fate of good or bad luck. But the system factors can all be affected by a community's decisions. The chain of survival describes the key system and therapy factors that ensure rapid delivery of care.

The Chain of Survival

What we do know is that successful treatment of cardiac arrest, and particularly ventricular fibrillation, is associated with an EMS system's ability to deliver care quickly. The chain of survival, with its five links of early access, early CPR, early defibrillation, early advanced care, and early post resuscitative care illustrates the most critical elements of addressing sudden cardiac arrest.



Embracing the Challenge

KEY CHALLENGES

The system and therapy factors that comprise the links in the chain of survival are quantitative in nature, meaning they have a specific value and can be measured. Some are time related (time to CPR, time to defibrillation); others can be measured by their presence (Telephone-CPR, community CPR training, community PAD) and two can be scored (quality of CPR can be determined by compressions per minute of CPR and duration of pauses, and the interaction of CPR and defibrillation can be determined by the duration of pauses before and after defibrillation). All can be measured in one way or another. Does this mean that a community merely has to put these system and therapy factors in place in order to see its rate of survival rise? It would certainly be convenient if this were the key to fully understanding the disparity in cardiac arrest survival, but, although one can measure these factors they do not fully explain a system's success or lack thereof. Every community's EMS system already incorporates some if not all of them at least to some degree – but even these factors, although they're necessary, are not sufficient. After all, a baseball team can have nine players but still lose every game. What else, then, is needed?

The Frame of Survival

To fully understand an EMS system's success (or lack of success) we need to address the qualitative factors that also determine the system's performance. The qualitative factors are far more difficult to measure or score. These factors, though lacking in hard numbers, are just as (or more) important than the hard metrics.

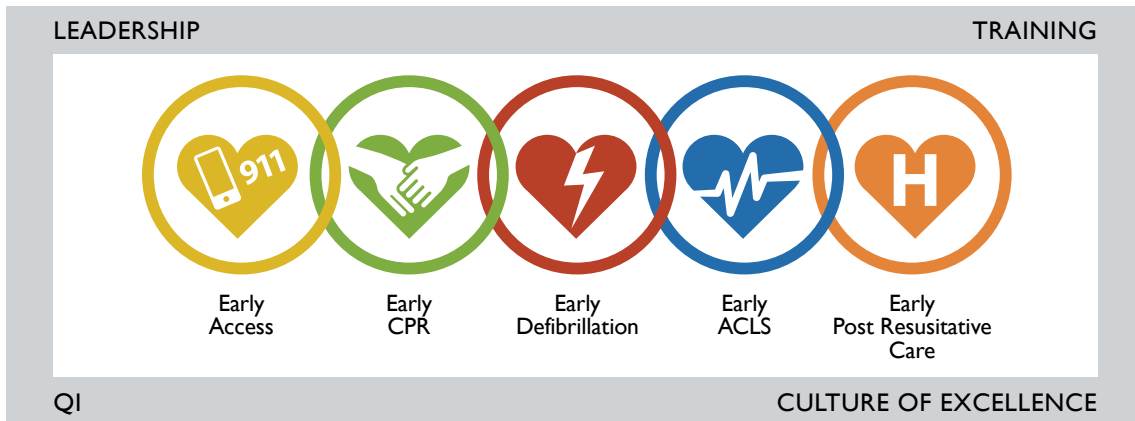


The links in the chain cannot stay connected unless they are embedded in a context of strong medical and administrative leadership, continuous medical QI, a culture of excellence, and stellar training and continuing education for dispatchers, EMTs, and paramedics. These four elements literally frame, surround, and embed the core links of care. These elements are termed the frame of survival. Together the chain of survival and frame of survival form a complete and comprehensive system of care. Together they nurture, sustain, and define a high-quality EMS system. Just as important to the success of a champion baseball team that starts with nine excellent players are sustained

Embracing the Challenge

KEY CHALLENGES

practice, superb managing and coaching, continuous review and fine-tuning, and team spirit. In sum, the frame surrounding the chain of survival can be reduced to a single word: accountability. It is accountability, achieved through leadership, quality improvement, training, and excellence, that holds the chain of survival in place and ensures that its links are as strong as they need to be.



An EMS system that cannot be accountable to the citizens it serves will at best be mediocre. Though the elements comprising the frame are far more difficult to measure than those inside the frame, they are the keys to success in managing cardiac arrest. Their relative absence is the reason why some EMS systems fail.

Outstanding leaders can instill in their organizations their vision of high expectations and relentless striving for excellence. They also continuously ask the question, "How can the system be improved?" Ongoing quality improvement (QI) is the mechanism by which they know where and how to improve. And training and continuing education are the vehicles by which expertise and professionalism are brought to every cardiac arrest.

Embracing the Challenge

KEY CHALLENGES

Public Expectations

Is there a public expectation for high-quality emergency medical services? Before you answer, 'of course', consider the evidence. The average citizen of the average city has no idea what his or her community's EMS systems performance is, as measured by survival rates for cardiac arrest. Furthermore, the average citizen has no idea how his or her community's EMS system works, or who provides the services. Are the services contracted? Are they public? Does the EMS program use a tiered-response system? Are the first-in personnel EMTs or paramedics? Who is the medical director? Is there an academic connection? Is there a cardiac arrest registry? Is there assertive



Michael K. Copass, MD

*Professor Emeritus, University of Washington Harborview
Medical Center/Seattle Medic One*

To view this video visit resuscitationacademy.org/ebook

Telephone-CPR? These and countless other questions would never enter the mind of the average citizen. For most people, the local EMS system, whatever it is, seems to work: dial 911, and several minutes later one or more vehicles arrive to whisk the patient off to the hospital. But what if concerned citizens in City A realized that virtually no one survives cardiac arrest in their city but over 50% survived in City B? What if concerned citizens everywhere understood that most communities, their own included, don't track survival rates for cardiac arrest? How can a problem be fixed if it can't be measured? How will the problem even be revealed? Why are survival rates so disparate?

Nothing will change if the status quo continues to be tolerated. And the status quo in virtually every community is indifference combined with insufficient data – a powerful duo on the side of inaction. The catalyst for change will probably vary from community to community.

It may come from an external group or organization, or it may come from within the EMS system or from the political structure of the community. In some communities, a citizens group or a civic action group may take the lead, or a group of physicians may agitate for change. Coalitions may take shape among the local medical society, the chamber of commerce, health care organizations, chapters of the American Heart Association or the Red Cross, local newspapers or TV stations.

Their united voices, especially on behalf of a mission as clearly and widely accepted as improving the community's survival rates for cardiac arrest, can go a long way toward prompting politicians to review the community's EMS services and create an action plan for their improvement.

The media can also play a large role in galvanizing awareness of sudden cardiac arrest and the potential for successful resuscitation. A news media (paper, TV, radio or local web story) might conduct an investigative report to determine the survival rate in its community. The reporter will likely discover how difficult it is to determine

Embracing the Challenge

KEY CHALLENGES

his or her community's survival rate and, assuming it can be determined, how poorly it likely fares compared to other communities. That's part one of the report. Part two could be what "best practices" the community does or doesn't have in place. Cardiac arrest registry? Assertive Telephone-CPR? High-performance CPR? Rapid dispatch? Detailed review of every cardiac arrest? Feedback to EMTs and paramedics? Voice recording of the event? Etc... And, part three could be a prescription for improvement.

It is probable that most people also view cardiac arrest fatalistically – sure, there are all those dramatic saves in the movies and on TV – but for the rest of us cardiac arrest is simply the end. This is certainly true for cardiac arrest associated with asystole and pulseless electrical activity (PEA). What is not appreciated, however, is the good prognosis for ventricular fibrillation. When VF is treated quickly, the prognosis is very favorable. If EMS systems began to view VF as a condition with an excellent prognosis, they would both celebrate their successes and investigate every death. Why did the death occur? What could have been done to prevent it?

Leadership

Change is unlikely to happen without leadership. The medical director, paramedics or EMTs, the administrative director of EMS, the mayor, the city council – any of these parties, regardless of their official roles, can take the lead to improve the system. For example, the medical director can unilaterally form an advisory group, create a cardiac arrest registry, rewrite the protocols for cardiac arrest, partner with an academic medical center, establish requirements for training and continuing education, obtain follow-up information on patients, and provide feedback to EMTs and paramedics. Leadership can take many forms and may as likely start in the middle or bottom of an organization, as from the top.



A simple first step is to ask "Why did this patient with witnessed VF not survive?" Detailed answers are likely to facilitate a local action plan leading to improvement. Paramedics and EMTs can work to record times and interventions accurately, improve teamwork, train in high-performance CPR, synchronize AEDs with dispatch centers, suggest ways to speed up response times, and collaborate with dispatch centers to institute rapid dispatch. The administrative director and the medical director along with the director of the emergency communications center can work together to revamp the protocols for Telephone-CPR.

Embracing the Challenge

KEY CHALLENGES

The mayor or the city council can mandate a QI program for cardiac arrest, increase the extent of medical control, and synchronize the operations of the dispatch center with those of the EMS agency. There is no limit to what can be accomplished by motivated individuals working within an organization. Changing an organization's culture is hard work. It would be naive to think that you, the reader of this guide, could simply shout, "Eureka!", and then instantly set about implementing radical changes within your organization. Nevertheless, whatever your role in your EMS system, you can take or contribute to some relatively resource-light actions that are likely to raise your community's survival rate for cardiac arrest, actions whose short-term dividends can encourage and reinforce the will to engage in longer-term, more difficult change efforts.



Russ McCallion

Asst. Chief EMS & Training Divisions East Pierce Fire and Rescue

To view this video visit resuscitationacademy.org/ebook

EAST PIERCE FIRE & RESCUE ALUMNUS

"We would tear our department apart and rebuild it step by step, if we thought we were losing 4 to 6 citizens per year that should have been rescued from fires. So, when we know that we can save 4 to 6 additional people every year from cardiac arrest—are we as an agency going to step up and put the same energy into saving these CPR patients? Whether it is a person dying in a house fire or a person dying from cardiac arrest—to the family—dead is dead, and equally tragic, so why would we spend any less effort saving these patients?"

Embracing the Challenge

KEY CHALLENGES

The Will and the Way

The following pages provide a game plan with 10 specific steps to achieve improvements in both the chain and the frame of survival. It takes determination to incorporate these steps into an existing EMS system. An individual or group needs to want it to happen. But change can occur, and survival rates for cardiac arrest can improve. Two-hundred and fifty years ago, community leaders in Amsterdam decided to improve survival rates for drowning, the sudden death of their time, and they established the world's first rescue society. But resuscitation science at that time was primitive, and therapy was not very effective; the leaders of Amsterdam had the will for resuscitation, but not the way. The sudden death of our time is cardiac arrest due to heart disease. Science has made great strides, and therapy can be effective. We now have the way; all we need is the will. Is it possible to change an EMS system in fundamental ways? Can a community's survival rate for cardiac arrest be dramatically and permanently improved? We believe the answer is an emphatic YES!

What our Alumni have to say

If you don't believe us, take a moment to see what our alumni have to say...



Cindy Hambly

Training/Quality Improvement Manager Thurston County Medic One

To view this video visit resuscitationacademy.org/ebook

THURSTON COUNTY, WA ALUMNA

"Success breeds success: we had immediate, positive results when we rolled out the "High-Performance CPR" training. News of this success spread rapidly through the ranks, and the providers were motivated to be part of the success".

Embracing the Challenge

KEY CHALLENGES

HOWARD COUNTY, MARYLAND ALUMNUS

"The concepts needed to succeed are simple; converting knowledge into ACTION and changing culture are the true challenges. Our approach was to view cardiac arrest survival improvement as a "team" effort. The Academy Faculty's guidance is "spot on!" Great leadership among our field personnel, those who live and breathe life safety, made the true difference in changing the culture of our department when it comes to improving survival through CPR. Giving ownership of HP-CPR to the field EMTs and allowing them to gain the critical buy-in from their officers is our greatest accomplishment.

The medical director committed to reviewing all VF arrests and sending feedback; this created a system of measurement of where we were, so that we could assess the impact of each intervention on neurologically-intact patient survival.

We took full advantage of a Fire Chief who has come to realize that EMS is the specialty that this Fire Department does best and a County Executive who personally and closely realized that Sudden Cardiac Arrest can affect anyone, importantly, those people close to you, to accomplish much more: CPR training for students in our school system, AEDs on police cars and hands-only CPR training for the community. All of our successes are a product of the hard work of a team coupled with support from leadership both in the Fire Department and in the government of Howard County, Maryland."

Kevin G. Seaman, M. D., FACEP

Medical Director

HOWARD COUNTY, MARYLAND ALUMNUS

"Rushing to the scene doing as much as we can, as fast as we can, and rushing to the hospital only does one thing, and that is moving dead people quickly from here to there. If this sounds like you, I hope at least everyone looked good doing it! In a sudden out of hospital cardiac arrest, we the EMS providers are the definitive care. If we do not resuscitate these patients there is nearly a 100% probability they will not be walking out of the hospital because they are dead. In cases of cardiac arrest specifically, good quality care is more important than shortest on scene time possible if you expect patients to survive, and walk out of the hospital."

Captain Dale Becker,

Howard County, Maryland EMS

Embracing the Challenge

KEY CHALLENGES

YAKIMA COUNTY, WASHINGTON ALUMNUS

"People have a false belief that one person cannot make any changes but those are probably the same people that are afraid of change. Should people be afraid of change? I say not. Sinking your head in the sand hoping that the cardiac issues are going away just because we have the most sophisticated equipment in the world is very mistaken.

I feel proud to say that our department of EMS with your help is trying to make changes one step at a time.

I know and believe that we will start seeing VF as a condition with excellent prognosis. Thank you for all you have done and continue to do for our patients."

Juan F. Acosta, DO, MS, FACOEP, FACEP

MPD, Yakima County EMS



10 Steps: Grab the Low Hanging Fruit - Steps 1-4

The plan to improve a community's survival rate consists of 10 specific but diverse steps. Four of the steps are relatively easy and do not require much in the way of resources. These may be considered the low-hanging fruit. There are six steps that are more difficult and require modest to considerable equipment or resources – the higher-hanging fruit. It is unrealistic to presume that all 10 local steps can be implemented in any given community; an EMS director and medical director have to decide what is doable in their community. Furthermore what we consider easy steps, may be very challenging in some communities and vice versa. All the recommended steps are cognizant of the fact that real change requires addressing quantitative as well as qualitative factors. The total picture must entail the chain of survival as well as the frame of survival. This guide closes with some thoughts on how to implement change.

FOUR STEPS TO IMPROVE CARDIAC ARREST: THE LOW-HANGING FRUIT	
STEPS	LEVEL OF DIFFICULTY
Cardiac arrest registry	Low
Telephone-CPR: Training, Implementation & QI	Low
High Performance CPR: Training, Implementation & QI	Low
Rapid Dispatch	Moderate

A disclaimer: The recommendations put forward in this section cannot simply be used as a template and applied to any emergency medical system. Every community has its own constellation of resources, history, culture, and personalities. Indeed, this variety, which makes every EMS system unique, is a strength, offering a crucible for new ideas and new programs, which is why every community can become a source of innovation as well as a testing ground for new ideas. For some communities implementing even one of the recommendations offered here may prove challenging. For others, they may implement several steps in the first year.

The attendees at the Resuscitation Academy, by the end of the two-day training course, are fired up to return home and begin to make changes. It is clear that they are bursting with ideas big and small for their home communities. What should they tackle first? What will give the biggest bang for the buck? The faculty tell them to pick the low-hanging fruit first. Our advice is to reach for the largest, tastiest, juiciest, and closest pear before climbing the tree. Get some success under your belt and keep plugging away, small step by small step until there is a culture of change, allowing one to pick some of the higher-hanging fruit.

10 Steps: Grab the Low Hanging Fruit - Steps 1-4

The steps that can achieve the quick results are: 1) to establish a cardiac arrest registry, 2) to begin a program in Telephone-CPR, 3) to begin a program in high-performance CPR, and 4) to begin rapid dispatch. These steps are neither complicated nor costly, but they are not without challenges.

Three of them require ongoing QI if they are to reach their potential. High-performance CPR, Telephone-CPR, and rapid dispatch all require continuous maintenance and nurturing. To do otherwise would be like planting a vineyard and assuming it would do fine without watering and pruning. Programs without ongoing QI and ongoing training will result at best in mediocre and lackluster performance and at worst in no improvement at all.

STEP

1

Establish a Cardiac Arrest Registry



Jenny Shin, MPH

Program Manager, King County EMS CARES, Coordinator

To view this video visit resuscitationacademy.org/ebook

A cardiac arrest registry is the first step to improving survival. It is the essence of measurement. One of the mantras at the Resuscitation Academy is “measure, improve, measure, improve...,” encapsulating the concept of documenting cardiac arrest events (measuring) and then implementing changes for improvement. In turn, continued measurement will determine if the improvement has had an effect and will identify further steps for improvement. And so on... This is the most important mantra of the Academy since it pithily describes the bedrock upon which all programmatic change springs forth.

A registry is a means of taking the entire EMS system’s temperature. If a cardiac arrest is well managed, it’s more than likely that all other conditions will be well managed, too. In this sense, cardiac arrest stands for the whole system. A registry measures more than whether the patient lives or

dies, but all aspects related to the care. Was bystander CPR performed? Did the dispatcher provide Telephone-CPR instructions? How good was the EMT CPR? Were there unacceptable pauses in CPR? Did the paramedics intubate successfully? Given enough cardiac arrests, a profile begins to emerge of where the system is succeeding and where it is failing. This information then informs the specific elements that need improvement.

The cardiac arrest registry’s efforts must be viewed as a core function, and the registry itself must not be threatened with funding cuts or elimination during lean times. It must have sufficient resources and the full support of the

10 Steps: Grab the Low Hanging Fruit - Steps 1-4

medical and administrative directors. Necessary resources include staff time for gathering information from run reports (electronic or paper), dispatch center reports, AED recordings, hospital records, and ideally death certificates. Clearly, a small community will not have the volume of events to justify full-time dedicated staff, but several small communities can join together to establish a registry at the county or regional level. In 2005 investigators from Emory University, with initial funding from the Centers for Disease Control, established the structure for a national cardiac arrest registry: The Cardiac Arrest Registry to Enhance Survival (myCARES.net).

The registry is open to EMS systems throughout the nation. There is an annual fee to participate. As of 2018, there were hundreds of communities from 22 participating states, plus many dozens of communities from nonparticipating states. The registry entails having the EMS system and local hospitals submit data via a web-based system. CARES overcomes a major obstacle in most well intentioned registries, namely obtaining outcome data from hospitals. Did the patient live or die and what was the neurological condition on discharge? The CARES project is based on voluntary participation, and all the participants receive summaries of their own community as well as a national summary.



CARES can be customized for the needs of the local community. CARES also provides templates so communities can review their statistics sliced and diced in any way they wish. The main template is the Utstein reporting template, which provides the survival (discharged alive) rate for witnessed cases of VF in which the collapse occurs before the arrival of EMS personnel. For agencies participating in CARES, the Utstein template is automatically generated.

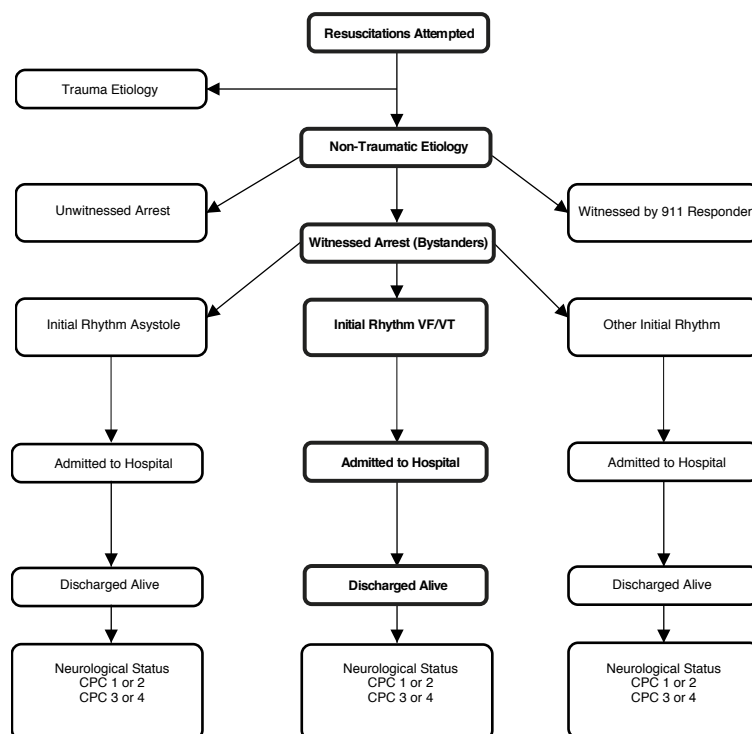
10 Steps: Grab the Low Hanging Fruit - Steps 1-4

The main metric is discharged alive survival from bystander witnessed cases of ventricular fibrillation of non-traumatic etiology. The survival is expressed as a percentage of all cases meeting this definition. When possible the neurological status of the survivors should also be determined from the hospital record. CPC scores of 1 and 2 indicate good to moderately good neurological outcomes and CPC scores of 3 and 4 indicate poor to terrible outcomes. To maintain a cardiac arrest registry (whether in CARES or as a free-standing registry) at its basic level, probably a quarter-time person is needed for a community of one million to gather incident data and obtain follow-up information from hospitals. If the tasks associated with maintaining the cardiac arrest registry are combined with those of collecting and managing data for high-performance CPR

and the Telephone-CPR program, there will be enough work for one half-time employee. This estimate assumes that the EMTs and paramedics are assisting in the data collection such as forwarding run reports and defibrillator downloads. It also assumes that the dispatch center is providing CAD reports and recordings on CPR calls.

The registry should collect information on all cardiac arrests for which EMS care has been provided – in other words, when resuscitation was attempted. The major emphasis, however, should be on cardiac arrests in which VF was the presenting rhythm. For communities with limited resources, restricting the registry to cases of VF or witnessed VF is a reasonable measure. Implicit in the concept of a cardiac arrest registry is the assumption that time intervals will be measured accurately. The most important time intervals are those between the patients collapse and the start of CPR, and between the collapse and the first shock. Admittedly it is not usually possible to know the exact time of collapse. Therefore, the first accurate time is the time the 911 call is answered, and this should be the precise moment the EMS clock starts ticking. If dispatch recordings are available, the time from call to start of CPR may be determined when Telephone-CPR is administered. Ideally, all the system's AEDs will be synchronized automatically or manually to an accurate clock.

Utstein Survival Report for Reporting CA Survival



10 Steps: Grab the Low Hanging Fruit - Steps 1-4

YAKIMA COUNTY, WA ALUMNA

"After providing the facts from our new data entry program through CARES, we saw marked increase in interest and participation from local EMS and Fire administrators"

Candace Hamilton

Yakima County EMS

It is important to be realistic about what a cardiac arrest registry includes. To be fully functional a registry must have the following three elements:

1. Full capture of all arrests meeting the case definition:

The case definition we use in King County for an event is a cardiac arrest in which EMS personnel initiate or continue CPR. Patients who receive public AED shocks and subsequently do not require EMS CPR, are also considered cases. Trauma cases are excluded from the registry unless the trauma involves a low speed motor vehicle accident or other situation in which the cardiac arrest may have preceded the trauma. Patients who are dead on arrival or have a "do not resuscitate (DNR)" order and those who did not receive EMS CPR do not qualify under the case definition. But we do include cases in which EMS CPR is started and then stopped after a DNR order is clarified. However, since these cases are invariably non-VF cases, they do not affect the VF survival rate.

2. Measurement of critical variables:

Measurement of critical variables include: Witnessed collapsed, collapse before EMS arrival, first rhythm obtained, shockable rhythm, bystander CPR, Telephone-CPR, time of call to dispatch center, time of EMS CPR, time of first compression for Telephone-CPR, time of first defibrillation.

3. Measurement of outcome:

Death at scene, death in hospital, discharge alive (ideally with a determination of neurological outcome). To obtain critical information on the outcome of all patients admitted to the hospital, a good working relationship with area hospitals is essential. A registry is part of ongoing quality improvement and is considered protected information in most states (and consent from the patient to release medical information is not required). The completeness of the registry can of course vary from the bare minimum of information to hundreds of variables. In King County, we have a registry that is comprehensive and serves as the basis for many studies. The 300 variables we collect from CAD reports, incident reports, defibrillation downloads, voice recordings, hospital records, autopsy reports and death certificates, would be considered excessive for routine quality improvement. A good basic registry can be achieved with a handful of variables.

10 Steps: Grab the Low Hanging Fruit - Steps 1-4

STEP

2

Implement Telephone-CPR with Ongoing Training & QI



Julie Buckingham

To view this video visit resuscitationacademy.org/ebook

Most dispatch centers claim to have Telephone-CPR protocols in place, but in practice they don't offer CPR instructions very often. (synonymous terms are dispatcher-assisted CPR or telecommunicator-CPR) Admittedly, it is difficult and stressful for dispatchers to determine the presence of cardiac arrest and provide CPR instructions; it is far easier simply to reassure the caller that help is on the way. But the center whose culture supports it's dispatchers to assertively offer callers CPR instructions over the telephone, is a center that has the chain of survival firmly in its grasp. This kind of culture can exist only if someone has responsibility for teaching Telephone-CPR, monitoring the program, and watching like a hawk. Someone has to listen to recorded information from all cardiac arrest calls and give feedback to individual dispatchers, as well as to the entire staff. It is just as important to review the calls in which

instructions were provided (how could it be done faster, better?) as it is to review the calls in which cardiac arrest was not recognized (how can we do a better job identifying cardiac arrest?).

The adjective "assertive" describes a useful mindset for dispatchers when fielding possible cardiac arrest calls. A take charge attitude that moves ahead with CPR instructions, when there is reasonable likelihood that cardiac arrest is present, is the attitude needed for this program to succeed. If the dispatcher is overly cautious or holds back in the face of uncertainty, the instructions will seldom be given or there will be considerable delay in their implementation.

One element of any successful Telephone-CPR program is training, which should include continuing education. Dispatchers in King County receive an initial forty hours of training in emergency medical dispatching, and are hereafter required to complete eight hours of continuing education every year. Special emphasis is placed on recognizing cardiac arrest and delivering CPR instructions.

10 Steps: Grab the Low Hanging Fruit - Steps 1-4



911 Audio Excerpt:
**Great CPR For Over
8 Minutes**

resuscitationacademy.org/ebook



911 Audio Excerpt:
**Quick to Identify Need
for CPR**

resuscitationacademy.org/ebook



911 Audio Excerpt:
**Great CPR & Good
Coaching**

resuscitationacademy.org/ebook

Recently a five-year randomized clinical trial in King County, and Thurston County (south of King County) in Washington State and London (England) looked at whether Telephone-CPR achieved better survival with standard CPR (mouth-to-mouth with compressions) instructions than with chest compressions only instructions. The trial found no difference overall in survival but there were non-statistical improvements in survival and neurological recovery with chest compression only. As a result we now provide chest-compressions only instructions for all adult cardiac arrests. (Chest compression only instructions for adults is also recommended by The American Heart Association). The dispatchers provide standard CPR instructions (mouth to mouth combined with chest compression) for cardiac arrest in children and infants (fortunately rare events) and when there is an obvious respiratory cause of arrest such as drowning, hanging, or smoke inhalation.

Prior to delivering these instructions the dispatcher has determined the likely presence of cardiac arrest. This is achieved by asking two critical screening questions: Is the patient conscious (awake)? Is the patient breathing normally? Note that the instructions call

10 Steps: Grab the Low Hanging Fruit - Steps 1-4



911 Audio Excerpt:
**Need for CPR Missed Despite
Many Signals**
resuscitationacademy.org/ebook



911 Audio Excerpt:
Unnecessary Questions
resuscitationacademy.org/ebook

for chest compression only CPR. If respiratory arrest is the suspected cause of cardiac arrest then ventilation instructions are provided. There are slightly different protocols for children and infants as well as protocols for choking patients. In King County, there is an expectation that “every call is a cardiac arrest until proven otherwise”. (We think of this as a step specific mantra for Telephone-CPR). Though only one percent of the calls will actually be a cardiac arrest, nevertheless this expectation primes the dispatcher to always ask the two screening questions (unless the caller is the patient) as quickly as possible.

- ***Is the patient conscious (awake)?***
- ***Is the patient breathing normally?***

If the answer is no to both, the dispatcher immediately begins instructions. (Thus, giving us the second step specific mantra **“No, No, Go”: No-Not conscious, No-Not Breathing Normally, Go-Begin CPR.**)

Dispatchers learn the significance of agonal respirations and how to recognize them. It is particularly important that they offer CPR instructions when there are agonal respirations, since these patients are the ones most likely to be resuscitated and discharged from the hospital. Agonal breathing is present in approximately 60 percent of patients with VF cardiac arrest. Yet the presence of agonal breathing will often confuse the caller and/or dispatcher into thinking the patient is not in cardiac arrest.

Despite our considerable training on how to recognize agonal breathing, it remains a challenge. When asked, “Is the patient breathing normally?” the caller often responds with “a little” or “sometimes” or “I’m not sure” or “I think so.” The dispatcher is seeking a yes or no response to the question and instead receives an ambiguous reply. When the dispatcher asks the caller to describe the breathing, the replies are varied and include gasping, snoring, slow, grunting, groaning, and gurgling. Often the agonal breathing can be heard in the background but if not the dispatcher may ask the caller to bring the phone to the patient in order to better hear the breathing. In terms of training and motivation, the director of a dispatch center should do whatever is necessary to ensure that the center achieves a 50 percent



911 Audio Excerpt:
Agonals Example - Gargling
resuscitationacademy.org/ebook



911 Audio Excerpt:
Agonals Example - Moaning
resuscitationacademy.org/ebook

10 Steps: Grab the Low Hanging Fruit - Steps 1-4



911 Audio Excerpt:

Good Example - Breathing Normally

resuscitationacademy.org/ebook

a 75 percent rate of Telephone-CPR instructions in cases of cardiac arrest. This is not an unrealistic target. Achieving such a target will require a sponsor – someone who takes charge of the desired change, has the authority to mandate it, and establishes training, professional expectations, and ongoing audits to see that the change is fully implemented. Once dispatchers realize how

vital they are to the chain of resuscitation, and especially when they see concrete evidence of their success, they will become the staunchest advocates of Telephone-CPR.

As with high-performance CPR the quality of Telephone-CPR can be measured. At a minimum every call of cardiac arrest must be reviewed with the following elements measured:

- Was cardiac arrest recognized?
- Were the two basic questions asked:
 - Is the patient conscious (*awake*)?
 - Is the patient breathing normally?
- Were agonal respirations (*if present*) recognized?
- Were Telephone-CPR instructions offered? We believe ongoing QI of Telephone-CPR should include the following attainable goals:
 1. Recognition cardiac arrest by the dispatcher in 75% of all cardiac arrests treated by EMS.
 2. Recognition of cardiac arrest within one minute (*on average*).
 3. Provision of Telephone-CPR in 50 percent of all cardiac arrests calls treated by EMS (*excluding the calls in which bystanders are performing CPR at the time of the call*).
 4. First compression started within two minutes (*on average*).



911 Audio Excerpt:

Dispatcher Does Not Get Sidetracked

resuscitationacademy.org/ebook



911 Audio Excerpt:

Well Handled Breathing Question

resuscitationacademy.org/ebook

Feedback must be provided to the dispatcher following every event. The American Heart Association in 2012 issued a Scientific Statement strongly endorsing Telephone-CPR, including the importance of asking the two identifying questions, special training in the recognition of agonal respirations, and a vigorous ongoing QI program.

10 Steps: Grab the Low Hanging Fruit - Steps 1-4 _____

Dispatcher All Caller Interview

*****Only use bulleted phrase if caller does not understand bolded instruction*****

9-1-1

- What is your emergency?
- Do you need police, fire, or medical help?
- What are you reporting?

What is the address?

- Are you at (prompt with location on screen)?
- Where are you?

Are you the patient?

- Who is hurt?
- Who needs help?

Are they conscious? (Awake?) - If NO: ask next question (breathing). - If YES : “Bring the phone to the patient so I can speak with them .”

- Can they talk to you?
- Can they respond to you?
- Can you wake them up?

Are they breathing normally?

- Tell me what their breathing sounds like
- Is their chest rising and falling?
- Is their stomach going up and down?

If patient is not conscious and not breathing normally, begin CPR instructions.

- Dispatch Police AED unit
- Be alert for premise/radius Information Indicating AED
- Send second rescuer to retrieve AED or send lone rescuer ONLY if AED is nearby and easily accessible

About how old is the patient?

- Adult, child, baby?
- 20's, 40's, 60's?
- Skip the following all-caller questions until later in the call if the patient needs CPR

Is the person a man or a woman?

What is the phone number you are calling from?

What is your name?

10 Steps: Grab the Low Hanging Fruit - Steps 1-4 _____

Adult CPR Instructions

*****Only use bulleted phrase if caller does not understand bolded instruction*****

1. “I’ve notified the dispatcher, talking to me won’t cause a delay. Follow my instructions”

If caller does not understand, say something like this:

- “We need to help the heart work.”
- If caller asks, confirm that they will be doing CPR.

2. “Get them on their back on the floor.” (Confirm position, if any doubt that patient is on floor.)

If caller does not understand, say something like this:

- “Lay them down”
- “On the ground”
- “Face up”

3. “Kneel by their side.”

If caller does not understand, say something like this:

- “Get down on the floor”
- “Next to/close to/near them”

4. “Put your hand on the center of their chest, right between the nipples, and put your other hand on top of that hand.”

If caller does not understand, say something like this:

- “Middle of the chest”
- “Between the breasts”
- “Use palm/heel/bottom of your hand”

5. “With straight arms push down as hard as you can, just like you’re pumping the chest. Let’s start push, push, push, push, 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4 ... Push and count out loud 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4 ... Keep going! Do not pause. “

TIPS: Count with the caller!

When it sounds like caller is confident counting, stop counting to listen to rate. Jump back in counting with them to speed up or slow down rate, or eliminate pauses. Don’t interrupt them with unnecessary questions.

COACHING

Give reassurance and coach caller after chest compressions have been going for awhile:

- “You’re doing great I Keep going!”
- “Push as hard as you can”
- “Don’t stop until they tell you to stop”

10 Steps: Grab the Low Hanging Fruit - Steps 1-4 _____

Adult CPR Instructions

Only use bulleted phrase if caller does not understand bolded instruction

TROUBLESHOOTING

- If caller worries they are hurting the person, reassure them that the person is not in pain.
- If caller is tired, ask if they are keeping their arms straight, or suggest a short break.
- If caller mentions phone is interfering with CPR, suggest using speaker phone or putting the phone down during compressions.
- If another person is present, suggest that this person do compressions (take turns).
- If caller feels weak or unable to do compressions, ask if there's a neighbor you can call to come help.

NOTE: IF CALLER REPORTS VOMITING, INSTRUCT CALLER TO:

- Turn patient's head to one side.
- Sweep out contents with your fingers before you resume.

VENTILATION INSTRUCTIONS

(for use when suspected cardiac arrest is secondary to respiratory arrest)

START with **30 compressions**, then:

PINCH the **NOSE**, with your other hand,
LIFT the **CHIN** so the head tilts/bends back

Completely **COVER** their **MOUTH** with
your **MOUTH**

GIVE 2 BREATHS OF AIR

Continue cycles of **30 COMPRESSIONS**,
followed by **2 BREATHS**

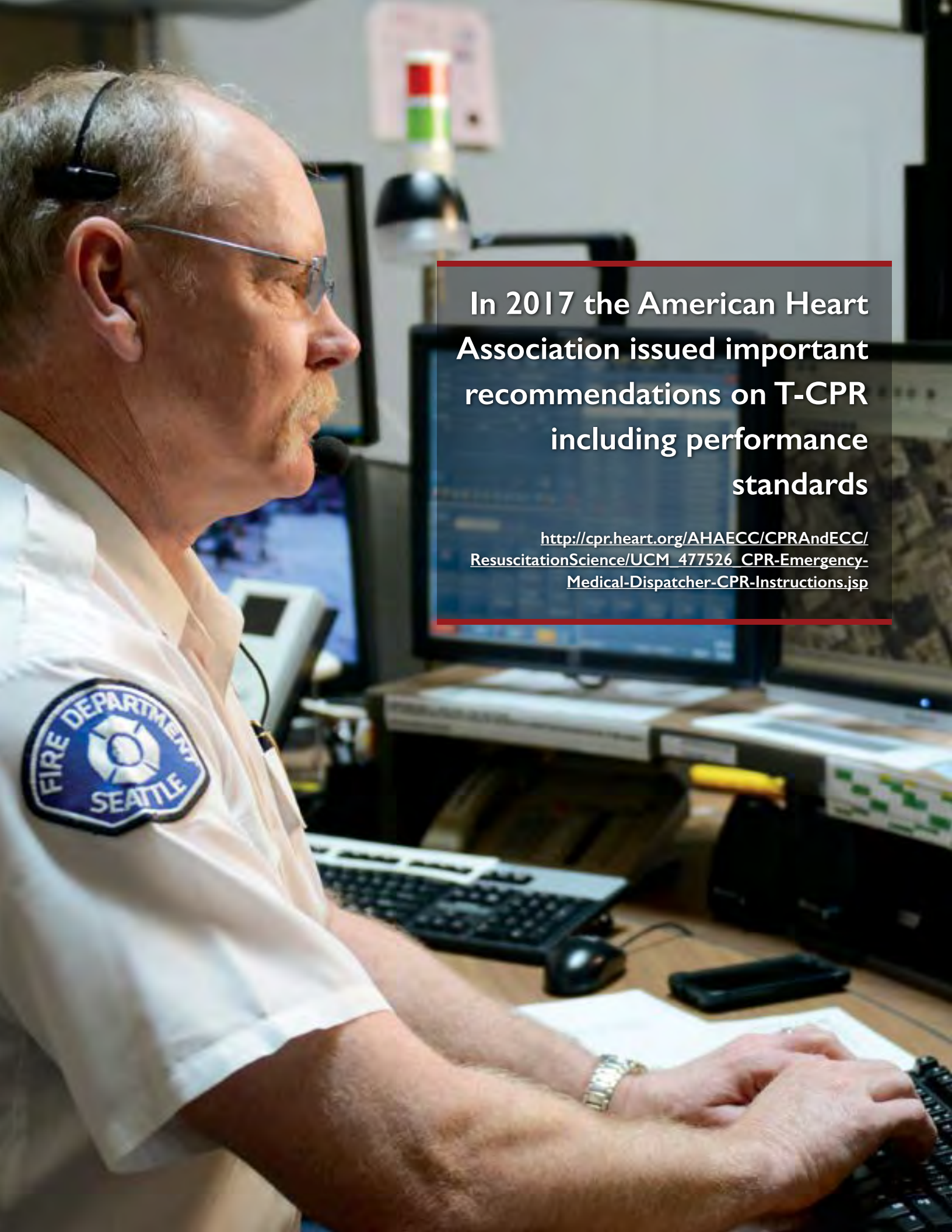
FOREIGN BODY AIRWAY OBSTRUCTION INSTRUCTIONS

(confirmed choking, now unconscious)

Look for item after 30 compressions:
"Look inside mouth and remove any obvious obstruction."

If object is removed, give 2 ventilations between each set of 30 compressions.

If object is not seen, continue with compression.
Look for item after each set of 30 compressions.

A photograph of a middle-aged man with glasses and a mustache, wearing a white Seattle Fire Department uniform shirt with a patch on the sleeve. He is sitting at a desk in a dispatch center, wearing a headset and looking at a computer monitor. His hands are on a keyboard. The background shows other computer monitors and office equipment.

In 2017 the American Heart Association issued important recommendations on T-CPR including performance standards

http://cpr.heart.org/AHA/ECC/CPRAandECC/ResuscitationScience/UCM_477526_CPR-Emergency-Medical-Dispatcher-CPR-Instructions.jsp

Telephone-CPR (T-CPR)

Program Recommendations and Performance Measures from the American Heart Association

(The following 3 pages are reprinted with permission: Telephone-CPR (T-CPR) Program Recommendations And Performance Measures ©2018 American Heart Association, Inc)

Sudden cardiac arrest (SCA) is the sudden, unexpected loss of heart function, breathing and consciousness, and is commonly the result of an electrical disturbance in the heart. Each year an estimated 350,000 cardiac arrest events occur in the United States in an out-of-hospital environment. Almost all of these events result in a call for help to 911. Without quick intervention in the form of cardiopulmonary resuscitation (CPR) and defibrillation, death from SCA is certain.

Telecommunicators are the true, first responders and a critical link in the cardiac arrest chain of survival. It is the telecommunicator, in partnership with the caller, who has the opportunity to identify a patient in cardiac arrest, providing the initial level of care by delivering Telephone-CPR (T-CPR) instructions to the caller, and quickly dispatching the appropriate level of help. It is through these actions that the telecommunicator can make the difference between life and death. It is important to emphasize that the telecommunicator and the caller form a unique team in which the expertise of the telecommunicator and the willingness of the caller to provide T-CPR represents the best opportunity to improve survival from SCA.

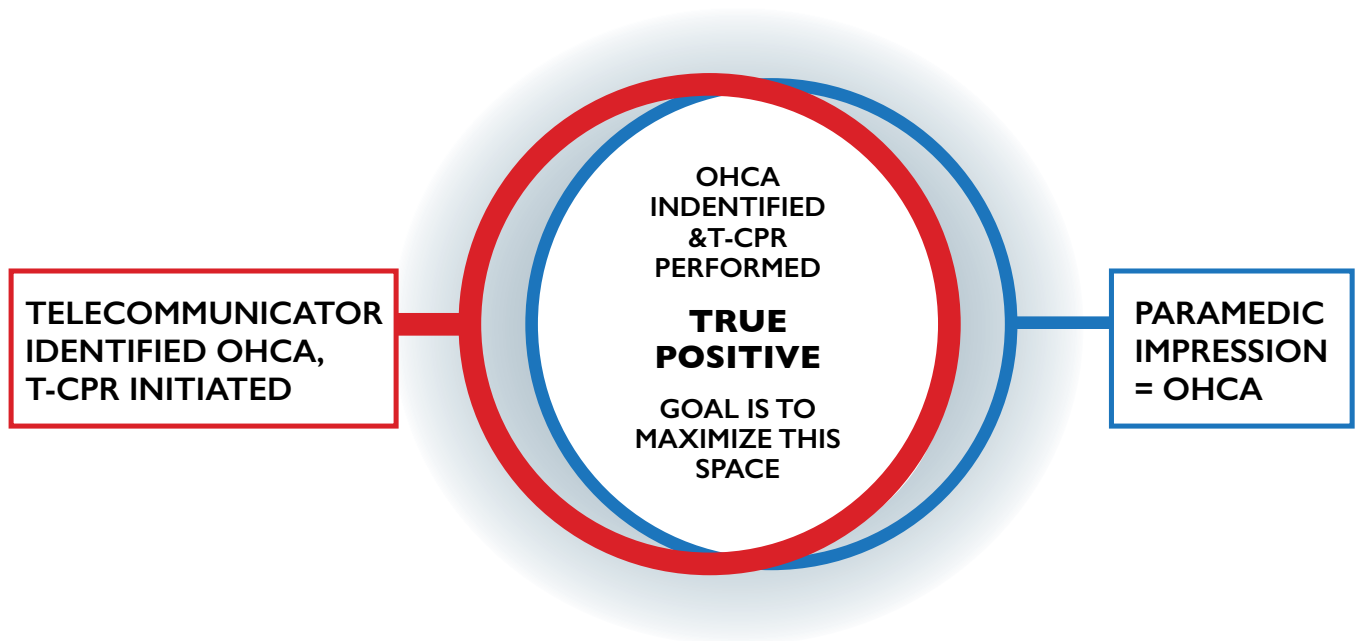
The information below outlines the minimal acceptable standards for timely and high-quality delivery of T-CPR instructions by emergency telecommunicators. Where possible, these processes should occur in parallel, rather than in series, to minimize the overall time interval from 911 call to T-CPR as much as possible.

Every emergency dispatch center in the nation should be aware of the following:

- The provision of T-CPR instruction for virtually all cardiac arrests is a standard of care.
- Meeting this standard requires training, ongoing training, and continuous quality improvement.
- Meeting this standard saves lives.
- Not meeting this standard results in deaths that are preventable.



Telephone-CPR (T-CPR) - Program Recommendations _____



1. Commitment to T-CPR

- The emergency communications center will commit to providing effective T-CPR.
- The dispatch center director must provide leadership and hold the staff accountable for implementation.

2. Train and Provide Continuing Education in T-CPR for all Telecommunicators

3. Conduct Ongoing Quality Improvement (QI) for all Calls in which a Cardiac Arrest is Confirmed by EMS Personnel and in which Resuscitation is Attempted

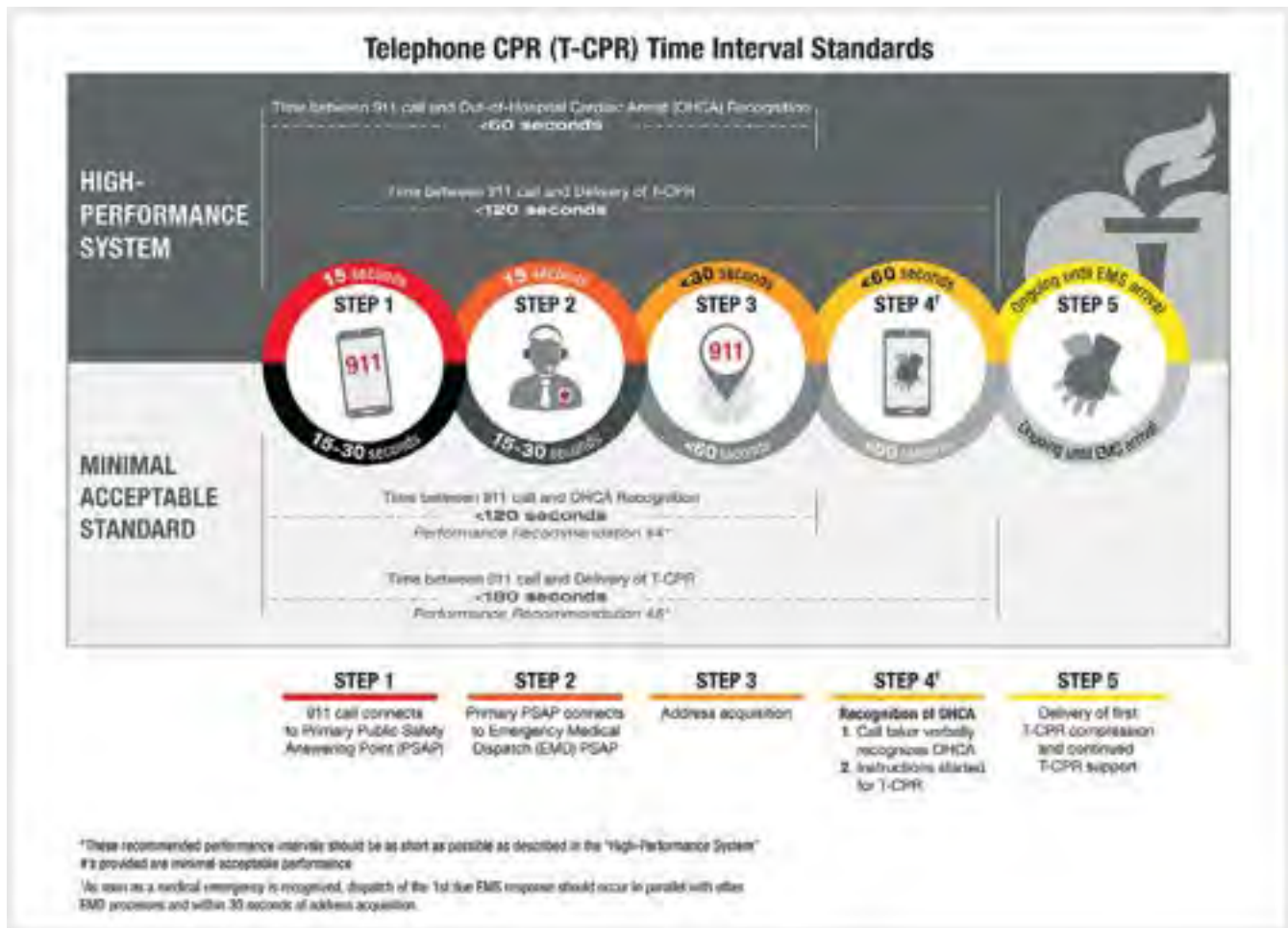
4. Connection to EMS Agency

5. Designated Medical Director

6. Recognition for Outstanding Performance

Details about each of the above 6 program recommendations may be found on the AHA website (see page 38)

Telephone-CPR (T-CPR) - Performance Measures



1. Percentage of Total Out-of-Hospital Cardiac Arrest (OHCA) Cases Correctly Identified by Public Safety Answering Point (PSAP)

- Definition: telecommunicator recognized / total OHCA (confirmed by EMS impression)
- Numerator: # of QI reviewed EMS confirmed OHCA with recognition noted
- Denominator: EMS confirmed OHCA
- Performance Goal: 75%

2. Percentage of OHCA Cases Correctly Identified by PSAP that were Recognizable

3. Percentage of Call-Taker Recognized OHCA Receiving T-CPR

4. Median Time Between 911 Call and OHCA Recognition

5. Median Time Between 911 Call and First T-CPR Directed Compression

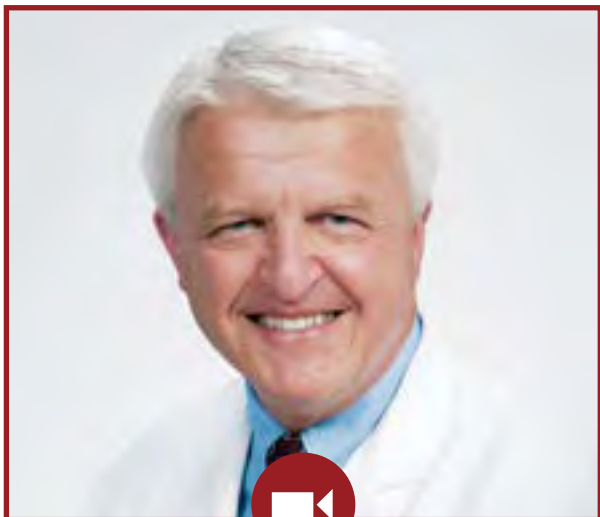
Details about each of the above 5 performance measures may be found on the AHA website (see page 38)

10 Steps: Grab the Low Hanging Fruit - Steps 1-4 _____

STEP

3

Implement High-Performance CPR with Ongoing Training & QI



Peter Kudenchuk, MD

*Professor of Medicine, Division of Cardiology University of Washington
Medical Director, South King County EMS*

To view this video visit resuscitationacademy.org/ebook

Recent studies demonstrate the connection between quality CPR and survival from cardiac arrest. Not only is the time interval from collapse to onset of CPR predictive of survival, but also the quality of the CPR is just as important. The better the CPR, the better the outcome. Since 2005, when we trained every EMT in our system how to perform high-performance CPR, we have seen a dramatic increase in survival. Resuscitations that go on for 50 or 60 minutes with a pharmacy of medications and 10-20 defibrillatory shocks and a patient who survives – with excellent neurological recovery – used to be the exception, but now seems commonplace. It is as though the onset of high-performance CPR suspends death and gives a better opportunity for the defibrillatory shocks and medications to work their magic.

High-performance CPR is as much a construct as a measurable skill. The construct says that letter-perfect CPR is the goal of all resuscitations. This skill can be achieved in training, as well as through review of real events. We believe training with instrumented manikins is the best teaching tool as it provides instant feedback as well as training review.



High Performance CPR - BLS - Continuous Compressions

To view this video visit resuscitationacademy.org/ebook

10 Steps: Grab the Low Hanging Fruit - Steps 1-4

Elements of High-Performance CPR include:

- Correct hand position
- Compression rate of 100-120 beats per minute
- Depth of compression of 2 inches
- Full recoil on the upstroke
- 50:50 duty cycles
- Ventilations of one second each
- Minimal interruptions of CPR (*no pause to exceed 10 seconds*)
- Intubation and IV start without pausing chest compressions

Last, and perhaps most important, is that there is an ongoing QI program that provides feedback with specifics about CPR performance to EMTs following every cardiac arrest? A QI program should among other things measure the percentage of time chest compressions are performed during each two-minute interval between rhythm assessments. Well-trained EMTs should be able to provide chest compressions for at least 90 percent of the available time. Most defibrillators allow digital downloads following the resuscitation, including precise measurements of CPR percentage and quality.



Captain Jonathan Larsen

Firefighter/Paramedic Seattle Fire Department (retired)

To view this video visit resuscitationacademy.org/ebook

Another aspect to high-performance CPR is the choreography between the EMTs and the paramedics. Other terms used to describe this flawless team performance are the “dance of resuscitation”, the “CPR ballet” and the “pit-stop approach to CPR”.

Observing well-trained rescuers engaged in high-performance CPR is indeed like watching a well-choreographed dance. The term pit-stop refers to the pre-defined role of each rescuer and the very minimal waste of time. Like a professional race car pit crew, each member of the team knows exactly what to do and does it with the minimal wastage of time and effort. This choreography means the members switch or rotate roles with minimal interruptions – current protocols call for rhythm analysis every two minutes. Thus, the chest compressor and the ventilator can switch roles every two minutes. With sufficient personnel at the scene, one EMT

10 Steps: Grab the Low Hanging Fruit - Steps 1-4

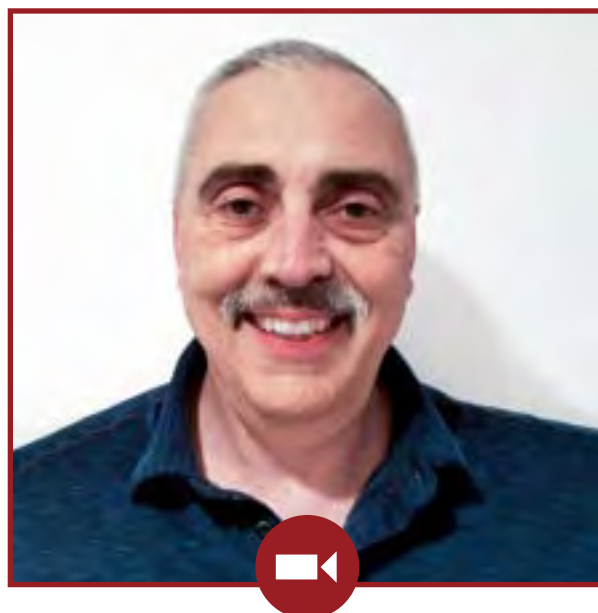
can start compression, the second EMT can attach the AED pads, the third EMT can provide ventilation, while the fourth EMT can feel the femoral pulse (*in order to define the location of the artery and determine if a shock leads to a perfusing rhythm*). A fifth EMT, if present, could be the “captain” of CPR and provide direction to the crew (*typically the person providing overall direction is the one who operates the automated external defibrillator*). Paramedics should optimally intubate and place the IV with no interruption in chest compression. Clearly if there are fewer rescuers the responsibilities must be aggregated. In our system, we think of the EMT crew as owning CPR, meaning that they are responsible for the quality and directing assignments. The paramedics own advanced life support, meaning they are responsible for intubation, starting an IV, and administering medications. Upon arrival paramedics become the overall team captains, but they know to delegate CPR to the EMTs. The EMT team not only keeps track of the quality of CPR, but also keeps track of the timing of interventions. Since there is a rhythm analysis every two minutes, an EMT is the official timekeeper, literally using a stopwatch. (*In King County we go slightly beyond two minutes of CPR in order to end with 30 chest compressions prior to every rhythm analysis.*)

For the EMTs and paramedics to understand why high-performance CPR is so critical, part of our training includes instruction in the science of CPR. Our colleague, Dr. Peter Kudenchuk, has developed a compelling 30-minute video on the science of CPR and why letter-perfect CPR is so important. This video is part of every King County EMT’s training. The video below, is an excerpt:



Excerpt from *The Science of CPR*, with
Peter Kudenchuk, MD

To view this video visit resuscitationacademy.org/ebook



Norm Nedell

Paramedic, EMT Instructor & Dispatcher
Seattle Fire Department (retired)

To view this video visit resuscitationacademy.org/ebook

High-Performance CPR & The American Heart Association

The American Heart Association guidelines emphasize the need for high quality CPR (*proper depth, rate and full recoil*) and minimizations of pauses while performing CPR. This is exactly what HP CPR focuses on and strives to achieve.



Michael Sayre MD

Professor, School of Medicine University of Washington
To view this video visit resuscitationacademy.org/ebook



Russ McCallion

Asst. Chief, EMS & Training Divisions East Pierce Fire and Rescue
To view this video visit resuscitationacademy.org/ebook

STEP 4

Implement Rapid Dispatch



Cleo Subido

EMD Training/QI Coordinator King County EMS
To view this video visit resuscitationacademy.org/ebook

With rapid dispatch, the closest EMT-staffed vehicle is dispatched within seconds, when specific medical emergencies are reported to the 911 dispatcher. The dispatch should occur even while additional information is being gathered from the caller. The quick arrival of at least an EMT vehicle, allows the EMTs to perform CPR and deliver the first defibrillatory shock. On the other hand, it may be immediately clear that both EMTs and paramedics are required (such as a report of ongoing CPR) and thus, both vehicles can be rapidly dispatched. If additional information from the caller suggests that paramedics will not be needed after all, the dispatcher can call off the paramedic unit with a code green message.

The symptoms or complaints that should trigger a rapid

10 Steps: Grab the Low Hanging Fruit - Steps 1-4

SYMPTOMS TRIGGERING RAPID DISPATCH

Unconscious

Difficulty breathing

Stroke symptoms

Chest Pain

Seizure

Major Trauma

Diabetic hypoglycemia

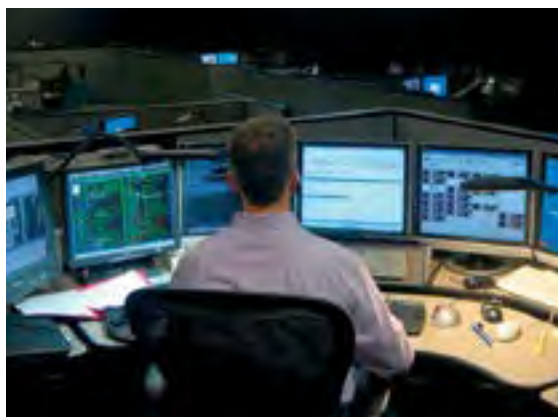
dispatch are: unconscious or suspected cardiac arrest, chest pain, difficulty breathing, stroke symptoms, ongoing seizure, and significant trauma. A community should carefully measure its current time interval from first ring into the alarm center to specific dispatch of the first responding unit (EMT or paramedic unit or EMT/paramedic unit). This time interval is variously labeled but will be called “dispatch time” here. The National Fire Protection Association (NFPA) sets a dispatch time standard of 60 seconds for critical events. Rapid dispatch can do much better than that. The rapid dispatch target time in King County dispatch centers is 15 seconds or less, especially when the address is auto populated into the dispatcher CAD (computer aided dispatch) system. The first mention of a critical symptom mandates

an immediate dispatch. Dispatch centers that place priority on a rigid, predefined protocol over rapid dispatch are doing their communities a disservice and in the case of cardiac arrest are delaying life-saving therapy.

The concept of rapid dispatch applies to tiered-response EMS systems as well as single-response systems. Many EMS systems’ dispatch protocols require full information before even a single rescue vehicle can be sent. That may be an acceptable procedure for the majority of calls, but speed is of the essence in a life-or-death situation, and in those cases usual dispatching protocols must be short-circuited. In Seattle and King County, we train dispatchers to use rapid dispatch when they hear certain key words and phrases from callers - either the short list of symptoms in the preceding paragraph or words such as “collapsed,” “unconscious,” “can’t breathe” and “heart attack.” We also urge the dispatcher to use common sense and immediately send EMTs whenever a caller otherwise conveys the likelihood of a critical event. In King County rapid dispatch is used in approximately 30 percent of EMS calls. We believe rapid dispatch saves 30-60 seconds in dispatch time for the most critical medical emergencies.

Given the fact that survival falls about 10 percent for every minute of delay in CPR and defibrillation, rapid dispatch can add 5-10 percent to a community’s survival rate. All of this can happen with no additional staffing or resources. Not bad. Now you see why this is one of the low-hanging fruits.

One more point to be made – EMS dispatch centers (whether stand-alone centers or part of larger combined centers such as fire and police) must have protocols authorized by medical directors. Medical expertise is necessary to provide pre-arrival instructions as well as determine the urgency of the callers complaints and thus how quickly units must be dispatched. The logical person to fill this roll is the EMS medical director. Unfortunately many dispatch centers still do not involve the EMS medical director in the writing or approval of protocols for medical emergencies, a bizarre disconnect between the patient and the EMS system.



10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10 _____

Overcoming Challenges

Now it is time to go after the higher hanging fruit. These six more difficult steps will also likely lead to improved survival but their implementation is more challenging and resource intensive.

STEP

5

Measure professional resuscitation using the defibrillator recording

RA Truism: It's not complicated, but it's not easy

In Seattle and King County every cardiac arrest has a digital record created in part from the defibrillator. This includes second-by-second information about cardiac rhythm and CPR, synchronized with digital voice recording. Personnel may fear that the records may be used for disciplinary purposes. It is only intended to accurately reconstruct the events, and these thousands of voice and ECG recordings have never been used for disciplinary action. Voice recordings combined with the patient's cardiac rhythm make the event vivid. When was the defibrillator attached, when were ventilations given? Sequence and timing of events become clear and reasons for delays can be deduced (e.g. the dog was growling at the EMT, the patient was moved from the bathroom, the oxygen tank ran out etc). Post-event digital readout of compressions, ventilations, heart rhythm, and timing of shocks is clearly useful, but nothing beats a voice recording.

Voice recordings can have dramatic teaching value. One channel can track chest compressions. Voice and ECG recordings provide beneficial QI and teaching material when shared with the personnel, who want to do better next time. In one recording the paramedic asked the EMT to stop CPR so he could intubate. After 65 seconds with no CPR the paramedic asked the EMT to resume chest compression. When reviewed with the paramedic, he could not believe how long the pause was. He will do better the next time. There is nothing like a real event to grab your attention – to make one breathe a sigh of relief when things go well and to cringe when they don't.

Performance Goals

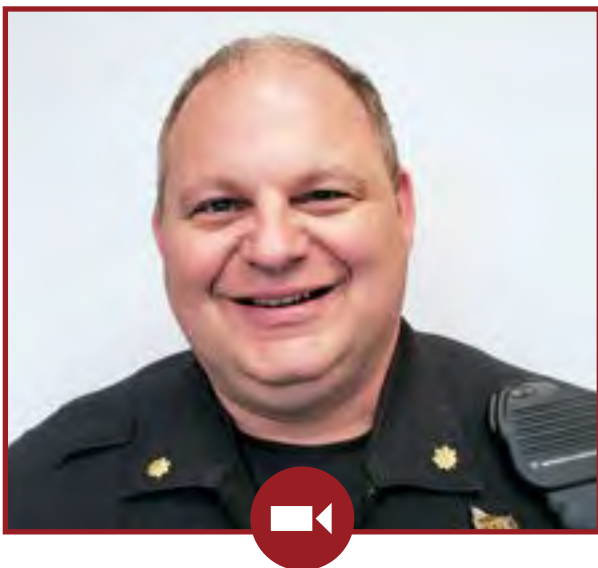
1. Collect and review defibrillator data and voice recordings for cardiac arrests
2. Document verbalization of event details, interventions and CPR metrics
3. Timely feedback to EMS personnel

10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10

STEP

6

Begin an AED program for first responders, including police officers, guards, and other security personnel.



Major Bryan Howard
King County Sheriff's Office

To view this video visit resuscitationacademy.org/ebook

RA Truism: Protect and serve includes saving lives

Public safety or other first-responders with CPR skills and AED training have the potential to increase survival rates from cardiac arrest, but their role has been modest and inconsistent. Some communities embracing police defibrillation have seen dramatic improvements in survival, most notably in Rochester, Minnesota.

There are many issues in a police defibrillation program involving leadership support and buy-in from the rank and file, support from fire department and/or EMS agency, initial and ongoing training costs, cost of AEDs, supervision, QI, and integration with EMS dispatching. Police AED programs in Bellevue and Kent, two cities in suburban King County, Washington each with approximately 100,000 residents, in 2010 contributed to successful resuscitation of a handful of

lives; and we believe further training (both for police and dispatchers) will lead to even more success.

A few critical lessons might help other communities as they embark on police defibrillation. There must be total police and EMS agency support, and every police officer should be taught in person (not only with video or web based training).

Secondly, the training message must be simple: "If the person does not respond and is not breathing normally, attach the AED. Let it analyze and then follow its prompts." We teach the police to provide chest compression only, and we do not use voice recordings for police AEDs. Both are a huge relief to police officers.

The police must be dispatched simultaneously with the first responding EMS agency. This is perhaps the most challenging issue in achieving a successful police defibrillation program. Our goal is for police to be dispatched only for true cardiac arrest events. It frequently takes some seconds (or longer) to confirm an arrest (remember that the EMS unit has already been dispatched under rapid dispatch). When the dispatcher waits to confirm cardiac arrest before dispatching police, the EMS will have had enough of a jump start to arrive before police in many instances. How to send police quickly, but not over send, is a challenge we continue to work on.

10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10 _____



Performance Goals for Police or other First Responders:

- Review all cardiac arrest calls for potential involvement
- Provide feedback; AED used properly? Patient outcome
- Ensure annual training on AED use and hands-only CPR

STEP

7

Use smart technologies to extend CPR and public access defibrillation programs to notify volunteer bystanders who can respond to nearby arrest to provide early CPR and defibrillation

RA Truism: Cardiac arrest response is a team effort

In the past five years numerous innovative pilot programs have demonstrated the utility of using smart technology to alert volunteer responders of a nearby cardiac arrest and/or signify the location of the closest AED. The potential is a volunteer rescuer arriving at the scene prior to EMS thereby increasing the probability of success. Several European pilot programs have demonstrated utility with this concept. These are some immediate response programs:



Jen Blackwood

Program Manager, King County EMS

To view this video visit resuscitationacademy.org/ebook

- Register publicly-accessible AEDs with the EMS system and telecommunicator center and when possible notify the caller of a nearby AED.
- Using a smart phone app, volunteers register on a cardiac arrest notification alert system. In the US the PulsePoint app is designed for this. When EMS is dispatched, the app notifies nearby volunteers and can display the location of nearby AEDs. The US system is currently limited to arrests in public places, which limits its utility.
- Volunteers agree to have an AED with them most times, and are notified when EMS is dispatched to a cardiac arrest. These volunteers could be the general public or limited to medically related volunteers including lifeguards, etc.

10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10 _____

The telecommunicator could notify the caller that a volunteer responder is traveling to the scene.



Greater Copenhagen has a register of 4,500 AEDs. The location of any AED less than 180 seconds transport from the site of call automatically comes up on the dispatcher screen (red dots in screen).



Real time video transmission of bystander CPR may help the dispatcher improve coaching

Performance Goals:

- Measure percentage of cardiac arrests with defibrillator placement as a result of public access defibrillation or a digital notification system
- Measure the percentage of population volunteering to participate in immediate response program.
- Measure time from call to arrival at scene for immediate community responders
- Measure survival rate for VF when immediate community responder provides CPR and/or defibrillation.



10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10

STEP 8

Make CPR and AED training Mandatory in School and the Community



Michael Sayre, MD

*Seattle Medic One Medical Director,
Professor of Emergency Medicine,
University of Washington*

To view this video visit resuscitationacademy.org/ebook

RA Truism: It takes a system (including kids!) to save a victim

Mandatory training in CPR/AED has been part of the school curriculum in Norway for many years and in Denmark for 10 years. In the United States, 27 states have enacted legislation for mandatory high school CPR/AED training. This is a step in the right direction, but we must work toward communities in which all adults are trained in CPR and aware of AEDs and how to use them. A population universally trained in CPR has the potential to double survival rates. How to bring this about is a challenge. It could be argued that since CPR can occur any place in the community, anyone who works with public contact should be required to have CPR training. Simple curricula, many of which are on line or smart phone based, exist to provide the basics of CPR and AED use in the work place. Other curricula exist for lay persons in the home setting.

Performance Goals:

- Train 100% of high school students in CPR prior to graduation
- Train 100% of public employees in CPR



10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10 _____

STEP

9

Work toward accountability



Mickey Eisenberg, MD, PhD

*Director, Medical QI, King County EMS, Professor of
Emergency Medicine, University of Washington*

To view this video visit resuscitationacademy.org/ebook

Submit annual reports to the community

RA Truism: Share the Knowledge

An annual EMS performance report is the best way to declare accountability to the community. A system that is transparent in its performance wants to improve and respects the citizens it serves by sharing vital information. This radical idea will undoubtedly raise eyebrows among EMS directors, but why should a system collecting cardiac arrest data and having comparison data from peer communities hide the information? Sharing such important information is a way of being accountable. The information can be used to promote the organization if results are positive. If results are not positive, then the information should be used to motivate stakeholders including community leaders and politicians to invest in efforts to improve.

Performance Goals:

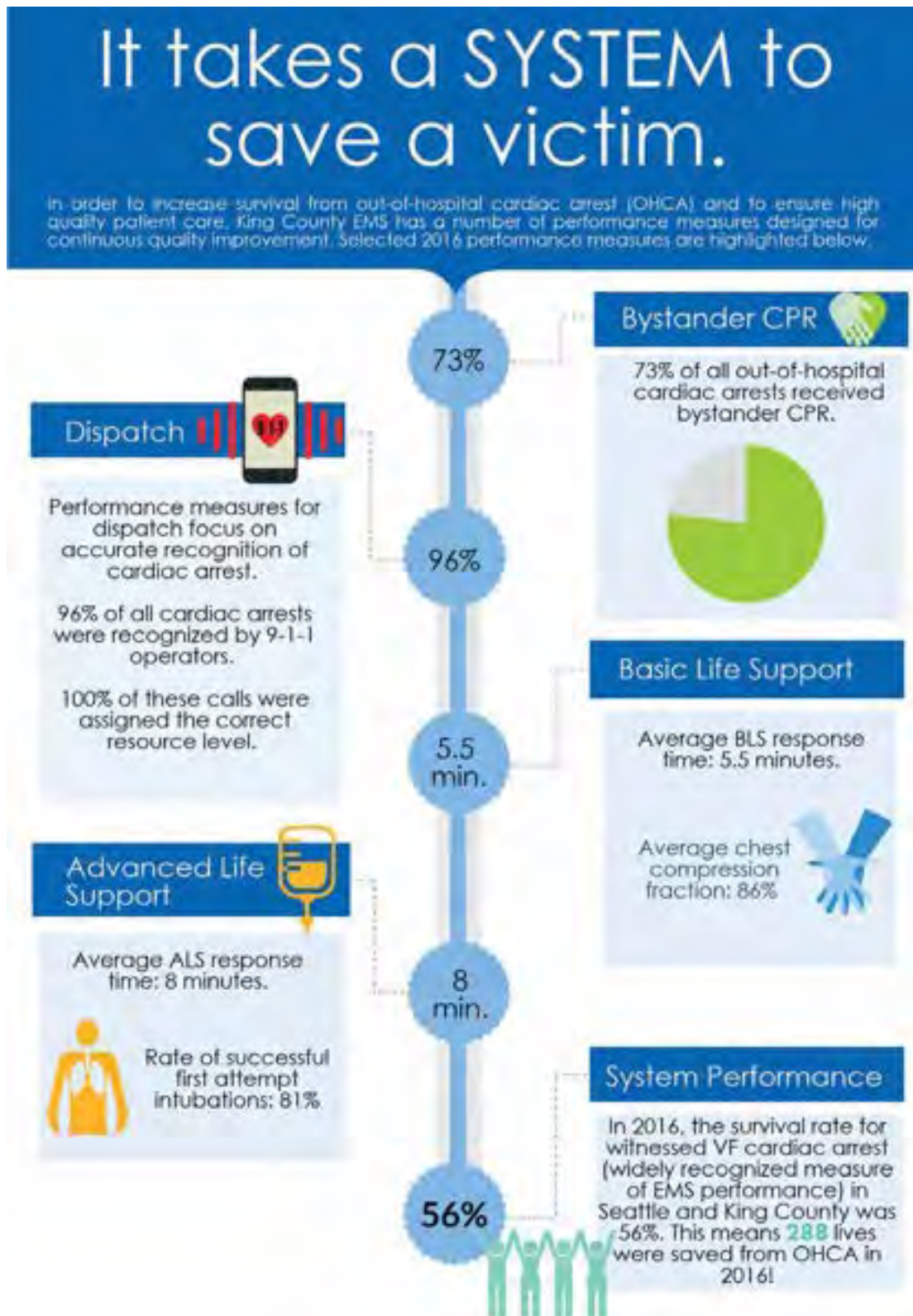
- I. Publish annual report internally or externally including major metrics for cardiac arrest patients, response factors, program features

Key Elements in the Report Card could include the following:

- a. Total population
- b. Total number of worked cardiac arrests
- c. Utstein survival (discharged survival from witnessed VF)
- d. Survival from all rhythms
- e. Percent of all arrests that are witnessed cardiac arrests
- f. Percent of all arrests that have bystander CPR
- g. Percent of bystander CPR due to Telephone-CPR
- h. PADs registered with the EMS system
- i. Number of cardiac arrests in which a PAD was applied prior to EMS arrival
- j. Number of first responder or police responses to cardiac arrest and number of defibrillations prior to arrival of EMS personnel

10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10

Executive Summary from King County EMS



10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10 _____

STEP

10

Work toward a Culture of Excellence

RA Truism: Everyone in VF survives

Performance Goals:

1. Convene leadership meetings once a month
2. Analyze data in partnership with operations and medical director
3. Use data to inform training and protocols

Creating and nurturing a culture of excellence is perhaps the most difficult step. What is a culture of excellence? It is an implicit awareness perceived by most or all members of the organization that high expectations and high performance define the standard of care. A culture of excellence requires a leader (or leaders) with an uncompromising vision. Ideally, the administrative director and the medical director should share this vision. Practically they should meet regularly – perhaps weekly – to jointly administer and plan all aspects of the EMS program. The two of them, together, should establish a long-term plan to create and maintain a culture of excellence. Some people would argue that a high-quality EMS system demands such a culture. An equal number would claim that creating a culture of excellence is extremely challenging. No doubt it is. Nevertheless, a culture of excellence, hard though it may be to define or measure, is probably a key factor separating great systems from those that are merely satisfactory.



Leonard Cobb, MD

*Medic One Founder, Professor Emeritus, University of Washington
Harborview Medical Center/Seattle Medic One*

To view this video visit resuscitationacademy.org/ebook



Michael K. Copass, MD

*Professor, University of Washington Harborview Medical Center/Seattle
Medic One*

To view this video visit resuscitationacademy.org/ebook

10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10

Administrative and medical leadership together must enhance training and continuing education and make medical QI the means of constant improvement. Excellence also requires buy-in from the extended EMS family of dispatchers, EMTs, and paramedics. When EMS providers recognize the presence of sincere, mission-driven leadership, as opposed to lip service, they respond to the positive culture and contribute to it as well.

The Medical Model

A culture of excellence can be achieved in any organization model. However, we believe such a culture can more easily be accomplished in a system that is based on a medical model. What is meant by a medical model? It is a system in which a medical director plays a large role in determining and supervising the quality of medical care. Specifically, a medical model of EMS is a system in which the medical director is responsible for the seven areas (shown in the insert).

Medical Director - Areas of Responsibility

- protocols for dispatchers, EMTs, and paramedics
- medical supervision online and offline
- evidence-based practice
- ongoing medical QI
- training and continuing education
- controlled substance policies
- medical discipline

There is an eighth optional area of responsibility, namely, ongoing research studies. Continuous studies (to push the envelope of knowledge) create a sense of being part of a larger enterprise and helps foster a desire to contribute new evidence-based knowledge to the world of EMS. These studies do not have to be randomized clinical trials. One can embark on small-scale projects and still make a contribution. The studies need not necessarily be published in peer-reviewed journals – merely sharing the findings with the personnel, can be rewarding and help to achieve a sense of pride.

A medical model does not require that the physician director run the entire system. In fact, the less administrative involvement by the medical director, the better. The medical director should be responsible for the quality of medical care and establish high expectations and see that they are being met. The EMTs and paramedics must be accountable to the medical director for the quality of their care. The ideal system would have the administrative director responsible for budget, operations and personnel matters and the medical director responsible for patient care. And in the best of all words the two would work closely in partnership since their responsibilities complement each other. The medical director should not deal with hiring, though he or she should have a say in who is hired. And we don't expect the doctor to directly fire anyone, though we expect him or her to work with the administrative director to limit, suspend or terminate an EMT or paramedic whose medical care is substandard. In Seattle and King County, there is a phrase that encapsulates the critical role of the medical director: The EMT or paramedic practices under the medical license of the medical director. In essence, the clinical buck stops with the medical director.

How does one create a medical model? Certainly there is no guidebook to follow and probably many if not most EMS programs think they have a medical model.

10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10

Continuous Quality Improvement

A culture of excellence also demands ongoing quality improvement. The medical director, with the support of the administrative director, is responsible for conducting QI audits of the EMS system. The cultural norm says we (all of us who provide care) are measuring how we perform in order to perform even better.

Medical QI can involve any aspect of EMS care. As it relates to cardiac arrest, however, the substrate for continuous QI is the cardiac arrest registry. Without QI, the cardiac arrest registry is just a collection of facts. With QI, the registry becomes the basis for improvement.

QI can occur at the macro level (system level) or micro level (components of the system) and even at the level of an individual resuscitation. At the system level one should be able to determine the survival rate for witnessed VF. For the micro level, QI bores down to the components of the system.

For example:

What is the average time to...

- CPR? Defibrillation? What percentage of arrests have bystander CPR?
- Telephone-CPR? What is the average time to deliver CPR instructions? The time intervals from the 911 call to CPR and defibrillation are critical to measure. Measuring these time intervals can be challenging but without this information it will be like trying to solve a puzzle with several key pieces missing.



Most EMS systems report response time (time from call to arrival at scene). However, in many centers the actual call occurs seconds (sometimes a minute or more) before being keyed as an EMS call. Thus the actual call occurred before the response time clock starts ticking. And arrival at scene occurs a minute or several minutes before someone touches the patient. Measuring time intervals in EMS is a maze. The point, however, is that there are unmeasured time intervals prior to the so-called response time and unmeasured time intervals after the response time.

What really matters is the interval from the first ring in the primary PSAP to contact with the patient including who starts CPR, when it starts, and the exact time of the first defibrillatory shock. At the level of individual cases QI should routinely try to piece together the key interventions. This is particularly important for VF cases when the patient did not survive.



10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10

**If one starts
with a mindset
that every case
of VF should
survive, then,
when the
patient does
not survive,
the question
becomes,
Why not?**

Important Questions

- Who started CPR?
- What was the time to CPR?
- What was the time to first defibrillation?
(total number of defibrillatory shocks)
- Were Telephone-CPR instructions offered?
- Did the dispatcher recognize agonal respirations?
- Was there rapid dispatch? (What was the time to dispatch the first-in unit?)
- What was the interval between EMTs arrival at the patient's side and delivery of the first shock?
- What was the density of CPR between two shocks?
- After the first defibrillatory shock, how long did it take to resume chest compressions?
- Did CPR occur for two minutes between shocks?
- Was the patient intubated? (How many attempts were required for intubation?)
- Was an alternate airway used? (Such as laryngeal mask airway)
- Was an intravenous line started? (Was it peripheral, central, or interosseous?)

Every link and every sub link in the chain of survival can be studied; the number of possible QI projects is limited only by resources and by the accuracy of the registry's data. An EMS system should never become complacent. There are always opportunities for improvement, and continuous QI is the way to bring it about.

Improve Skills among Paramedics, EMTs, and Dispatchers

In Seattle and King County, paramedics are required to perform 12 intubations and 36 IVs every year to maintain certification. Paramedic staffing correlates directly with opportunities to perform critical skills. There are strong advocates for various types of paramedic staffing in EMS programs. In Seattle and King County, a tiered response system is utilized and paramedics are sent only to the most serious calls. Thus, they are able to maintain critical skill such as endotracheal intubation and central vein IV placement. In other systems, a paramedic is sent to all EMS calls. These programs assume that service is thereby improved, since every call, regardless of the seriousness of the emergency, will have a paramedic in attendance. But the unintended consequence is less opportunity for any single paramedic to practice critical skills. It is unclear whether a high or low ratio of paramedics to total population served, is associated with community cardiac arrest survival.

10 Steps: Reach For the Higher Hanging Fruit - Steps 5-10

As for EMTs, the care provided by these personnel is the foundation for all subsequent care delivered during an attempted resuscitation. If that foundation is of poor quality, the entire care structure is jeopardized. EMTs can do a great deal to treat ventricular fibrillation definitively, or to prime the patient's body with high-performance CPR for further intervention by paramedics. The details of CPR and defibrillation often determine the outcome, and the key to positive outcomes is training. Dispatchers are also members of the EMS team. They have the critical role of mobilizing the EMTs and paramedics and seeing that Telephone-CPR begins before EMS personnel show up. Dispatcher's training, practice and skill review are as important to positive outcomes as are high-performance CPR and defibrillation. A highly trained dispatcher can, with rapid dispatch, easily save thirty to sixty seconds in the initial dispatch and, by offering Telephone-CPR instructions, can significantly increase the likelihood of the patient's survival.



Implementation: Make It Happen

This guide lists 10 steps that will lead to improved survival. There are four easy steps (the low-hanging fruit) and six more difficult steps (the higher-hanging fruit). But one community's easy, may be another community's difficult. An EMS director or manager, partnering with the medical director, must decide what can be achieved in his or her own community. Whether one selects an easy or more challenging step the key is to begin. Success with one step will create momentum for tackling others. The steps listed above provide the overview and general approach to implementation. Missing are detailed game plans as well as the specific tools to implement the programs. Reading a short description of high-performance CPR, or Telephone-CPR, or rapid dispatch may convince you of the importance and need of such programs but how do you bring them about?

The Resuscitation Academy began in 2008 with the goal to improve cardiac arrest survival. Its tag line is "Improving cardiac arrest survival, one community at a time." It was apparent from the first Resuscitation Academy class in 2008 that the lectures, breakout sessions and workshops could only go so far. We, the faculty, needed to spell out the details of how to implement the various programs we were talking about. The Resuscitation Academy Tool Kits were developed to do just this. They provide a how to guide, for setting up various programs within local communities. But even tool kits have limitations and we realize how hard it can be for local communities to implement the various programs. We think more attention must be focused on the challenges of implementation and the need to mobilize local community resources. Thus the last portion of this chapter tries to shine a beacon on the difficult topic of implementation.

10 Actions to Achieve Implementation

To quote a cliché, "Good ideas are a dime a dozen." Without successful implementation good ideas will wither on the vine. The chain of survival metaphor contains important concepts that can contribute to survival, but implementing a community system of sudden cardiac arrest (SCA) survival requires understanding the strengths and limitations within a particular community. Communities have uniquely established operational processes, programs and personnel each with their own work styles, values, attitudes, guiding standards and protocols. One should always be aware of the community context when proposing new programs or policies.

Prior to implementation of any program there has to be an awareness of the program's scope and the granular details of what is required. The Resuscitation Academy Tool Kits were developed to provide this information. They are how-to guides for setting up various programs within local communities, but even with tool kits, local community implementation can be challenging. Often the key to success lies at the local level where local community resources must be mobilized to focus on specific challenges to implementation.

We realize how hard it can be for local communities to decide what program or programs should be implemented. We think more attention must be focused on careful decision-making, the challenges of implementation, and the need to mobilize local community resources. Thus this section tries to shine a beacon on the difficult topic of how to objectively assess your system and achieve successful implementation of programs.

What does it take for communities to successfully implement the programs of the Resuscitation Academy? The question is also gaining attention at the national level – the American Heart Association recently published a consensus statement

Implementation: Make It Happen

in 2011 appropriately called “Implementation strategies for improving survival after out-of-hospital cardiac arrest in the United States.” Why does community A embrace these recommendations and transform their system and why does community B, given the same information, do very little to improve resuscitation? What is the secret sauce?

Definitive answers are elusive, though there is no end to possible explanations. Is it individual charisma? Is it leadership? Is it complementary personalities? Is it legislative mandates (funded or not)? Is it adequate resources? Certainly some or all of these may provide part of the explanation. Common sense says that an effective leader can be a catalyst for change but such individuals are relatively rare and often the changes evaporate when that individual leaves or retires. Thoughtful implementation will facilitate meaningful change.

**“Thoughtful
implementation will
facilitate meaningful
change.”**

The following actions are practical aids as you strive to achieve successful and lasting programmatic improvements. Some or all may be useful to you.

10 Actions for Successful Implementation of Resuscitation Programs

1. Select program or programs to implement
2. Form a team or advisory board
3. Determine how to make it happen in your community
4. Set specific goals
5. Achieve buy-in from agency personnel
6. Establish performance standards
7. Consider a pilot program
8. Communicate progress within the agency
9. Communicate with the public and EMS personnel
10. Support, Advocate, Celebrate



Implementation: Make It Happen

I. Select the program to implement

Initial energies should be devoted to implementing the core components typically easiest to implement and offering a high likelihood of immediate and dramatic improvements in results (the low hanging fruits). But how to choose which to implement first? Participation in a cardiac arrest registry is mandatory. If there is no state or country registry option, begin your own free-standing registry. While it cannot make cross-community comparisons, you can track your survival rate and other variables over time.

The next step to identify the best choice for programmatic implementation for your community can be to calculate an impact score. This approach has some subjectivity but enables a constructive way to think about which programs might be best.

The equation is as follows:

The following table of six programs is an example of how every program has an associated survival impact, challenges of implementation and cost. It is meant as an example and each community should consider their own challenges. Though one can debate our “scoring” of the survival impact we try to indicate the relative importance of Telephone-CPR, HP-CPR, and rapid dispatch relative to other interventions.

Typical program costs, challenges and impact

Program	Cost	Implementation Challenges	Survival Impact
Telephone-CPR	Small	Small	Large
HP-CPR	Small	Small	Large
Rapid dispatch	Small	Small	Large
Record resuscitation	Modest	Small	Modest
Police defibrillation	Large	Large	Small
CPR/AED Mandatory	Modest	Modest	Modest

2. Form a team or advisory board

A team or advisory board can be immensely useful depending on the scope of the program you select. For small focused programs (such as beginning rapid dispatch) a large advisory board may not be required. For a larger program involving multiple constituencies or agencies a board can give support, guidance, and help achieve buy-in. We believe a team effort with shared vision is often the most important ingredient in the sauce of implementation. The vision can be as simple as improving survival from out of hospital cardiac arrest. The team or advisory board or steering committee (or whatever term you use), should ideally be led or co-led by: the EMS director (or fire chief or chief of EMS operations); the medical director with a core group consisting of the dispatch director; the head of personnel training; the QI officer (if one exists); a representative of the local hospital (or local hospital association); ideally a political leader (mayor or council member); and a citizen. This core group may be ad hoc or formal (in other words commissioned by the mayor or council with

Implementation: Make It Happen

formal appointments), and all it takes is one enthusiastic and determined individual to catalyze the initiative. One person must be accountable to the board, keep everyone on task and maintaining forward momentum. The staff person should be thought of as the site coordinator who works on behalf of the advisory board.

3. Determine how to make it happen in your community.

Every program must be customized to the local system and its strengths. There is no one pattern. Rochester, Minnesota, has a completely different EMS system from Seattle and King County. And yet both achieve high survival rates proving that there is no ONE system. Each EMS leader must mobilize and strategize based on what is possible locally. Some stakeholders may be more or less motivated. Or the structure of the system may make a particular program challenging to implement. In one community, police response to cardiac arrest may be straightforward because of leadership and logistics while in another community such a program may have real leadership or design challenges. We recommend that the planning team or advisory group discuss goals and objectives for each area of change and decide which ones to focus on in which order. Optimally all areas must work together to achieve maximum survival rates, but this is a long-term process and must be carefully and strategically planned to achieve long-term success.

4. Set specific goals

This planning group must be realistic. They will need to consider community characteristics and the pace of change that the community will support. No system will be transformed overnight, and attainable goals should be achieved by prioritizing low-hanging fruits. Progress will likely be slow and iterative (step by step). The more you can help the planning group set achievable goals the better, especially in the early days where early successes might help motivate others to join. Once on the path to improvement there is no stopping that community.

Each step your planning and advisory group selects, needs its own goals. Whenever possible, provide explicit benchmarks including a timeline i.e. "Complete training of the EMS agency by March 1". If appropriate, share these goals with leaders and frontline personnel to achieve buy-in and help motivate performance. If progress is slow, reassess and invite others to provide input for how to refine the plan and its goals as part of program implementation.

5. Achieve buy-in from agency personnel

Leadership can't achieve much without support of agency personnel. The leaders must share and sell their vision outlining the importance of the proposed programs. Change can be very hard and the reasons for push back and resistance are numerous. Change may be perceived as unwelcome worsening of work conditions, or a misguided counterproductive effort because leadership does not understand field dynamics. Early discussions, careful listening, and being attentive to concerns among all the personnel can help achieve buy-in.

Implementation: Make It Happen

A presentation or materials might help explain the reasons for programmatic change. Highlighted goals of improved patient care and outcome can win over skeptical individuals to the effort. Another approach is to invite influential skeptics to help with decisions. This can transform a skeptic into a champion while also making for a better logistical approach. Buy-in is essential and you will need to extend yourself to make personal connections with those stakeholders who provide the logistical and leadership traction that will be required for implementation.

6. Establish performance standards

Earlier in this guide, we listed possible performance standards for Telephone-CPR and high-performance CPR. When you begin a new program, let everyone know what the standards are and why they matter. Then provide the training and support to meet these standards. Consistent (and timely) feedback is also part of the equation. A 2011 consensus paper from the American Heart Association calls for specific benchmarks and quality improvement goals for out-of-hospital cardiac arrest. These goals span the spectrum from medical leadership to dispatch to EMS to hospital care. Whether one agrees with the specific goals is in some way less important than the fact that performance standards are becoming part of the national dialogue on how to improve survival rates. The following are possible standards for an urban or suburban EMS system and are meant to complement the 10 specific steps at the beginning of this guide. Note how the standards are weighted toward bystander CPR (whether by a trained person or as a result of dispatcher assistance) and the rapid delivery of CPR and defibrillation standards that will surely lead to improved survival. One might consider different standards depending on community and EMS characteristics. These standards provide an excellent basis to try to improve care.

Highlighting cases with success or contrasting difficult cases helps cement the standards as a worthwhile effort.

Examples of Performance Standards:

- **Telephone-CPR**

- Delivery of Telephone-CPR directed chest compressions in 75% or more of cases
- Less than 1 minute between pickup of call and dispatch of first EMS unit
- Less than 2 minutes between pickup of call and start of chest compressions

- **Medical Review**

- Use of the defibrillator recording to provide resuscitation review
- Physician review of each cardiac arrest

- **EMS High Performance CPR**

- Provide performance standards for HP-CPR
- Rate of 100-120 compressions / minute
- CPR fraction of >90% for 10:1 compression: ventilation (or >80% for 30:2)
- Full recoil
- No pause in CPR > 10 seconds
- One second breaths
- No over ventilation (300-400 ml of air)
- Intubation and IV start with no stopping chest compressions

- **Community survival rate - Discharged from hospital of 50% for patients with witnessed VF**

Implementation: Make It Happen

7. Consider a pilot program

Consider a pilot of the program prior to full implementation. This could be implementation of a segment of the overall plan. Pilot program success should motivate even doubters and naysayers and provide credibility to your planning group with the rest of the community. A pilot program is a great way for everyone to gain experience with the program and work out the bugs as well as recalibrate goals and expectations. The pilot should be time-limited and include all stakeholders when you review the results and refine the larger implementation plan.

8. Get a little help from your friends

Seek help. Help can come from many sources. One obvious source is the Resuscitation Academy. It is intended to share programs and resources and, most of all, provide support and encouragement -- particularly communities which know their system needs improving but aren't sure exactly what to do or how to proceed.

9. Communicate to the public and to EMS personnel

It is important to share data and QI information with everyone in the EMS program, with elected officials and the public. Communicating directly to the public via press release or public forums is a way to be accountable to the community served. It also communicates to everyone (within the agency and the general public) that the EMS agency takes its performance seriously. Make sure to highlight areas in which you have created successes. Some success will convince community leaders that you have good ideas and provide the leverage to address other areas where you have not yet achieved success. If small numbers lead to too much variability, then consider rolling averages that combine years to give a more reliable picture of your efforts.

10. Support, Celebrate, and Advocate

Support

Approximately 25,000 people survive SCA in the United States annually. For many survivors and their families, leaving the hospital after experiencing a sudden cardiac arrest can be unsettling. For instance, many survivors receive an implantable cardioverter defibrillator (ICD) to prevent future fatal arrhythmias and may have concerns related to the device and what activities are safe.

Partner with local hospitals and other advocacy groups to develop a cardiac arrest survivor forum for patients and families and, when possible, share resources with family members of surviving patients. In addition, grief support and resources may also be shared with families of the many victims who do not survive. Often times, it is these family members who go on to become community champions and advocates for improved survival.

Survivors also commonly deal with memory loss or delayed recall. Forgetfulness and/or a reduced ability to comprehend or problem-solve can lead to increased stress, anxiety, anger and depression. These issues can be managed. Making

Implementation: Make It Happen

sure survivors and their families have the support and connections they need to local and online resources is part of the community's chain of survival.

Celebrate

Throw a party. Invite officials, the public, employees, and especially survivors. Let everyone know when the survival rate increases and next steps to continue the success. Such a celebration contributes to the culture of the agency and publicly pronounces the commitment to doing everything possible for cardiac arrest patients.

Advocate

Survivors play an integral role in educating the public about sudden cardiac arrest. Sharing survivor stories can powerfully influence EMS agencies and hospital providers and can be leveraged to challenge the public to learn CPR and place AEDs in their neighborhoods. Survivors increase awareness of SCA through appearances, media interviews, and fundraisers.

Survivors also take an active role in advocating for policy change at the local, state, and national levels. For example, many states have passed legislation mandating or recommending CPR and AED training in middle and high schools. Survivors and family members of victims lost to SCA are in many cases behind the scenes driving this important work.

A Vision of the Future

We believe that survival from VF in many communities could reach 60 percent. Some communities are already over 50 percent. In King County we have exceeded 60 percent with meticulous application of high-performance CPR and intensive training in recognition of cardiac arrest and delivery of Telephone-CPR. For communities currently at the 10, 20, 30, or 40 percent survival rates, we cannot guarantee a sudden surge to 60 percent, but we do think dramatic increases in survival are possible. The many inspiring success stories alumni have shared since attending the Resuscitation Academy, is evidence that improving survival rates from cardiac arrest is not only a possibility for the future, but can, with focused and concerted effort, be possible now.



The Resuscitation Academy



Mickey Eisenberg, MD, PhD

*Director, Medical QI, King County EMS, Professor of
Emergency Medicine, University of Washington*

To view this video visit resuscitationacademy.org/ebook

Remember two of the opening mantras: “Change occurs step by step” and “It’s not complicated but it’s not easy”. Those are good reminders as you embark on the difficult but rewarding journey to improve cardiac arrest survival in your community. We hope this guide will motivate you, not only to start the process of improvement in your community, but also to attend a future Resuscitation Academy class. The classes are offered tuition-free twice a year, typically in March and October. Each class is 2 days long. We also offer one day focused Academies on Telephone-CPR and high-performance CPR. Information about future classes and how to register, as well as free downloads of the toolkits, may be found at the Resuscitation Academy website.

The Resuscitation Academy



The tag line for the Resuscitation Academy is, “improving cardiac arrest survival, one community at a time.” Since the first Academy class in 2008, we have been trying to do just that. The Resuscitation Academy, held twice a year in Seattle, is a joint effort of King County EMS (*Public Health – Seattle and King County*), Seattle Medic One (*Seattle Fire Department*), and the Medic One Foundation.

The Resuscitation Academy

Additional support comes from Harborview Medical Center, University of Washington, American Heart Association, Laerdal Medical, Philips, Stryker, Zoll, Asmund S. Laerdal Foundation and the Medtronic Foundation HeartRescue Project. The faculty members are veterans in directing EMS programs as well as distinguished researchers in resuscitation science. Our back of the envelope calculation says that the faculty members collectively represent 300 years of EMS experience.

“The Academy broadened my awareness & knowledge of the science of cardiac resuscitation. It convinced me that measuring outcomes is absolutely required for improving system performance.”

Resuscitation Academy Alumnus

The Resuscitation Academy is offered tuition-free and attendees come from throughout the country (and world). The small class size allows for a two-way exchange of Information – the faculty provides evidence-based information and tools to improve cardiac arrest survival and the attendees share the real-life challenges they face. Every community has a different constellation of culture, leadership, resources, and opportunity. Above all we (the faculty) have learned that change is very challenging and one should never assume that just because someone comes along with a good idea that it will be embraced and implemented. Impediments to change, whether they stem from habit, inertia, malaise, or lack of resources, will overwhelm the best of intentions. We have also learned that no system will transform itself overnight. Change is not only difficult, it occurs slowly – tiny step by tiny step.

Resuscitation Academy Website

Updated information about the Academy may be found at: www.resuscitationacademy.org. The most recent curriculum is posted on the site as well as upcoming Academy classes and registration information. Though we have experimented with different lengths for the Academy ranging from one to five days, we have settled into the 2-day length that works well for us, and allows a nice mixture of lectures, small group discussions, workshops and breakout sessions. We expect every student to select a project to implement in his or her home community upon return from the Academy. We limit each Academy to 35-40 students in order to maintain a small group seminar feel to the class. Plus, the small class allows the faculty to get to know the individuals and vice versa.



The Resuscitation Academy

The Academy's Main Message

The Academy encapsulates the collective experience of decades of running the Seattle Medic One and King County EMS programs. Quantitative and qualitative factors explain a system's success or failure in managing cardiac arrest. The combination of measurable and "softer" factors was conveyed in the figure of the chain of survival (*measurable quantitative factors*) surrounded by a frame of survival ("*softer*" *qualitative factors*). The operant message is that the chain of survival and the frame of survival provide a complete package for success. The Academy obsesses on that message and takes it further by offering concrete instruction on how to implement change.



Resuscitation Academy Tool Kits

The Resuscitation Academy provides toolkits on the following topics:

- Cardiac Arrest Registry
- High Performance CPR: Training, Implementation, and QI
- Telephone-CPR: Training, Implementation, and QI
- Community CPR - Community Public Access Defibrillation
- Police Defibrillation
- End of Life Issues

Download Resuscitation Academy toolkits at www.resuscitationacademy.org/toolkit/

The Resuscitation Academy

The tool kits are not exactly recipe books with specific steps for each program. Rather, they provide the information, background, training materials, sample letters, sample forms, references and resources, and a general approach to achieving buy in from directors and managers, as well as the dispatchers, EMTs, paramedics, and police. While they provide important tools, the contents of each kit must be applied and/or modified based upon resources and leadership within the attendee's community.

The tool kits are publicly available on the Resuscitation Academy website. Tool kits (**pdf format**) may be downloaded free of charge. All the information on the website is free.

The faculty considers the Resuscitation Academy to be a work in progress. We strive to make each Academy better than the one before. In addition to the two-day Academy, we offer one-day mini Academies focused on Telephone-CPR and high- performance CPR. Such mini Academies can better reach the folks directly responsible for training and QI. We continually learn from attendees on what works best and what needs to be modified. We have welcomed the opportunity to partner with EMS leaders in other states to assist with starting up regional Resuscitation Academies.



EMS System Assessment

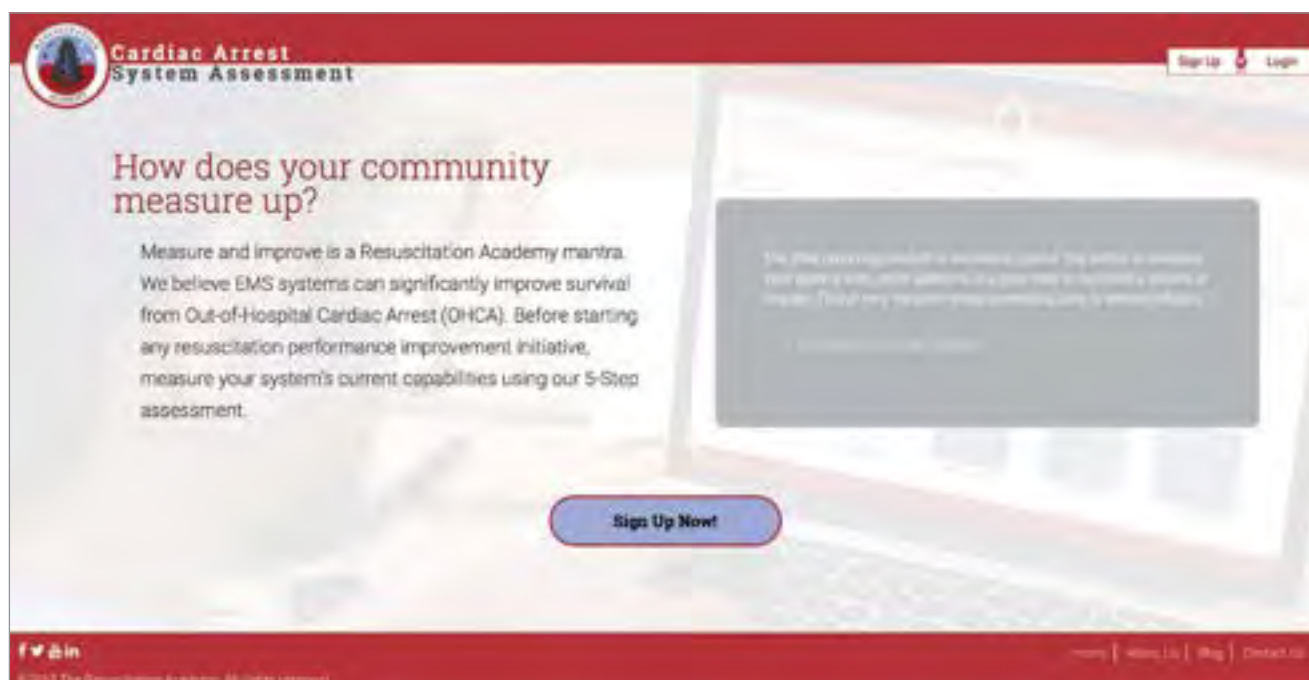
Implementation: System Assessment

The preceding material described 10 steps which we believe will improve a community's survival rate from sudden cardiac arrest. Of the 10 steps some are more impactful and less resource-intensive than others and each step has implementation challenges. However, in keeping with our first mantra of measure and improve, we believe it foundational for EMS systems to assess themselves prior to implementing new or revitalized programs. In effect, a system should assess itself to determine what is needed as well as how they are doing compared to other communities. To help a system measure itself the Resuscitation Academy has developed a Cardiac Arrest System Assessment. We encourage every system to take this assessment, as it will indicate where the system excels and where it is deficient compared to peer communities. This in turn might indicate which one or several should be grasped first.

Some directions on completing the Cardiac Arrest System Assessment.

resuscitationacademy.org/casa

1. Create an account and log in. (log in information allows you to have future access to your assessment)
2. Since you may not have all the required information at your fingertips we recommend completing the assessment if possible with a small group including persons from dispatching and EMS operations.
3. It is OK to partially complete the system assessment and return later to finish it.
4. You will receive information allowing you to make comparisons with peer communities.
5. You will receive specific recommendations addressing programs in your community needing improvement.



RQI Programs - Bringing the 10 Steps to Life

Working Together

In order to magnify our impact and make quality training programs widely available, the Resuscitation Academy is working closely with RQI Partners. RQI Partners, formed in 2018 as a collaboration of the American Heart Association and Laerdal Medical, is dedicated to developing and promoting quality programs in System Assessment, Telephone-CPR, High Performance CPR, and EMS Resuscitation. These programs stem from programs we have been teaching for a decade and were developed with our assistance and full cooperation. For more information, go to www.rqipartners.com

Consultative Services Program

How does your EMS system know where to begin when improving your chain of survival? How strong is your chain of survival today, and what changes will optimize it? How do you measure up against other systems?

The Consultative Services program will answer these questions for your EMS system.

Cardiac Arrest System Assessment Interviews

RA consultants will take a comprehensive, detailed look at your EMS system's performance within the chain of survival. They will conduct 5 structured, 2-hour virtual interviews with your team members.

Each interview will include questions about performance metrics, collaboration between departments, training protocols, guidance and support from leadership, processes and protocols.

Each of the 5 interviews will focus on one of the topics below:

1. Cardiac Arrest Registry
2. Telephone-CPR (T-CPR)
3. High-Performance CPR (HP-CPR)
4. Community CPR & AED Training
5. First Responder (i.e. police) CPR & AED Training



Cardiac Arrest System Assessment Report

After the interviews, your consultants will write a comprehensive report about your EMS system. The report will identify steps to improving your cardiac arrest survival rate. It will discuss the largest opportunities for improvement as well as how to improve and where to start.

You will also receive a weighted score, which grades your chain of survival against the gold standard and against other EMS systems.

The recommendations within the report will be actionable, clear, and personalized for your system. The report is a tool that you can use to drive change within your system.

For more information, go to www.rqipartners.com/casa.

RQI Programs - Bringing the 10 Steps to Life

RQI Telecommunicator

Telecommunicators play a critical role in the cardiac arrest chain of survival. It is the telecommunicator, in partnership with the caller, who has the opportunity to identify a patient in cardiac arrest, providing the initial level of care by delivering Telephone-CPR (T-CPR) instructions to the caller, and quickly dispatching the appropriate level of help.

RQI Telecommunicator is a program based on the guidance and legacy of the Resuscitation Academy and scientific recommendations of the American Heart Association.

- Prepares the first First Responders with the same emphasis and learning methodology we use to prepare EMS and Fire Services in response to cardiac arrest events
- Complies fully with the American Heart Association's Telephone-CPR (T-CPR) Program Recommendations and Performance Measures:
cpr.heart.org/telephonecpr



RQI Telecommunicator is a continuous learning and improvement program designed to help PSAPs improve survival from cardiac arrest. Each quarter, participants will engage in:

- Cognitive learning evidence-based, engaging curriculum delivered in a low-dose, high-frequency format for greater retention
- Realistic simulations based on real life calls with RQI-T coaches, followed by immediate debriefing and feedback
- Analytics ongoing learner analytics
- Quality improvement review of 100% of the actual cardiac arrest calls for the PSAP
- Implementation and support program guidance and best practice recommendations on a quarterly basis
- Recognition of competency through RQI Verified eCredential



For more information, go to www.rqipartners.com/rqit.

RQI | RESUSCITATION
QUALITY
IMPROVEMENT®
Telecommunicator

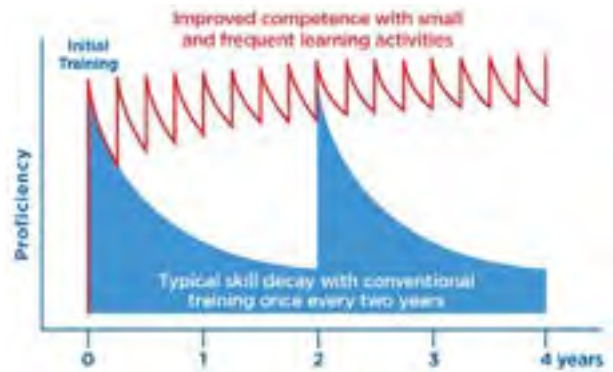
RQI Programs - Bringing the 10 Steps to Life

RQI EMS

Evidence shows that CPR skills decline in as little as 3-6 months following training.

Resuscitation Quality Improvement (RQI) Programs shift resuscitation training from a traditional mindset of 2-year compliance to one of competence through mastery learning and verified CPR skills competence.

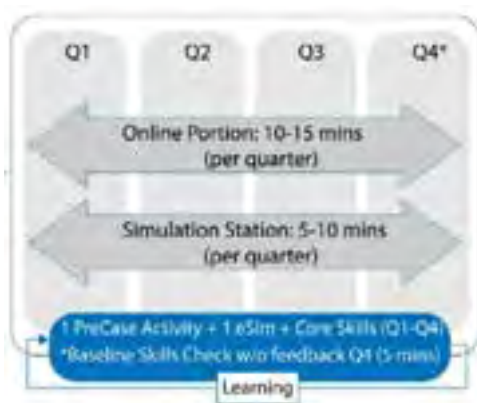
RQI EMS is a low-dose, high frequency learning program that promotes individual mastery of High-Performance CPR skills in order to improve patient outcomes. Learning activities and skills are completed quarterly, to combat skills decay.



Online Learning Modules – individual, self-paced activities consisting of a learning activity and an eSimulation

Structured, quarterly practice with Verified Skills Competence – Learners perform compressions and ventilation on both adult/child and infant manikins at the simulation station:

- Yearly baseline skills check without feedback to evaluate a learner's current skill level
- Quarterly skills activity with real-time feedback that provides learners on-going guidance to achieve optimal performance
- Feedback based on the metrics of High-Performance CPR: chest compression rate, depth, recoil, and appropriate ventilation
- Detailed debriefing to improve future performance



RQI eCredential is an American Heart Association-backed verification of a learner's demonstrated competence in High-Quality CPR skills and knowledge.

RQI RESUSCITATION
QUALITY
IMPROVEMENT®
EMS

For more information, go to www.rqipartners.com/ems.

RQI Programs - Bringing the 10 Steps to Life

RQI EMS Team

A High-Performance CPR program designed for those who respond to medical emergencies as a team. This program builds on the foundation of individual High-Performance CPR skills in order to maximize effectiveness of a team response. RQI EMS Team is designed to improve outcomes of cardiac arrests through on-going training and continuous quality improvement.

Online Learning Modules – individual, self-paced activities and videos, emphasizing the content to hone team activities and communication

Structured, quarterly practice – Provides the opportunity to measure, improve, and refine response to a cardiac arrest event as a team:

- Learners practice with their colleagues using the equipment and local protocols they use every day
- Scenarios are based on real-world examples of cardiac arrest emergencies
- Team activities are completed on portable simulation stations developed to be accessible 24/7 by learners
- The goal is to allow learning and team activities to be completed while on duty
- Participants receive detailed, post event feedback and debriefing

On-going tracking through analytics, to help monitor and improve team performance through:

- Team scores for each simulation with specific measurement of High-Performance CPR
- Video playback aligned with metrics occurring during the scenario
- Overall analytics of ALL team simulation scores to measure improvement across the program

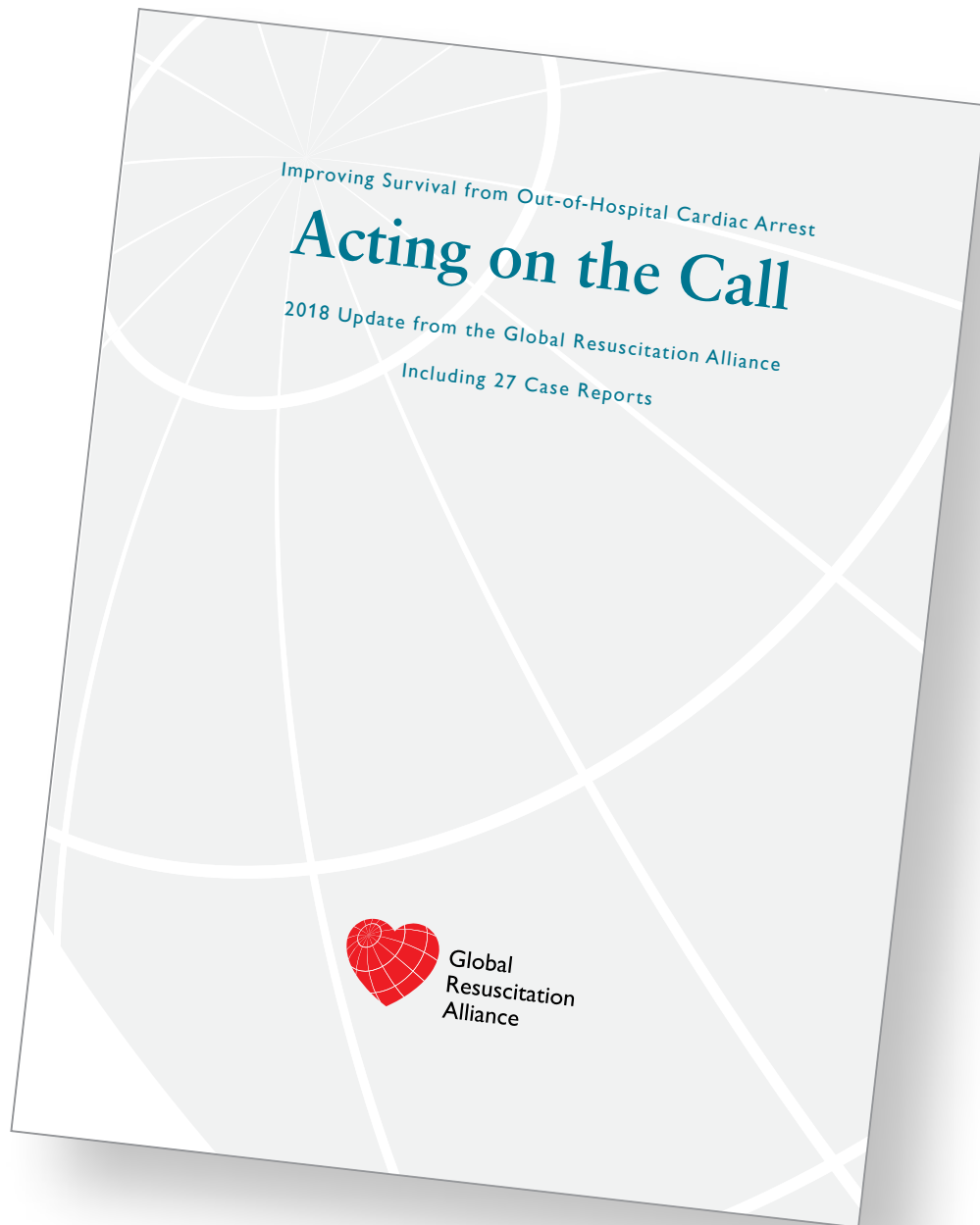


HP-CPR Simulation



For more information, go to www.rqipartners.com/ems.

RQI | RESUSCITATION
QUALITY
IMPROVEMENT®
EMS team



The Resuscitation Academy partners with and works closely with the Global Resuscitation Alliance. Visit globalresuscitationalliance.org where a PDF copy of Acting on the Call may be downloaded.

Acknowledgements & Resources



Over 2000 people, from the United States and the world have attended the Resuscitation Academy. The faculty would like to thank the Academy alumni for teaching us about their EMS systems and for enlightening us on the unique challenges they face. We thank them all for serving as change agents in their community, and for their willingness and passion to be catalysts for improving cardiac arrest survival. We think this small army of believers will do wonders in their community. Special thanks to the members of the Resuscitation Academy Network and Global Resuscitation Alliance (globalresuscitationalliance.org) who partner with us to disseminate the messages of the 10 Steps worldwide.

Sponsors

The Resuscitation Academy would like to thank the following organizations for their deep commitment to the program and for their ongoing support:

PHILIPS

W
UNIVERSITY of
WASHINGTON

KING COUNTY
EMS
EMERGENCY MEDICAL SERVICES



ZOLL

Public Health
Seattle & King County

HARBORVIEW
MEDICAL CENTER
UW Medicine

stryker
PHYSIO CONTROL



**American
Heart
Association®**

**HeartRescue
PROJECT**
Every second counts. Every action matters.



Acknowledgements & Resources

Resuscitation Academy Contributors

Jennifer Blackwood	Bryan Howard	Laura Miccile
Julie Buckingham	Lance Jobe, MD	Norm Nedell
David Carlbom, MD	Peter Kudenchuk, MD	Mark Peterson
Leonard Cobb, MD	Jonathan Larsen	Michele Plorde
Michael Copass, MD	David LaCombe	Thomas Rea, MD
Catherine Counts, PhD	Jonathan Larson	Michael Sayre, MD
Mickey Eisenberg, MD	Andrew Latimer, MD	Harold Scoggins
Ann Doll	Mike Levy, MD	Kevin Seaman, MD
Gene Goodner	Becky Matthews	Jenny Shin
Cindy Hambly	Andrew McCoy, MD	David Weed
Mike Helbock	Hendrika Meischke, PhD	Todd Wollum

Book Acknowledgement & Credits for Second Edition

The content of this book is based in part on Chapter 10 of the book, “Resuscitate! How Your Community Can Improve Survival from Sudden Cardiac Arrest” (Second Edition) by Mickey Eisenberg, MD, published by University of Washington Press. It is also inspired by the Resuscitation Academy Faculty.

Production

Jennifer Blackwood – Photography

B.A. Bosaiya – Videography

Ann Doll – Editorial Consultant

Mickey Eisenberg, MD – Writer & Editor in Chief

Brian Vigorita – Designer, Digital Producer

Rebecca Watson – Designer, Image Editor, Digital Producer

Steven Lee, Meridian Printing – Printing

Tegan Hampton, Assistant Editor

This Resuscitation Academy Foundation
publication is made possible through support
from the American Heart Association and
Laerdal Medical, through their joint venture,
RQI Partners, LLC.



**American
Heart
Association®**



Laerdal®
helping save lives

2020