EMS Protocols Toolkit
EMS PROGRAM TOOLKIT

This toolkit is free to EMS agencies interested in implementing training and protocols to improve outcomes from Sudden Cardiac Arrest. The materials have been developed to provide step-by-step instructions for implementing a program and useful materials to assist you in that process.
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Overview

Emergency Medical Dispatch (EMD) is a vital component of any Emergency Medical Services System. An EMD program should provide written, medically approved guidelines or protocols that emergency medical dispatchers use to effectively deliver pre-arrival emergency telephone instructions, including CPR. The assistance to provide CPR instructions and walk the caller through the delivery of CPR for the patient is known as Dispatcher Assisted CPR (or DA CPR henceforth in this document).

Time from collapse to initiation of CPR is a critical factor in determining survival from out-of-hospital cardiac arrest. Providing CPR instructions over the telephone immediately after someone calls 911 is a critical element that decreases time from collapse to initiation of CPR. The response time for most EMS systems in the United States is 4-6 minutes. An assertive and well trained dispatcher can recognize cardiac arrest and have the bystander performing CPR in less than 1 minute from the time the call was received. Studies have shown that DA CPR can improve the percentage of cardiac arrest cases that receive bystander CPR and overall survival.1

Achieving Buy-In

Determine Key Players

EMS systems across MN vary in their structure and level of responsibilities. Key partners to the success of implementing new protocols and training are law enforcement responders, fire department responders, EMS agencies - both BLS and ALS, and medical directors for each of the regional or community agencies. Each EMS system and region of MN is different and may require distinct strategies for success.

**Law Enforcement** – In many communities, law enforcement - either local police department, regional or county sheriffs, or MN State Patrol, are often the first responders to arrive on scene of a medical situation. However, this tends to be the lowest percentage in the overall volume of calls they respond to and therefore is often the least amount of refresher training they receive. Including this group in the system of care can have a significant impact on outcomes from sudden cardiac arrest and provide a service to the individual officers and department by offering awareness and training.

**Fire departments/districts** – MN departments have a variety of protocols regarding response to medical calls, in fact, some departments rarely, if ever, respond to a medical call. Recently with changes to guidelines for cardiac arrest management, fire departments have added Cardiac Arrest to the calls they will respond to in order to assist with rapid care and transport of the patient. The Fire Chief may be the best advocate. In a large fire department that provides EMS services, there may also be a Deputy Chief, Assistant Chief, or Battalion Chief that oversees EMS Services.
Other EMS providers – You may want to obtain the assistance of other agencies in your region, such as the MN Emergency Regulatory Board (EMSRB) or Minnesota Ambulance Association (MAA). There are 8 regions in Minnesota: Northwest, North, Central, West, Southwest, North Central, South Central and East (See map above.) The EMSRB website may be accessed at http://www.emsrb.state.mn.us. If not in Minnesota, contact your State Department of Health for more information.

Medical Director – In MN, ambulance services are required to have medical direction, as well as first responding agencies. However, implementation of this varies across the state. Many MN Medical Directors are very involved in the decision making and training of the agencies they oversee. They can easily implement changes and improvements to cardiac arrest management by expectations in annual training.

Hospitals – The EMS system in an area may be administered by a hospital. If this is the case, contact the Chief of Emergency Services. Hospitals also play a critical role in cardiac arrest case surveillance. If outcome data on cardiac arrest from the hospital is desired, a good partnership with your local hospital is important.

Community Citizens/Survivors – Individuals who have survived a cardiac arrest can be passionate advocates for CPR. They can have a broad impact on not only community events but also on the professionals that you want to participate in the success of your initiative. In Minnesota, we have a very active SCA Survivors group. They are willing to help with training, events and share their stories. Contact them at http://www.mnscasurvivor.org.
Position Statements/National Organizations

Since the 1970s, arriving within eight minutes 90% of the time has been the gold standard for determining the quality of an EMS system. Response times are how EMS providers compete for contracts, and it’s how EMS leadership proves to the community that it’s providing quality service.

It’s even codified by the National Fire Protection Association. In fact, NFPA 1710 states that first responders and BLS units must arrive on scene within a four-minute timeframe 90% of the time for all incidents. The ALS crew that must respond within eight minutes. According the NFPA 1710, “This requirement is based on experience, expert consensus and science. Many studies note the role of time and the delivery of early defibrillation in patient survival due to heart attacks and cardiac arrest, which are the most time-critical, resource-intensive medical emergency events to which fire departments respond.”

The problem is that cardiac arrests represent a very small percentage of the overall EMS responses. The Emergency Medical Services Outcomes Project (EMSOP) identified seven clinical conditions that account for 65% of all adult EMS transports and seven that account for 85% of all pediatric transports. Of these conditions, only cardiac arrest—the second least frequent of all the conditions—appears to require rapid EMS response. Although much of the assessment of an EMS system was developed based on how well the responders handle a cardiac arrest, the authors note that the vast majority of the calls don’t require the same time-sensitive response.

What Needs to Change?

Although changing standards and the public’s perception is difficult, it is possible. These are some suggestions to help move the argument forward, including the following:

- Classify calls and modify responses based on the classifications.
- Track AEDs that are purchased. Add that data to the dispatcher’s information and even call ‘owners’ of AEDs nearby to cardiac arrest calls and ask if they’re willing to bring the AED to the patient nearby.
- Put AEDs in police vehicles.
- Triage calls using Priority Dispatch. Find other options for non-emergent patients.
- Educate payers so that EMS services get paid for preventive community health home visits.
- Demonstrate how money saved can be used to help prevent emergency calls.
- Use customer surveys to measure quality and performance. Share that information.
- Make the first response piece more integral and accountable. If there is no first response layer, then add it.

Talking Points

- Set the stage. Talk about your community’s cardiac arrest survival rate and what you’re trying to achieve.
- Stress the importance of saving time. Early recognition and activation of EMS, as well as rapid transport of patients.
- Discuss the benefits of using ‘Pit Crew’ methods to improve efficiency on cardiac arrest calls
Leadership

To implement training and new protocols, leadership must support the changes needed to fully encompass the program. This may include additional purchases of equipment, training sessions and paperwork.

Key players and stakeholders:

- Identify the Medical Director for the transporting agency.
- Identify the Operations Manager.
- Who, if anyone, is in charge of medical calls and training?

Acceptance of the recommended protocols is only one step of the process. Implementation, training and ongoing training can be a longer and more difficult process. Once implemented, it may require ongoing education and remediation to ensure confidence in skills.

Training

Training can be implemented in a variety of ways. Many organizations still use traditional courses for CPR through American Heart Association. While there may be some variations, AHA supports supplement training to practice and learn integrated skills for management of cardiac arrest.

Basic Training Program

Depending on individual program design, the basic training required to supplement CPR instructions will vary, however, any training can include the following:

- Pit Crew training and practice
- Use of tools and technologies - mechanical CPR devices, ITD and IO therapy
- Practice with other groups or utilizing the concept of first arriving, second, etc until transport
- Familiarity with equipment use and placement - cardiac bag
- Understanding of protocols and Medical Direction input
BLS HealthCare Provider CPR Supplemental Training Draft

History:

All EMS personnel working at MN agencies and all First Responders are required every two years to renew their CPR certification as part of training and certification renewal. Agencies have adapted supplemental training to their cardiac arrest management training or implemented entire events or training programs to cardiac management. Concepts implemented include the Pit Crew process, carpenter/electrician, and other tools to help providers follow the expected protocols. Take Heart developed a separate training module that could be implemented within an agency that includes high performance CPR, ResQPod and other suggestions for tools. While all these are wonderful options and some have been successfully implemented, the biggest concern of agencies regarding training is finding time to add more content. A simple, concise approach will be best received; implemented close to our expectations; and allow us to reach all First Responder and EMS personnel.

Solution/Goal:

Process: Instructors would utilize a short presentation or video to show main points and reasoning. One station would be added to CPR skills rotation with instructions for implementation and evaluation. Instructors would have handouts and other supplemental materials for additional suggestions for protocol.

- Provide a short 6-10 slide presentation or video
- Provide instructions for managing the practical station
- Provide handouts explaining process or procedures expected
- Provide an evaluation or assessment tool to ensure provider competency

Additional Education Resources

Local EMS agencies offer continuing education and case reviews to help implement and refresh on cardiac arrest management skills. Also, many National EMS groups and agencies offer educational resources and ongoing education.
Protocols

The MN Resuscitation Consortium committees for Pre-hospital and Hospital Responses, which include EMS Medical Directors, Emergency Physicians, and Cardiologist, have been working to develop unified protocols for BLS and ALS. The following BLS protocol has been reviewed and is currently being implemented in some of the major MN ambulance services.

BLS Protocol Unification Recommendation

Minnesota resuscitation outcomes from out-of-hospital cardiac arrest are currently among the highest in the nation with an overall survival of 14.9% for all rhythms and 44% survival for witnessed VF /VT. Our first responders arrive after 3.5±1.5 minutes from the 911 call and additional EMS follows within 3-4 minutes. These great response times allow for a unique approach and simplification of BLS protocols since ACLS for many citizens is close behind.

Based on broad discussions between the members of the MRC pre-hospital and hospital committees, the following recommendations were constructed to help first responders and EMS unify the protocols delivering care in the state of Minnesota. The following points are intended as recommendations based on American Heart Association guidelines and the unique characteristics of manpower, expertise, and resources in Minnesota.

As a general recommendation, first responders and paramedics that work in a team to provide Cardiopulmonary Resuscitation should think of their team as a NASCAR race pit crew.

The early rescuers have three vital functions to perform. If there will be more than one rescuer, each one of the members of the crew should have a clearly identified task and should know which intervention to perform upon arrival to the scene in a similar fashion to a NASCAR pit crew.

These important functions need to happen in the first two minutes.
1) Rescuers should remember that blood flow to the heart and brain is maintained through continuous chest compressions. The rescuer’s hands are the patient’s heart.
2) Early defibrillation saves lives and its effect is strictly time dependent. Therefore, rescuers should place an AED or manual defibrillator and check for a shockable rhythm within the first 2-3 minutes upon arrival to the scene.
3) Finally, open the airway and ventilate the patient.
1. **Compression-to-Ventilation Ratio**
   - **First responders (ex. Fire, Police, Sheriff):**
     - If bystander CPR is present and a defibrillator or AED is available at the scene (either in the response vehicle or nearby), rhythm recognition and early defibrillation should be performed -when indicated- as soon as possible. Early defibrillation offers significant survival benefit.
     - If a single first responder is present at the scene, uninterrupted chest compressions until a second person or EMS arrives is a reasonable strategy. Ventilations may be delayed until extra help is available (on average 3-4 minutes for major metro areas).
     - If more (≥2) first responders are available at the scene, we teach uninterrupted chest compressions plus asynchronous ventilation with 8-10 breaths per minute; as an alternative 30:2 compressions-to-ventilations could be performed.
   - **EMS arrival:**
     - Due to the availability of more rescuers at this time point, one person should focus on uninterrupted chest compressions while the remaining rescuers focus on rhythm check and defibrillation, airway management, ventilations, uninterrupted chest compressions plus asynchronous ventilation with 8-10 breaths per minute (or possibly 30:2 compressions-to-ventilations ratio if no advanced airway), placement of an automated CPR device when available, and finally intravenous or intraosseous access.

2. **Defibrillation**
   The earliest application of either an AED or a manual defibrillator is indicated when present. For unwitnessed arrest initiation of continuous chest compression CPR, as described above is recommended while defibrillator/AED patches are applied and rhythm check should be implemented within 2 minutes. If indicated a single shock is delivered by AED or manual defibrillator followed by an immediate resumption of continuous chest compressions plus asynchronous ventilation with 8-10 breaths per minute CPR for another 2 minutes before pulse checks. The AED’s intrinsic limitation of pausing CPR for 15-20 seconds for analysis and shock delivery should be considered by EMS if both manual defibrillators and AEDs are available and the least interfering modality should be preferred.

3. **Ventilations**
   - First responders should utilize continuous chest compressions for the first few minutes (3-4 minutes) of CPR until either an AED is applied or until more help arrives. At that point, ventilations should be done with continuous uninterrupted chest compressions and 8-10 breaths per minutes delivered through a BVM or bag and advanced airway (supraglottic or endotracheal tubes) or compressions and ventilations can be done in a 30:2 ratio.
   - If the first responders identify significant delay in the arrival of EMS, ventilations with mouth-to-mouth technique should be considered after 4-5 minutes of continuous chest compressions since oxygenation significantly decreases after this time point. Initiation of a 30:2 strategy is not unreasonable for a single rescuer after 5 minutes of chest compression. If two or more rescuers (first responders) are present, ventilations should be considered after 3-4 minutes of CPR until EMS arrives and takes over the resuscitation efforts.
   - **Oxygenation.** If first responders have BVM capability then ventilations will be delivered with room air (FiO2 of 0.21). Upon arrival of EMS, oxygen resuscitation has been the standard. Avoidance of 100% oxygen is reasonable since a large amount of animal data is available and shows worse cerebral recovery. Limiting oxygen flow to maintain saturation above 92% and below 100% is recommended. A 4 L/min flow is a reasonable starting point and adjustment to avoid hypoxemia (saturation<92%) should be made on an as needed basis as resuscitation efforts get prolonged.
4. **Advanced Airways**

- **First responders:** Focus should be placed on chest compressions and if the manpower exists, secure the airway. BVM ventilation is the most widely utilized approach. Ventilation with room air (FiO2 of 0.21) is reasonable when oxygen supply does not exist.

- Supraglottic airway devices can be placed as soon as possible once the initial first 2-3 minutes of CPR efforts do not result in successful ROSC.

- Choice between supraglottic airway (SGA) devices and endotracheal intubation is a matter of the EMS directors’ discretion (based on available resources, training, and time for transfer to the emergency department). Recently generated evidence suggests that the use of SGA devices could be associated with worsening neurological outcomes when compared to endotracheal intubation both in animals and in humans. Given the absence of randomized clinical studies to address the issue, the potential negative association with outcomes should be weighted against the ease of SGA device placement and value of securing the airway.

- Endotracheal intubation should be the preferred method of securing the airway if the resources and abilities of the rescuers permit. However, endotracheal intubation should be performed with continuous chest compressions ongoing. Do not stop chest compressions during intubation.

5. **Intravenous access**

Intraosseous (IO) and intravenous (IV) access should be placed after securing good quality CPR and access to rhythm analysis. When a first responder team regularly consists of more than three rescuers, training one member to be proficient in intravenous or intraosseous access should be considered since earlier ACLS access has been linked to higher overall survival in patients with OHCA.

6. **Devices**

- **Automated CPR devices: (ex. LUCAS, Autopulse).**

  When available, placement of an automated CPR device can be used to provide high quality, consistent chest compressions. Mechanical device CPR can free a rescuer to perform other duties such as obtaining IV or IO access, securing the airway, allowing for defibrillation with ongoing CPR, and ambulance transport to the Emergency Department of patients with high quality ongoing CPR resuscitation efforts, for transport of viable refractory VF patients, and for transport of potentially reversible causes of PEA. Automated CPR devices are considered a non–inferior CPR method to manual CPR although they offer significant logistical advantages (except cost).

**Inspiratory Impedance Threshold Device and Active Compression Decompression CPR (ITD and ACD ResQPump*)**

The use of an ITD should be considered with a facemask or intubated patients and placed as early as possible especially during BLS efforts, if available. The use of an ITD with a LUCAS automated device offers part of the advantages of active compression decompression CPR +ITD. ACD+ITD CPR has been shown in 5 randomized trials to increase all resuscitation related outcomes. Most importantly, one-year survival with good neurological outcomes was increased by 53% compared to standard manual CPR.
Active Compression Decompression CPR (ResQ Pump*) in combination with an ITD should be considered as a future alternative to manual compressions. ACD+ITD should be the preferred CPR method when available, since it is the only CPR method that has been proven to increase survival to hospital discharge with good neurological outcomes and the effect was maintained for up to one year.

*The ITD has full FDA approval as a circulatory enhancer and is currently used clinically. The Active Compression Decompression device (ACD ResQPump) is currently under evaluation by the FDA. Therefore the ResQPump cannot be recommended for use in the US until final approval. It is used in Europe. Currently the combination of a LUCAS device in combination with an ITD could be considered as an alternative.

Implementation

How To Win the Race to Save Lives
excerpts from Jason Busch, associate editor for EMS World

Watch an auto race on TV. The speed of the cars captures the eye. A daring pass through traffic inspires the imagination. A terrible wreck catches the breath in your throat. What often goes overlooked, to all but the most avid race fan, is the work of the pit crew. Each crew member has a defined role, which they perform in practiced harmony to get their driver back into race a tenth of a second faster than the next guy. It goes a long way toward winning races, and it can do the same for saving lives.

That’s the theory at least behind the assigned task—or “pit crew”—model employed in some EMS systems’ responses to cardiac arrests. And it’s not new. But it is garnering new appreciation following a recent study in which paramedic students employed it for simulated STEMI patients.

According to Orlando/Orange County EMS Medical Director George Ralls, MD, who presented on the findings of the study at the 2012 EMS State of the Sciences Conference (“Gathering of Eagles”), having assigned tasks for each crew member was linked to faster scene times and could hold promise for faster door-to-balloon times for real patients. Ralls also believes the model could work across a variety of call types, including trauma and extrication.

“We conducted 54 simulated-patient encounters—30 control and 24 intervention encounters,” Ralls says
of the study, done in conjunction with the Society for Academic Emergency Medicine. “The mean time-to-completion of each task was compared in the control and intervention groups, respectively. Time to obtain vital signs was 4:18 in the control group vs. 2:21 in the intervention group (P=0.001); time to ASA administration was 3:54 vs. 2:00

In each case, the time-to-completion goals established for each position in the crew were exceeded.

Local Allina Medical Transportation co-medical directors, Charles Lick, MD, and Paul Satterlee, MD, recently looked at re run data that showed maybe there were people who were dying who could have been saved.

Lick and Satterlee are both emergency room physicians and they oversee training and patient care by prehospital providers for about 1 million people in 80 Minnesota communities. Their system's 70,000 annual calls include more than 300 cardiac arrests.

After ruling out other contributing factors, quality assurance reviews on patient care showed a striking difference in patient survival rates according to how closely the prehospital crew followed American Heart Association (AHA) treatment algorithms. In 2007, 5% of the patients who received care that did not closely follow AHA algorithms survived. For patients whose care did closely follow AHA algorithms, their survival rates were 25%. In 2008, the comparative survival rates were nearly 10 and more than 26%, respectively.

The doctors saw the problem not as a lack of training or effort, but a lack of tools and top-of-mind awareness in a high-stress, chaotic event. They also cite a new study showing that refresher training alone is not adequate to maintain the unique skills needed for such complex patient care.

They set out to see if there was an engineering way to improve cardiac arrest survival rates with a "pit crew" model.

Managing a cardiac arrest can be very stressful, and a recent study shows that refresher training every two years is not adequate to maintain the unique skills needed to care for the patient.
Addressing this need, the PitCard for Cardiac Arrest is a real-time reference card for:

- Quickly listing the interventions defined by your service, and
- Organizing when they should be done to best follow your service protocols.

Like a race team during a pit stop, an organized approach with defined roles is critical to managing a successful cardiac arrest scene.

Using the pit crew approach and ArrestPAC’s PitCard for Cardiac Arrest your response team has a tool to ensure all interventions are performed on time and nothing is delayed or forgotten.

When you start, everyone should know their roles and the duties expected of them. When you are done, the team can be sure they have provided the most complete and efficient care.

The PitCard for Cardiac Arrest defines:

- A team leader who has the global view and understanding of the ongoing event
- The roles of the individual rescuers based on their level of training and capabilities
- When certain interventions are most optimal — for example, delaying the placement of an advanced airway, so that procedure does not distract the team from other time critical interventions like continued good CPR with rotation of providers

The PitCard for Cardiac Arrest comes in a standard protocol that closely follows the recommendations of the American Heart Association guidelines for management of sudden cardiac arrest, plus ArrestPAC can customize the PitCard for Cardiac Arrest to fit your local service guidelines.
## Emergency Medical Services

### V-FIB, V-TACH

**ADULT GUIDELINES 2010**

**BLS Provider**
- **At Least 2 inch Compression Depth**
- **100/minute “Stayin’ Alive”**
- **CC Interruptions < 10 seconds**
- Rotate Every 2 minutes

**BVM + ResQPod ASAP**
- 2 hand facemask seal
- Don’t break seal
- 1 Hand Squeeze/1 sec.

**Provider 1**
- **Monitor / Defib**
- **Do not check pulse after shocks. Only check pulse after 2 min CPR**

**Provider 2**
- **Access & Drugs**
- **Administer first drug within 3 minutes**

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<tr>
<th>Minutes</th>
<th>Provider 1 Actions</th>
<th>Provider 2 Actions</th>
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<tbody>
<tr>
<td>0:00</td>
<td>Start CPR</td>
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<tr>
<td>0:02</td>
<td>BVM + ResQPod ASAP</td>
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<td>0:04</td>
<td>Apply Lucas or Switch</td>
<td>Monitor ETCO2</td>
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**Continue to 30 minutes. If ROSC occurs, order 12 lead EKG and consider cooling measures.**

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**ACLS Certified**

**Resuscitation Leader**
- **Run the Code**
  - Drug within 2-3 minutes
  - Monitor Rhythm
  - Order Medications

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<th>Minutes</th>
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<tr>
<td>0:00</td>
<td>Confirm Resuscitation Status</td>
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<td>0:02</td>
<td>Consider Hyp &amp; Ts</td>
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<td>0:04</td>
<td>Consider Magnesium Sulfate 2 g IV/IO</td>
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<td>Consider Fluid Challenges</td>
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<td>Consider Sodium bicarbonate 30 mEq IV/IO</td>
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<td>0:10</td>
<td>Consider Narcan 3 mg IV/IO</td>
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<td>0:12</td>
<td>Consider Calcium Chloride 1 G IV/IO</td>
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**H&ET’s**
- Hypo/hyperkalemia
- Hypoxia
- Hypoglycemia
- Hypertension
- Hypothermia
- Nausea
- Tamponade (cardiac)
- Tension Pneumothorax
- Thrombosis (retinal)
- Thrombosis (extremity)
- Trauma

**IF ROSC Occurs:**
1. Order 12 lead EKG
2. Consider Cooling Measures

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Emergency Medical Services

**ASYSTOLE**
**PEA**
**ADULT GUIDELINES 2010**

- **BLS Provider**
  - Preshock: At least 2 inch Compression Depth
  - 100/min "Steady Air" CC Intercalations < 10 sec
  - 36-40% Output
  - Rotate Every 2 min

- **Provider 1**
  - Monitor / Defib
    - Do not check pulse after shocks
    - Only check pulse after 2 min CPR

- **Provider 2**
  - Access / Drugs
    - Administer IV/O ASAP
    - Administer first drug within 3 min

- **Run the Code**
  - Drug within 2-3 minutes
  - Monitor Rhythm
  - Order Medications

- **What's & Why:**
  - Hypotension
  - Hypoxia
  - Hypoxia (acidosis)
  - Hypo-/Hyperkalemia
  - Hypothermia
  - Hypothermia (shock)
  - Hypothermia (hypothermia)
  - Hypoxia (Hypercarbia)
  - Hypoxia (lack of oxygen)
  - Trauma

- **If ROSC occurs:**
  1. Order 12 lead EKG
  2. Consider Cooling Measures

- **ACLS Certified**

- **Minutes**

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Continue to 30 minutes. If ROSC occurs, order 12 lead EKG and consider cooling measures.

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Ongoing Monitoring

CPR Quality Improvement (QI) and CARES

Using CARES (Cardiac Arrest Registry to Enhance Survival) to develop benchmarks and training or new technologies that need to be implemented can be the easiest way to monitor the quality improvement in cardiac arrest cases.
Case Reviews done at a local level can also be beneficial for promoting skills and training refreshers. Additionally online case review can also be very beneficial.

Feedback

Electronic data entry tools can provide feedback and QI to providers.

CARES also has tools to provide feedback and QI.

CARES Summary Report
Demographic and Survival Characteristics of OHCA
Service Date: From 1/1/11 Through 12/31/2011 | Agency: All agencies

<table>
<thead>
<tr>
<th>Data</th>
<th>National N=15481</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>N=15437</td>
</tr>
<tr>
<td>Mean</td>
<td>64.2</td>
</tr>
<tr>
<td>Median</td>
<td>65.0</td>
</tr>
<tr>
<td>Gender (%)</td>
<td>N=15477</td>
</tr>
<tr>
<td>Female</td>
<td>58% (36.6)</td>
</tr>
<tr>
<td>Male</td>
<td>42% (27.4)</td>
</tr>
<tr>
<td>Race (%)</td>
<td>N=15438</td>
</tr>
<tr>
<td>American Indian/Alaskan</td>
<td>7% (1.8)</td>
</tr>
<tr>
<td>Asian</td>
<td>21% (3.4)</td>
</tr>
<tr>
<td>Black/African-American</td>
<td>35% (5.4)</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>77% (11.8)</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>12% (3.7)</td>
</tr>
<tr>
<td>White</td>
<td>57% (9.0)</td>
</tr>
<tr>
<td>Unknown</td>
<td>49% (32.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data</th>
<th>National N=15481</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-hospital Outcome (%)</td>
<td>N=15481</td>
</tr>
<tr>
<td>Pronounced in the Field</td>
<td>40% (26.1)</td>
</tr>
<tr>
<td>Pronounced in ED</td>
<td>30% (19.4)</td>
</tr>
<tr>
<td>Ongoing Resuscitation in ED</td>
<td>8% (5.4)</td>
</tr>
<tr>
<td>Overall Survival (%)</td>
<td>N=15481</td>
</tr>
<tr>
<td>Overall Survival to Hospital Admission</td>
<td>41% (26.5)</td>
</tr>
<tr>
<td>Overall Survival to Hospital Discharge</td>
<td>162% (10.5)</td>
</tr>
<tr>
<td>With Good or Moderate Cerebral Performance</td>
<td>123% (8.0)</td>
</tr>
<tr>
<td>Missing hospital outcome</td>
<td>16% (10.5)</td>
</tr>
</tbody>
</table>
### Resources

The following are websites with information and facts relative to Sudden Cardiac Death and Pit Crew CPR

**American Heart Association**  
http://www.heart.org/HEARTORG/

**Take Heart America**  
http://www.takeheartamerica.org
Emergency Medical Services

BLS Cardiac Arrest Algorithm assuming 3 Rescuers

**CARDIAC ARREST NOT WITNESSED BY EMS**

For any unresponsive adult victim with no breathing or no normal breathing and no definite pulse, start continuous “hands only” compressions immediately

- **3 minutes**
  - Performs continuous “hands only” compressions for up to 2 to 3 minutes

- **2 minutes**
  - Place AED electrodes on the patient and prepare to defibrillate @ 2 min. or after the 2nd attempt to place the King is unsuccessful
  - **ASSISTS** Rescuer 1 or 3, as needed

- **1 minute**
  - Place the King Airway (placement confirmed by auscultating both lungs)
  - If **successful**, places ResQPod on King, turns on timing light and ventilates @10 times/min. using BVM with O₂ flow rate at 4 LPM. If **unsuccessful**, attempts one more time.
  - If that attempt fails, then using BVM and oral airway Rescuer 1 does continuous compressions and rescuer 3 ventilates 10/times/min **AFTER** first analysis with AED

**ANALYZE RHYTHM WITH AED RESCUERS ROTATE**

- **Yes then shock**
  - Immediately resume continuous compressions with 10 breaths/minute. After 2 minutes of CPR AED will analyze
    - ******Rescuers Rotate******

- **No shock**
  - Immediately resume continuous compressions with 10 breaths/minute. After 2 minutes of CPR AED will analyze
    - ******Rescuers Rotate******

**Return to: Analyze rhythm with AED. Repeat until ALS support arrives**

Place LUCAS 2, when available running only continuous compressions

- **Do not check for pulse unless signs of circulation are present. If pulse returns, remove ResQ Pod and support ventilations at 10 breaths per minute. With re-arrest resume CPR and place ResQ Pod on King Airway.**
  - ******Medics may switch out King Airway for Endotracheal Tube******
The Minnesota Resuscitation Academy is supported by:
University of Minnesota Cardiovascular Division,
Medtronic Foundation HeartRescue Project,
MN Department of Health,
MN Ambulance Association,
MN Hospital Association
In partnership with:
Participating community initiatives, MN EMS and Hospitals