

**EMS/Prehospital Best Practices**

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**Introduction:**

The care provided by Emergency Medical Services (EMS) to a known or suspected out-of-hospital cardiac arrest (OHCA) victim plays a key role in the outcome of the patient. Working in practiced conjunction with 911 dispatch centers (PSAP: Public Safety Answering Point) and the receiving emergency center, Medical First Responders, EMT's, and Paramedics provide the initial assessment and treatment for OHCA.

Emergency Medical Services are enhanced and may result in improved survival if:

- Lay public are trained to recognize cardiac arrest, early EMS activation, bystander CPR, and utilizes a public access AED.
- Trained 911 Emergency Medical Dispatchers (EMD) that provide timely and practiced pre-arrival instructions to the caller including Dispatcher-Assisted CPR instructions.
- Emergency systems that provide advanced cardiac resuscitation care and work cooperatively with EMS and hospital cardiovascular services to transport appropriate patients without delay to cardiac arrest receiving centers capable of "around-the-clock" coronary revascularization, temperature management, complete critical care services, and standardized neuroprognostication.

While much of the training, protocols, and infrastructure to accomplish these goals are in place, there remains significant opportunity for improvements in each area, and are identified through identifying and describing best practices.

**Best Practices:**

**I. Quality Assurance/Quality Improvement (QA/QI)**

- a. Key to the successful resuscitation efforts of the pre-hospital care providers is a robust systematic continuous QA/QI program
  - i. In the healthcare setting, QA/QI is often defined as “systematic, data-guided activities designed to bring about immediate (or nearly immediate) improvements in health care delivery”
- b. QA/QI efforts should be a focal point of an EMS agency’s resuscitation initiatives
- c. While certain activities are retrospective in nature, EMS agencies should strive to acquire and use technologies that provide real-time or near real-time feedback on resuscitation efforts to enhance care



## II. Data Collection

Before attempting to identify areas for improvement in the pre-hospital management of the cardiac arrest victim, it is important to understand the current environment, trends, and patient outcomes. This is accomplished through consistent and organized data collection.

- a. The SaveMiHeart Initiative uses CARES™ (Cardiac Arrest Registry to Enhance Survival) to measure and improve cardiac arrest performance.
  - i. “CARES was developed to help communities determine standard outcome measures for out-of-hospital cardiac arrest (OHCA) locally allowing for quality improvement efforts and benchmarking capability to improve care and increase survival.” ([www.mycares.net](http://www.mycares.net))
  - ii. The CARES™ Program seeks to:
    1. CARES™ Save more lives from OHCA
    2. Strengthen collaboration between 911 centers, first responders, emergency medical services (EMS) agencies and hospitals.
    3. Provide a simple, confidential process for assessing patient outcomes in compliance with HIPAA.
    4. Offer technical assistance (TA) to help community leaders identify and prioritize opportunities to improve EMS performance.
    5. Generate annual national and statewide reports for benchmarking capability.
- b. The SaveMiHeart initiative is working with the 911 Dispatch Centers, EMS Providers, and Hospitals within our catchment area to assure their respective data are entered into CARES™ assuring 100% of OHCA cases are captured and entered.

## III. Monitoring & Feedback

Technology to monitor resuscitative care is widely available and should be utilized by advanced care providers (Paramedics). Real-time monitoring of airway management and CPR effectiveness can be used to assure and enhance airway care and CPR effectiveness. Further, comprehensive data collection of the entire resuscitative effort can be used in post-care analysis for quality improvement activities.

- a. ETCO<sub>2</sub> is considered the gold standard for intubation verification and is increasingly used to show compression effectiveness.
  - i. Protocols to modify treatment, especially ventilation and oxygenation, to achieve target ETCO<sub>2</sub> should be developed and implemented with consistency. As of June 2021 the MDHHS BETP has not developed a standardized protocol which allows EMS to alter resuscitative or treatment efforts based upon ETCO<sub>2</sub> findings.
- b. Feedback during both training and patient care to each provider for their assigned role can increase effectiveness and help to design specific training enhancements, e.g. compression effectiveness
  - i. Compression effectiveness should be monitored using either an accelerometer device (aka “puck”) or through chest impedance using ECG/Defibrillator technology

- c. Agency-level data monitoring from resuscitation care should be routine and include post-arrest case review to assure quality and, when gaps are identified, used to create and distribute appropriate education. Partnering with the Dispatch PSAP on Quality Review should be included.
- d. This can be accomplished through the capture and review of a “code summary. Each of the advanced practice ECG Monitor/Defibrillators in the prehospital setting offer this technology:
  - i. Physio Control (LifePak) CPR Quality  
<http://www.physio-control.com/ProductDetails.aspx?id=2147484984>
  - ii. Zoll CPR Quality  
<http://www.alsius.org/medical-technology/cpr/>
  - iii. Philips CPR Quality  
<http://www.usa.philips.com/healthcare/solutions/emergency-care-resuscitation>

**IV. High Quality CPR and the AHA Consensus Statement:**

“The ‘2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care’ increased the focus on methods to ensure that high-quality cardiopulmonary resuscitation (CPR) is performed in all resuscitation attempts. There are 5 critical components of high-quality CPR: minimize interruptions in chest compressions, provide compressions of adequate rate and depth, avoid leaning between compressions, and avoid excessive ventilation.”<sup>1</sup>

- a. The use of enhanced protocols to assure high-quality CPR is consistently performed should be implemented across the SaveMiHeart catchment area
- b. High quality CPR, often referred to as “High Performance CPR” or “HP-CPR”, has well-established protocols and educational programs, the most common being the Resuscitation Academy (<http://www.resuscitationacademy.org/>)
  - i. Education toolkits are free and can be found at:  
<http://www.resuscitationacademy.org/high-performance-cpr-hp-cpr/>
  - ii. A key element of achieving ROSC and enhancing survival for the OHCA patient is to resuscitate the patient on scene according to existing Michigan EMS Protocol:
    - 1. Michigan Termination of Resuscitation Protocol 5-29
      - a. The cardiac arrest management protocols are currently (June 2021) under review and will be published shortly, with modifications related to the 2020 updated AHA guidelines.

**V. A Culture of Excellence Through Leadership and Accountability**

A culture of excellence requires continuous and coordinated leadership across all levels of the emergency response system. Leaders must recognize and support the interdependence between and within the links of the chain of survival. (2)

# save mi heart

Working to Improve Cardiac Arrest Survival

Videos of mechanical CPR device, 3-person rotation CPR and 2-person rotation CPR



Media1.mp4



Media2.mp4



Media3.mp4

- **Resources:**

- AHA Resuscitation Journal- 2020 CPR Guidelines
  - [https://www.ahajournals.org/toc/circ/142/16\\_suppl\\_2](https://www.ahajournals.org/toc/circ/142/16_suppl_2)
- Michigan EMS Protocols
  - [https://www.michigan.gov/mdhhs/0,5885,7-339-73970\\_5093\\_28508\\_76836-403850--,00.html](https://www.michigan.gov/mdhhs/0,5885,7-339-73970_5093_28508_76836-403850--,00.html)
- Resuscitation Academy
  - <http://www.resuscitationacademy.org/>
  - <https://www.resuscitationacademy.org/toolkits>
- Heart Rescue Project (Partnering with SaveMiHeart)
  - <http://www.heartrescueproject.com/>

**References:**

1. Peter A. Meaney, Bentley J. Bobrow, Mary E. Mancini, Jim Christenson, Allan R. de Caen, Farhan Bhanji, Benjamin S. Abella, Monica E. Kleinman, Dana P. Edelson, Robert A. Berg, Tom P. Aufderheide, Venu Menon and Marion Leary. CPR Quality: Improving Cardiac Resuscitation Outcomes Both Inside and Outside the Hospital: A Consensus Statement from the American Heart Association. *Circulation*. June 25, 2013; Print ISSN: 0009-7322. Online ISSN: 1524-4539
2. Strategies to Improve Cardiac Arrest Survival: A Time to Act (2015) Chapter: 4 Emergency Medical Services Response to Cardiac Arrest <https://www.nap.edu/read/21723/chapter/6#175>