

Best Practices for EMS
Time-Critical Diagnoses:

CARDIAC ARREST



WI ORH
Office of Rural Health

 **the
PARAMEDIC
foundation**

**Patient Care Policies
and Procedures Toolkit**

VISION

S T A T E M E N T



Deaths from heart attacks, stroke and trauma make up the largest collection of preventable deaths in the country. Each EMS agency can impact the care of these patients a great deal. To be successful in providing the highest standard of care to our patients and communities, we need to commit ourselves to a higher standard. We need to commit ourselves to becoming engaged partners in our respective systems of care. If we do this, we will provide greater value to our communities and the patients we serve.



INTRODUCTION

In 2016, the Office of Rural Health developed and delivered an assessment of EMS agencies related to patient care policies and practices titled, EMS Patient Care Assessment. The assessment focused on the care of patients with time critical diagnoses: stroke, STEMI, trauma and cardiac arrest. This was developed with experts in those areas. The assessment followed the model of a previous assessment of ambulance service management and leadership. For each patient care attribute in the STEMI Protocol Review, for example, there were five response options. Rather than the traditional “rate your agency on a 1 – 5 scale,” the response options were in narrative form. The options represented a “ladder” of policies/practices, from lower capacity to high capacity, representing the gold standard in patient care for that attribute.

One goal of this format is to provide examples for agencies of what a high capacity EMS service’s policy might look like regarding patient care. These can serve as a roadmap for improvement in order to become a high capacity agency. While the assessment itself can serve as this roadmap, it will also be useful to have a more detailed guide. The Patient Care Policies and Procedures Toolkit will explain why an agency may want to change their policies/practices and how they can implement them.

This document is divided into four systems of care. Each of these systems is then further divided into two primary subsections, the first being a workbook which serves as a “checklist” of completion for each of the corresponding policies and procedures manuals and the corresponding levels of achievement. Following each workbook is a development support section, again categorized by the systems’ attributes. This section provides support information, links to helpful data and more detailed explanations into the development of these attributes’ features.



CARDIAC ARREST

System of Care

Gold Standard Attributes

1

Attribute 1: Pit Crew CPR

The agency will have all staffed trained in Pit Crew CPR and all staff will have a role in the Cardiac Arrest Pit Crew resuscitation system during a cardiac arrest.

2

Attribute 2: Quality Assurance Policy

The agency will have QA policy that directs the collection of data on cardiac arrest cases. They will review all cases on a regular basis with the participation of the agency's medical director.

3

Attribute 3: Working with Receiving Hospitals on Cardiac Arrest Quality Assurance

The agency's medical director meets with its receiving hospitals on a regular basis to perform case reviews of cardiac arrest cases and associated data.

Attribute 1: Pit Crew CPR

State regulatory agencies and the national standard through the NREMT requires continuing education hours in trauma. The importance for an EMS agency to be connected and engaged with providing CE to its practitioners is imperative.

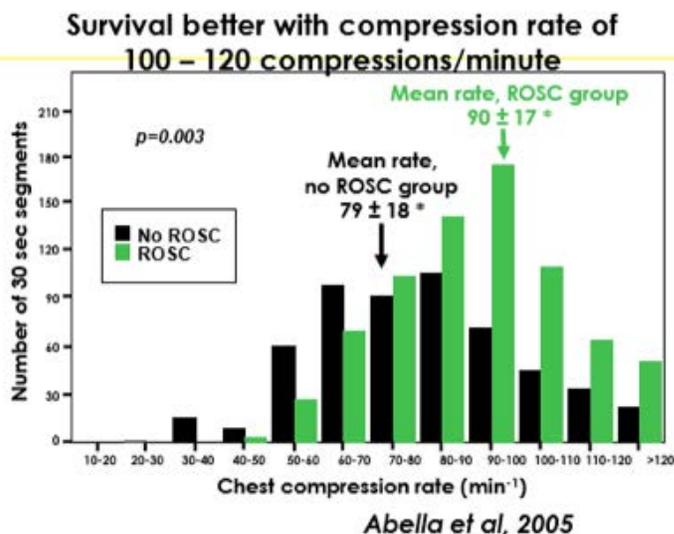
Objective

All staff are trained and understand their role in a cardiac arrest through the pit crew resuscitation system

Pit Crew CPR is not contradictory to ACLS, rather it emphasizes one of the most important parts of a cardiac arrest resuscitation. To better understand this in further detail, here are some of the facts surrounding successful cardiac resuscitation and the characteristics of successful resuscitation.

CPR is over 50 years old. Those 50 years have determined that survival is directly related to arterial pressure, which is directly correlated to coronary perfusion pressure. This is essentially the pressure created inside of the arteries during compressions, which in turn is directly correlated to perfusion, and perfusion is the key to survival. There are many studies on how to improve outcomes in CPR, all related to increasing arterial pressure. A study published in JAMA in 2005, for instance (Abella et al, 2005), is why practitioners now perform 100 compressions a minute, as this rate provides the greatest return on arterial pressure. It revealed a significant difference in survival or return of spontaneous circulation (ROSC) at these rates of compressions compared to

others. Similar studies determined the depth of compressions, first in 2005 a report from the ICCM and then again in 2015 a clinical trial by UT Southwestern Medical Center. These show the significant differences in ROSC when compressing to a depth of 2 inches or deeper as opposed to 1.5 inches. According to the ICCM (2005) report, it is as much as an 85% difference in survival rates. Even more interesting is the correlation to successful defibrillation attempts and



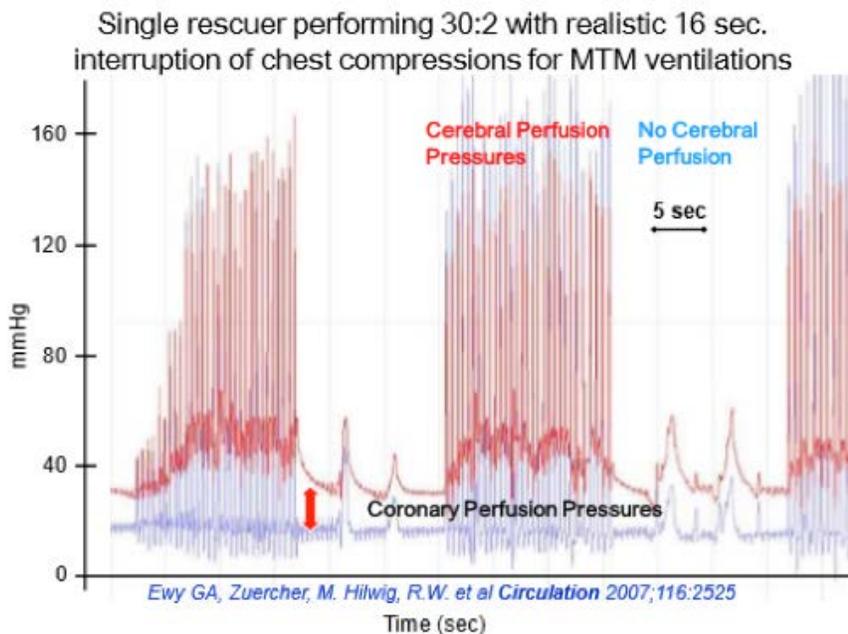
compression depths, which shows a 7% increase in success rate from 1.5 inches to 2 inches or greater and nearly a 48% increase compared to when compressions are less than 1.5 inches. (Edelson et al, 2006)

This all works because of an increasing understanding of how CPR works and why. Understanding this concept at its core helps explain why Pit Crew CPR may be beneficial to an agency and to patients.

When the chest is compressed, the Thoracic Pump is created. Much like how the heart has two stages in its pump, diastolic and systolic, the thoracic pump does too. This means that not only does the physical compression of the chest assist in moving blood flow, but the recoil of the compression as well. Compare it to a bulb syringe where most of the suction occurs when the syringe is released. This is why AHA places emphasis on allowing complete recoil of the chest.

Cerebral Perfusion Pressure is the measurement used to gauge the perfusion of brain tissue. This is obviously important for ideal patient outcomes and successful ROSC. When practitioners compress on the chest of a patient in cardiac arrest, the pressure increases in the same fashion as a garden weed sprayer. When a weed sprayer is pumped one time, the pressure is barely enough to get any fluid to come out of the nozzle. If the sprayer is pumped multiple times, the pressure builds, and the fluid comes out in a steady stream, much like coronary and cerebral perfusion pressures. A significant difference is that when pumping is stopped on a sprayer, it maintains a pressure that allows for the release of fluid. In cardio pulmonary resuscitation, this is not the case and pressure is immediately lost. This leaves you

back at zero and with inadequate coronary pressure.



Despite all the studies, advancements in available tools and cardiac arrest medications, the only clinically proven way to improve a patient's ROSC percentage is with highly effective CPR. As outlined previously, any interruptions in CPR, decrease in efficiency, depth or rate will result in a dramatic loss of ROSC percentages.

Pit Crew CPR is about building an incredibly effective system, an assembly line of CPR. It concentrates on perfect CPR technique and limiting any interruptions. Even an interruption greater than 10 seconds can result in the success rate of defibrillation to decrease by 30% (Edelson et al, 2006).

Effective teams share common traits. They all know what their own responsibilities are as a piece of the larger team. They know each other's jobs, communicate well and practice. These same characteristics are displayed in Pit Crew CPR. All practitioners know their role before they ever make patient contact. This limits deadly interruptions. They keep on a rigid time schedule with coordinated transitions. These transitions are communicated out loud so that everyone on the team can be on the same page. Everything about the process is designed to ensure that a fresh pair of hands stays on the chest always, ensuring quality CPR and that interruptions are limited. These concepts are the priority in Pit Crew CPR, placing chest compression over other procedures that result in interruptions.

It is these qualities within the Pit Crew concept that improve ROSC rates. These concepts are not new, nor are they contradictory to ACLS or other AHA principles. Rather it is a team approach to the cardiac arrest event.

Additional Note:

Many communities with the greatest ROSC percentages have achieved this through public education campaigns. These campaigns concentrate on improving knowledge of CPR and availability of AEDs. If you want to make a true impact on your community, engage them to become part of the cardiac arrest team. Teach them about the chain of survival, CPR and defibrillation. Interact with other stakeholders in your community and try to identify pathways to increase AED availability. If you can do this, it will make a drastic impact on your ROSC.

Attribute 2 & 3: QA Policy and QA Review

Objective

Your agency will have a QA policy which ensures the review of all cardiac arrest cases with your agency's medical director. Your agency will collect data specific to cardiac arrest data and review this data with hospitals within of your system of care.

In each of the sections preceding this one, the importance of having a QA policy and procedure is discussed, one that outlines the process and encourages the participation of the medical director. The Cardiac Arrest Policy and Procedures are no different. Use the previously developed QA policy and add an amendment to it which outlines the data collection metrics that an agency will collect on cardiac arrest patients.

The development of relationships with receiving hospitals to review cases with the agency, provide feedback on patient outcomes and practice transitions of patient care is warranted.

Below are some suggested metrics to collect pertaining to cardiac arrest patients.

- Was there bystander CPR?
- Last known well time
- Time of first defibrillation
- Interruptions in chest compressions
- Was there ROSC?

Collecting data in cardiac arrest scenarios can prove to be difficult. While principles in Pit Crew CPR and ACLS designate a practitioner to record care, reality is not always as neat, especially if the agency practices these events in a limited fashion. Without a sure way to record these events in real time, a practitioner's recollection of the event after the fact is usually not accurate. Discover a way to record these events with a high degree of confidence. An agency may want to research many methods available for this. They can be as complex as integrating telemedicine technology into the agency's ambulances or as simple as recording the audio of the call. Pay close attention to how you manage, store and protect this data to maintain HIPPA compliance.

This digital information can be integrated into a PSES system and protected by a PSO agency.

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