

Wake County EMS System

Peer Review/Clinical Data/System Performance

Explanations and Definitions for Reports

Wake County EMS engages in regular external review. The System makes quarterly reports to the Peer Review Committee, which is designed to keep external checks and balances on EMS System performance and service delivery.

The reports are presented in medical and professional terms. This document is intended as an adjunct to those reports to provide context, explanations and definitions for easier consumption by the public. The committee reports are formatted as a collection of slides, graphs and data. This document will present examples of those slides in the order in which they appear on the report, but with explanations and definitions underneath.

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Peer Review Committee

The Peer Review Committee of the Wake County EMS System is established in accordance with North Carolina General Statute 131E-155 (6b) in order to analyze patient data and outcome measures and thus to evaluate the ongoing quality of patient care, system performance, and medical direction for the EMS System. Review of medical records by the Peer Review Committee and/or any subcommittee thereof is confidential and is protected under [North Carolina General Statute 143-518](#). This committee serves as any other Medical Review Committee as defined under [North Carolina General Statute 131E-95](#).

Committee Membership (27 Total Voting Members)

Chairperson – EMS System Medical Director

EMS Representation – 8 Representatives

EMS Chiefs – 4 Representatives

EMS Executive Officer

Office of Professional Development

Chief Officer of Clinical Affairs

Member-at-large

Physician Representation – 5 Representatives

One physician from each emergency medicine group and two physician-at-large

Nursing Representation - 4 Representatives

One nursing representative from each hospital

First Response Representation – 3 Representatives

Hospital Administration Representation – 3 Representatives

One hospital executive from each hospital system

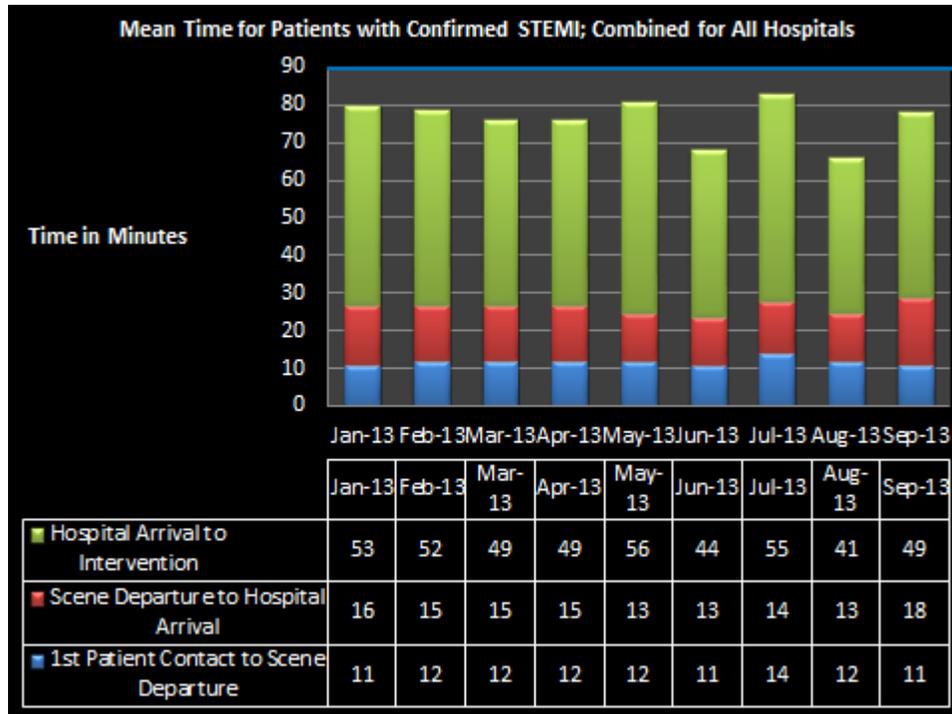
Communications Center Representation - 1 Representative

County Manager Representation – 1 Representative

Community Member-at-Large – 1 Representative

Medical Director Emeritus – 1 Representative

Mean Time for Patients with Confirmed STEMI



The goal is 90 minutes or less from first medical contact to STEMI intervention by the hospital .

Each color represents who is responsible and the minutes spent for each part of the time continuum up to actual STEMI intervention.

Measure: Total time elapsed from EMS contact to hospital intervention for STEMI.

Target EMS scene time for STEMI: 10-15 minutes or less.

Definitions:

STEMI is an acronym for “ST segment Elevation Myocardial Infarction.” In more common terms, it is a type of heart attack. **Myocardial** means heart muscle. **Infarction** means tissue death. Hence, the definition of a heart attack, which is heart tissue death.

ST segment Elevation refers to the “signature” of some types of heart attacks when seen on the electrocardiograph (ECG or EKG). Each wave form on an ECG is named by a letter. A typical heartbeat on the ECG has a set of wave forms that are named P, QRS, and T. The ST segment refers to the wave form between the S wave and the T wave. When that segment of the wave form is elevated higher than baseline, it is an indication of a heart attack occurring at that time. See Appendix 3 for illustrations.

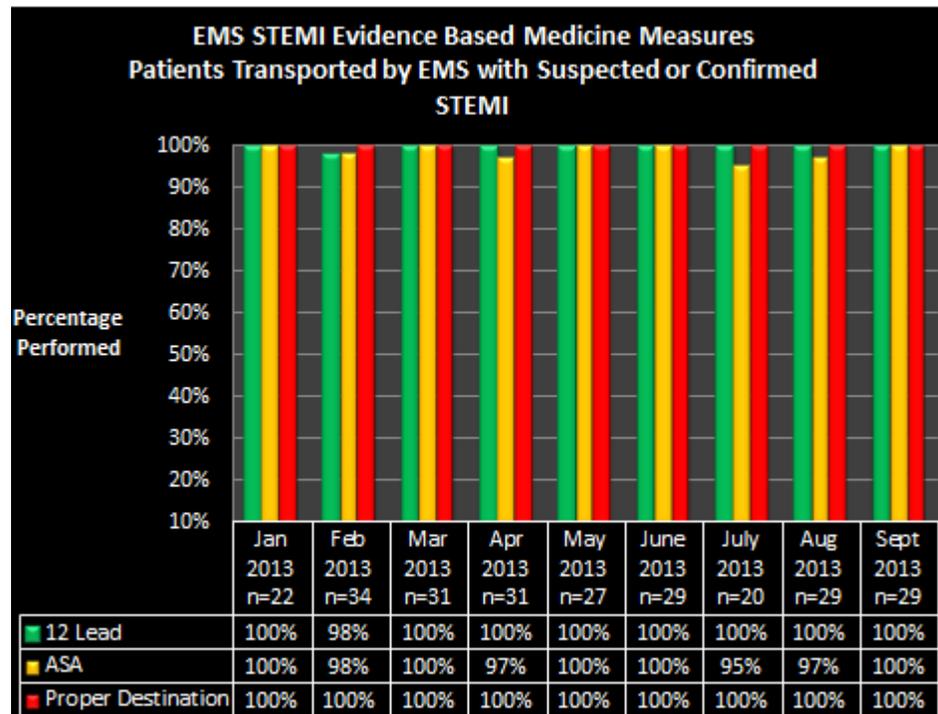
Notes:

Time is an important measure during a STEMI. Rapid intervention at an appropriate hospital is vital to limiting impact and preventing secondary heart attacks, stroke and death as a result of the STEMI. A critical component of time savings is field recognition and initial treatment of STEMI by EMS, followed activation of “Code STEMI” at the receiving hospital.

Presence of a STEMI puts a set of medical protocols and procedures in motion for EMS. Included in those procedures is a “Code STEMI” activation, which is a notification to the receiving hospital that puts a series of internal procedures in motion.

Heart attack signs and symptoms without the presence of STEMI documented by the ECG are not candidates for emergency cardiac catheterization, therefore there is no preferred hospital destination for those patients (see **Proper Destination** next page).

EMS STEMI Evidence Based Medicine Measures



Measure: EMS use of indicated procedure, medication and destination during STEMI.

Definitions:

12 Lead refers to a 12 lead ECG, which records heart activity from several angles. It allows paramedics to both see the STEMI as well as locate where in the heart the STEMI is occurring.

ASA is an abbreviation for aspirin, an important medication for heart attack. This measurement accounts for both aspirin given and “not given but justified,” which means documentation is included in the patient care report that the patient was unable to have aspirin for some reason (e.g. allergies).

Proper Destination STEMI care indicates transport to a hospital capable of emergency cardiac catheterization, which is an invasive procedure that works to clear the blocked artery in the heart that is causing the STEMI. Not all hospitals are “cath capable.”

PCI Percutaneous Coronary Intervention is another term for cardiac catheterization.

Destination Triage information can be found in the Wake County EMS System [Treatment Protocols](#)

Look under **-WCEMSS Protocols 2013 > Triage and Destination Protocols > TDP-STEMI**

Over Triage

Over Triage 3rd Quarter 2013

- There were **17** of **78** STEMI calls documented by the hospital as STEMI cancelled, categorized as “EMS over triage”
- All were independently reviewed and determined that all but **4** of the EMS activations were appropriate
- There was **4** actual over triage
– **5%** overtriage n=**78** STEMI calls

The Wake County EMS System – *Prompt, Compassionate, Clinically Excellent*



Care



Measure: EMS activation of Code STEMI and associated over triage.

Definitions:

Triage means medical sorting, prioritizing and directing patients to the most appropriate care.

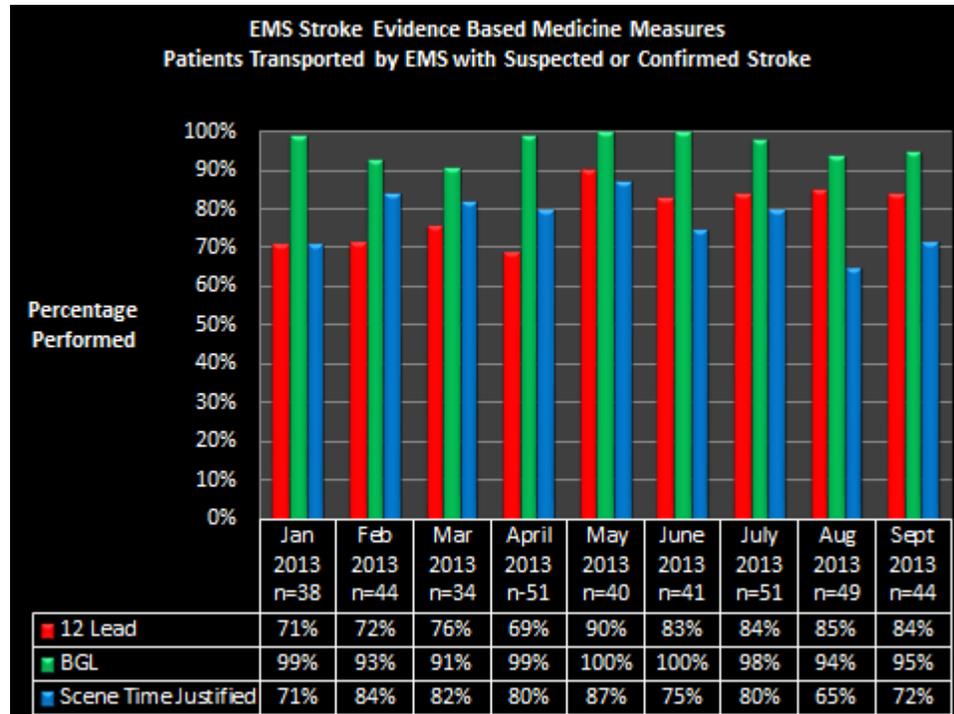
Over Triage is how often EMS activated Code STEMI for patients found to not actually be experiencing a STEMI.

Notes:

It is important that enough over triage exists to ensure that no STEMIs are missed in the field. However, the right balance of over triage must be maintained because of the impact that a Code STEMI activation has on a hospital.

Each over triage is independently reviewed by a cardiologist to determine if the original EMS triage decision was correct.

EMS Stroke Evidence Based Medicine Measures



Measure: EMS use of procedure, assessment and scene time during stroke.

Target EMS scene time for stroke: 10 minutes or less.

Definitions:

CVA Stroke is also referred to as Cerebral Vascular Accident (CVA). **Cerebral** refers to the brain. **Vascular** refers to blood vessels. A stroke, or CVA, results from disrupted blood flow to the brain. If the brain tissue dies it may permanently affect the bodily function the brain tissue is responsible for.

12 Lead refers to a 12 lead ECG, which records heart activity from several angles.

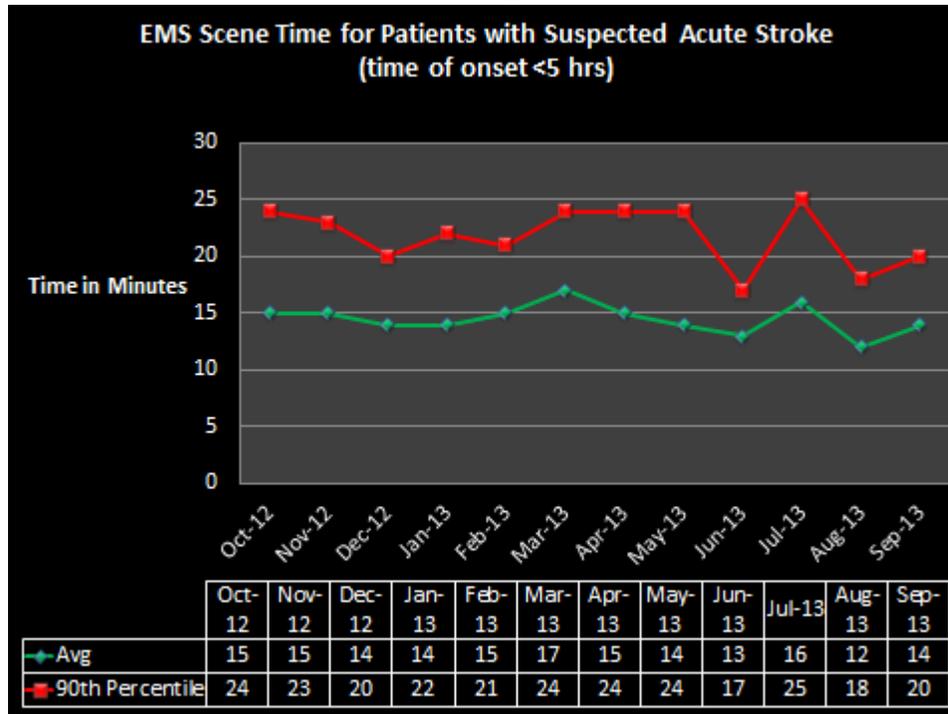
BGL Blood Glucose, or blood sugar, is the primary source of energy for every cell in the body. Inadequate supply of blood glucose has multiple effects on the body. Low blood glucose can mimic signs and symptoms of a stroke, and it is measured on patients with stroke-like signs and symptoms.

Scene Time Justified One objective in stroke care is minimal scene time. This report measures how well the EMS crew met the target scene time, or that there is documentation for why the scene time was exceeded. Scene times are sometimes lengthened by things like extra time required to move someone from an upstairs bedroom or even someone choosing not to accept medical care.

Notes:

Time is critical in the treatment of stroke, especially if the onset of signs and symptoms occurred within the previous 5 hours. EMS care for stroke patients within the 5 hour window includes rapid stroke detection, minimized scene time, and activation of "Code Stroke" at an appropriate hospital. Code Stroke is a set of protocols and procedures at a given hospital prepared to provide invasive stroke intervention. For patients with stroke signs and symptoms greater than 5 hours, the risk of invasive stroke therapy is much higher than the expected benefit. There is no hospital destination preference for >5 hour stroke. See Destination Triage for stroke next page.

EMS Scene Time for Patients with Suspected Acute Stroke



Measure: EMS scene time during acute stroke (time of onset less than 5 hours).

Notes:

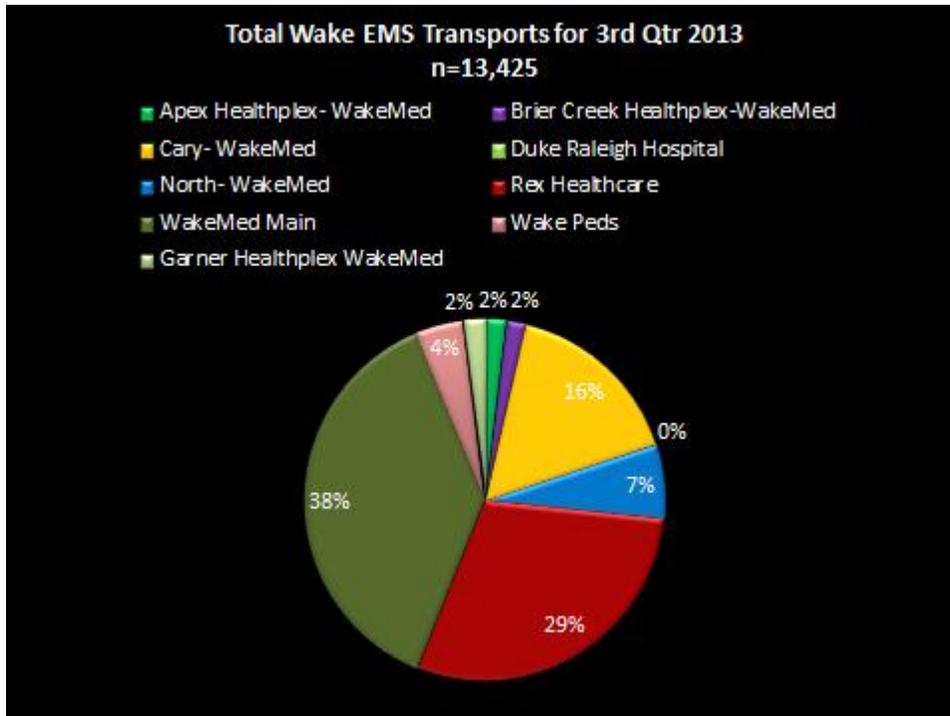
Some EMS System measures may include both mean (average) and 90th percentile. In the example above, the average EMS scene time for suspected stroke in September 2013 was 14 minutes, and 90% of EMS scene times were 20 minutes or less.

This particular metric does not account for “Scene Time Justified,” which means there could have been extenuating circumstances beyond EMS control that prolonged the scene time.

Destination Triage information can be found in the Wake County EMS System [Treatment Protocols](#)

Look under **-WCEMSS Protocols 2013 > Triage and Destination Protocols > TDP-Stroke**

Total Wake EMS Transports



Measure: The percentage of EMS transports to each hospital and “Free Standing Emergency Department” in Wake County.

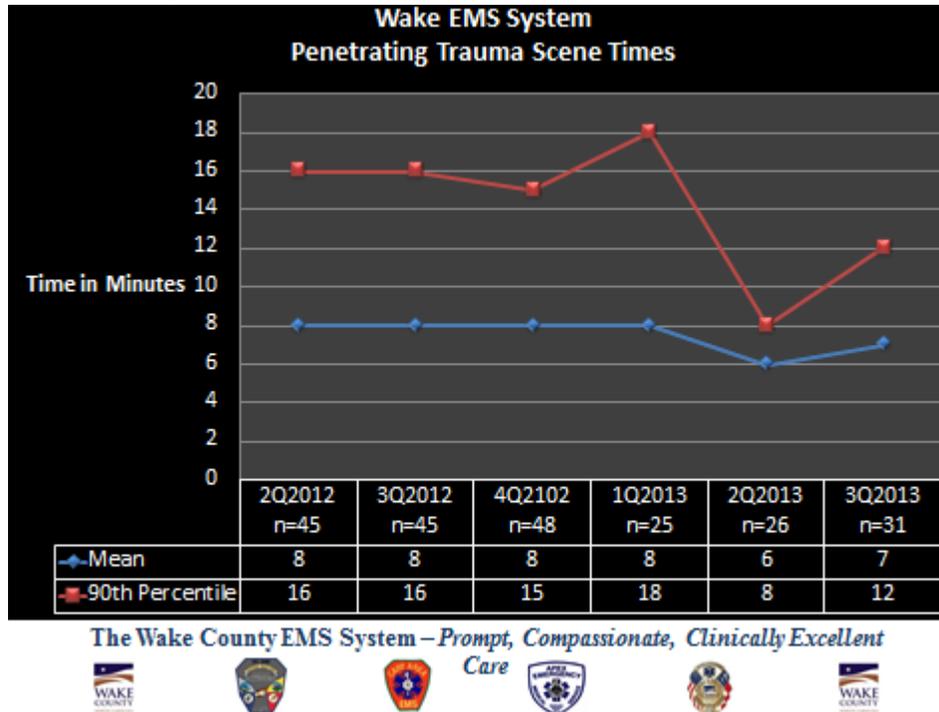
Notes:

Generally patients are transported to the hospital of their choice. However we use “Destination Triage” for certain well-defined medical circumstances that require specific treatments only available at a given hospital.

Destination Triage information can be found in the Wake County EMS System [Treatment Protocols](#)

Look under **-WCEMSS Protocols 2013 > Triage and Destination Protocols**

Wake EMS System Penetrating Trauma Scene Times



Measure: EMS scene times for penetrating trauma.

Target EMS scene time for trauma: 10 minutes or less.

Notes:

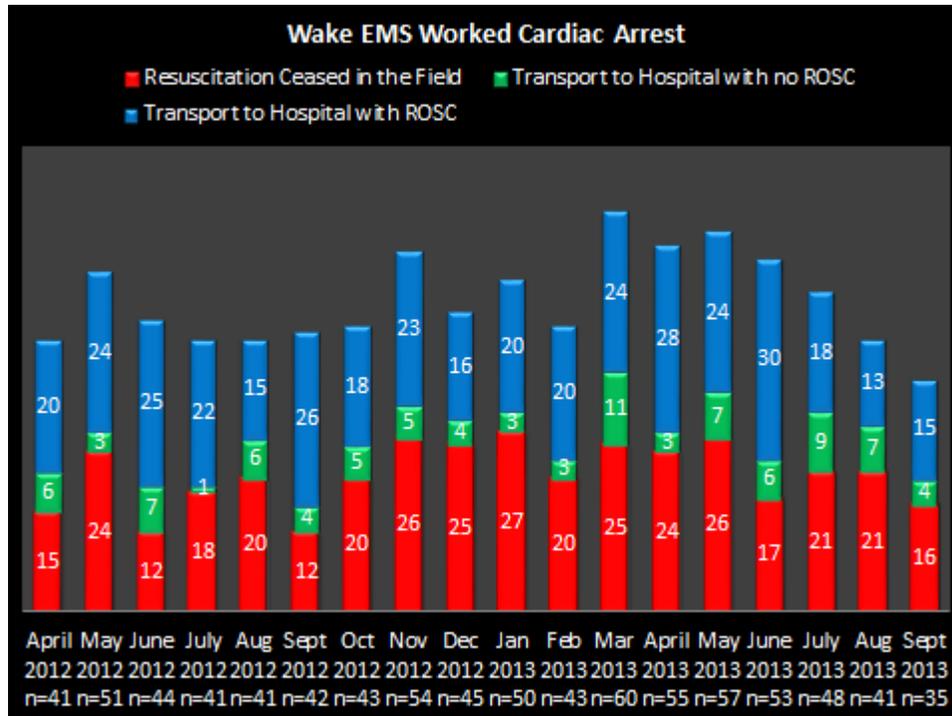
Time is important in the treatment of trauma. EMS priorities include rapid transport to a Trauma Center, which is a hospital specially designed, equipped and staffed to provide high level emergency care for life threatening injuries.

Trauma patients are often divided into *Penetrating* Trauma and *Blunt* Trauma for study and review. Penetrating trauma refers to injury sustained by something that penetrates into the body and causes injury. Common examples would include shootings, stabbings and impaled objects.

Blunt trauma usually refers to injury sustained by a collision with something. Common examples may include an automobile accident, a long fall, or being struck by a blunt object.

This slide measures scene time only for penetrating trauma. It is difficult to gather meaning from measuring blunt trauma scene times because many blunt traumas are caused by serious automobile accidents and other circumstances that lengthen scene times. Those circumstances are typically beyond EMS control, and thus are not reflective of EMS performance.

Wake EMS Worked Cardiac Arrest



Measure: Total number of cardiac arrests, number of resuscitations ceased in the field, number of cardiac arrests transported to a hospital without a pulse, and number of cardiac arrests victims transported to a hospital with a pulse.

Definitions:

Resuscitation is the treatment and measures taken to restore heartbeat and breathing in a patient. See Appendix 2 for more complete description.

ROSC Return of Spontaneous Circulation. Or, a pulse after a returned heartbeat.

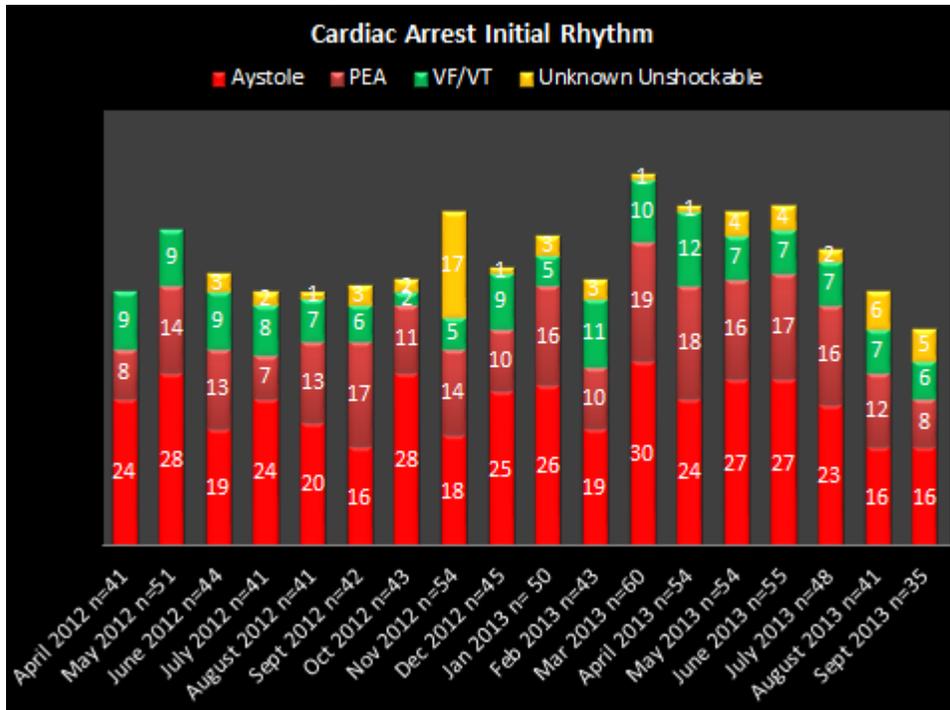
Notes:

EMS priorities are different for cardiac arrest versus other medical emergencies. The overriding objective in cardiac arrest is return of spontaneous circulation (ROSC). When the heart is not beating, the single most important objective is getting it to beat again. The greatest chance for ROSC is achieved when EMS does not move the patient at all, but works to resuscitate right where the patient is. If ROSC is achieved, EMS will begin the process of transporting the patient to a hospital. If ROSC is not achieved, EMS will cease resuscitation and the patient is declared dead.

Resuscitation procedures may take from 20 minutes to beyond 60 - 70 minutes in some cases. Although fewer people are resuscitated after longer periods, evidence shows that if the patient is resuscitated, they are just as likely to have a good overall outcome as if they were resuscitated in much shorter time periods.

In some circumstances EMS may elect to transport a patient without a pulse after extended resuscitation in order to prevent leaving a deceased patient in a public or otherwise inappropriate place.

Cardiac Arrest Initial Rhythm



Measure: Initial heart rhythm of cardiac arrest patients

Definitions:

Asystole is the absence of any electrical activity in the heart. It is recognized by the flat line on the ECG.

PEA Pulseless Electrical Activity. In this situation there are electrical impulses rhythmically travelling through the heart, but for some reason, it is not resulting in a heartbeat effective enough to generate a pulse. CPR is required. Paramedics may also use medication, fluid and other electrical treatments to achieve ROSC.

VF/VT Ventricular Fibrillation/Ventricular Tachycardia. In **V-Fib** there is “electrical chaos” in the heart. Disorganized electrical impulses are travelling erratically. The result is a “quivering” of the heart muscle and not the required organized rhythmic pulsation. CPR and AED use are required.

V-Tach is a rapid heartbeat in which the electrical impulse is organized but does not follow the normal electrical pathway. As a result, there is not the proper heart muscle contraction needed for filling and ejection of blood. In some cases there is no detectable pulse. If there is no pulse, CPR and AED use are required.

Unknown/Unshockable In some cases an AED is the first monitor device placed on a patient. When the rhythm does not require a shock, the AED says “No Shock Advised,” but there is no indication of what the original heart rhythm actually is.

Notes:

Cardiac arrest is ineffective or absent heartbeat resulting in no pulse (see Appendix 1). Basic CPR does not change regardless of what is causing cardiac arrest, but paramedic care does change. See Appendix 3 for ECG rhythm form examples.

Appendix 1:

Cardiac Arrest, Longer Description

Cardiac arrest is an immediately life threatening emergency in which the heart is not beating effectively or has stopped completely.

The heart is a hollow muscle. Small electrical impulses rhythmically travel through the heart muscle, which makes it repeatedly contract and relax. That contraction, or squeezing, forces blood within its hollow chambers to pulse out into the blood vessels, thus circulating the blood. The relaxation of the heart allows the hollow chambers to refill with the blood that is returning from vessels.

In cardiac arrest, the rhythmic electrical impulses are disturbed or stopped. When that happens, the heart may “quiver” and be unable to effectively fill and eject blood. The result is that organs, including the brain and the heart itself, are no longer receiving oxygenated blood. If circulation does not return within a few minutes, odds of survival are very low.

CPR is designed to recreate the filling and ejection of blood from the heart, which can keep blood circulating until medical help can attempt to restart the heart.

Defibrillation by an Automatic External Defibrillator (AED) is a shock to the heart that is designed to restore the heart’s own rhythmic electrical impulses again.

The primary goal in cardiac arrest is Return of Spontaneous Circulation (ROSC), or simply put, return of pulse.

Cardiac arrest and heart attack (STEMI) are not the same thing. The dying heart tissue in a heart attack may cause electrical disturbances or heart muscle pump failure that lead to cardiac arrest, but the two terms are not synonymous.

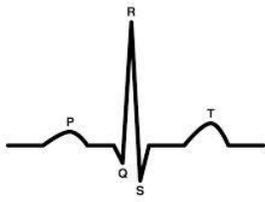
Appendix 2:

Resuscitation, Longer Description

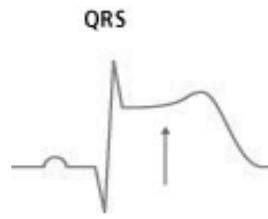
Resuscitation is the treatment and measures taken to restore heartbeat and breathing in a patient. The most basic treatments in resuscitation are chest compressions (CPR) and defibrillation. In order for the chest compressions to be effective, the patient must remain stationary in one place. Any attempt to move the patient causes ineffective chest compressions. Even short delays in chest compressions reduce the patient’s chance for survival by a large percentage. That is why paramedics will remain on scene without moving the patient as they “work” cardiac arrest.

Paramedics will also start IVs, place breathing tubes and administer a number of medications. Those medications may work to restore heartbeat or treat the initial medical problem that caused the cardiac arrest in the first place. Paramedics will also begin a treatment that lowers the patient’s internal temperature by a few degrees. Prevention of fever and general temperature management are proven to lead to vast improvements in overall patient outcome and survival after cardiac arrest.

Appendix 3:



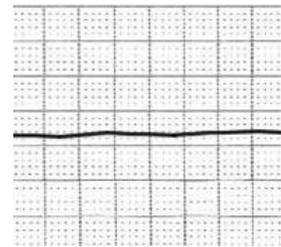
Typical "P-QRS-T" heartbeat



ST elevation



Ventricular Fibrillation



Asystole