



YOLO COUNTY EMERGENCY MEDICAL SERVICES AGENCY



2016/2017 EMS SYSTEM REPORT

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YEMSA - Yolo County Emergency
Medical Services Agency

EMS - Emergency Medical Services

EMR - Emergency Medical Responder

EMT - Emergency Medical Technician

EMTP - Paramedic

BLS - Basic Life Support

ALS - Advanced Life Support

CCT - Critical Care Transport

EMD - Emergency Medical Dispatch

PSAP - Public Safety Answering Point

Introduction

Yolo County EMS Agency (YEMSA) started providing an EMS delivery system to Yolo County in July of 2013. The focus was to create a collaborative approach among all partners and the community to enhance the EMS delivery model and improve patient outcomes. The integration of the health department into Yolo County Health and Human Services Agency in 2015 opened new communication and opportunities for EMS to re-align patients with services to meet their immediate and long-term needs. We are excited to be at the forefront of creating an integrative health system. This year's report highlights our delivery system strategies and performance, and our initiatives to promote community awareness and system enhancements.



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Mission-Vision-Values

MISSION

The Mission of Yolo County EMS is to evolve a cost effective, collaborative, and outcome-based EMS Delivery System that produces clinically superior and culturally competent care. We strive to work effectively with our Public Safety and Public Health partners to solve problems, make decisions, and achieve common goals.



VISION

A comprehensive, accessible, and sustainable EMS Delivery System, realized through collaboration, which provides clinically superior, efficient, and innovative care.

VALUES

Leadership
Innovation
Integrity
Collaborative
Patient Centered

System Partners

911 - ALS - CCT Transport Providers

American Medical Response



Paramedic Staffed Fire Departments

Yocha Dehe Fire Department

Air Transport Providers

CALSTAR
REACH



Municipal Fire Departments

Davis Fire
UC Davis Fire
West Sacramento Fire
Winters Fire
Woodland Fire
Yocha Dehe Fire

BLS Transport Providers

AMR-Sutter Health
NORCAL Ambulance
ProTransport-1
Sacramento Valley
Ambulance
Falck Northern California



Fire Protection Districts

Capay Valley Fire
Clarksburg Fire
Dunnigan Fire
Elkhorn Fire
Esparto Fire
Knights Landing Fire
Madison Fire
West Plainfield Fire
Willow Oak Fire
Yolo Fire
Zamora Fire

System Funding

Yolo County EMS Agency (YEMSA) is funded through the Exclusive Operating Area (EOA) franchise fee, penalty fees, Maddy funds, and fees collected for certifications, ambulance permits, ambulance inspections, and hospital designations.



Penalty fees
\$348,150.00



Franchise Fee
\$300,000.00



**Certifications, Permits,
& Inspections**
\$45,000.00



**Hospital
Designations**
\$165,000.00

**Total EMS
Funding**
\$858,150.00

Emergency Dispatch System

Yolo County is serviced by two primary Public Safety Answering Points (PSAP); Yolo Emergency Communications Center and City of Davis Police. These communication centers are responsible for answering 911 calls. After initial triage the dispatcher will send appropriate EMS response and give pre-arrival instructions according to professional Emergency Medical Dispatch (EMD) protocols.



9-1-1 Call



PSAP



EMD



EMS Response &
Pre-Arrival Instructions

The Yolo Emergency Communications Center is an Emergency Medical Dispatch (EMD) center that utilizes the Medical Priority Dispatch System. The dispatchers in this system triage calls using specific medical criteria that are based on signs and symptoms told to them by the caller. They send the proper level of care with the proper urgency and provide pre-arrival instructions, guiding the caller through life saving steps including CPR, choking, emergency childbirth, and other medical emergencies. These dispatchers play a vital role in the EMS Chain of Survival as the first point of contact with the public.

EMS Service Utilization by Population

2016

Population	215,802
Population per square mile	197.9
Square miles EMS system serves	1,024
County median household income	\$54,989
County population below poverty	17.5%
Total EMS response	21,802
EMS response per 1,000 people	98.5
Average EMS response per day	58.2

Ambulance Response Zones

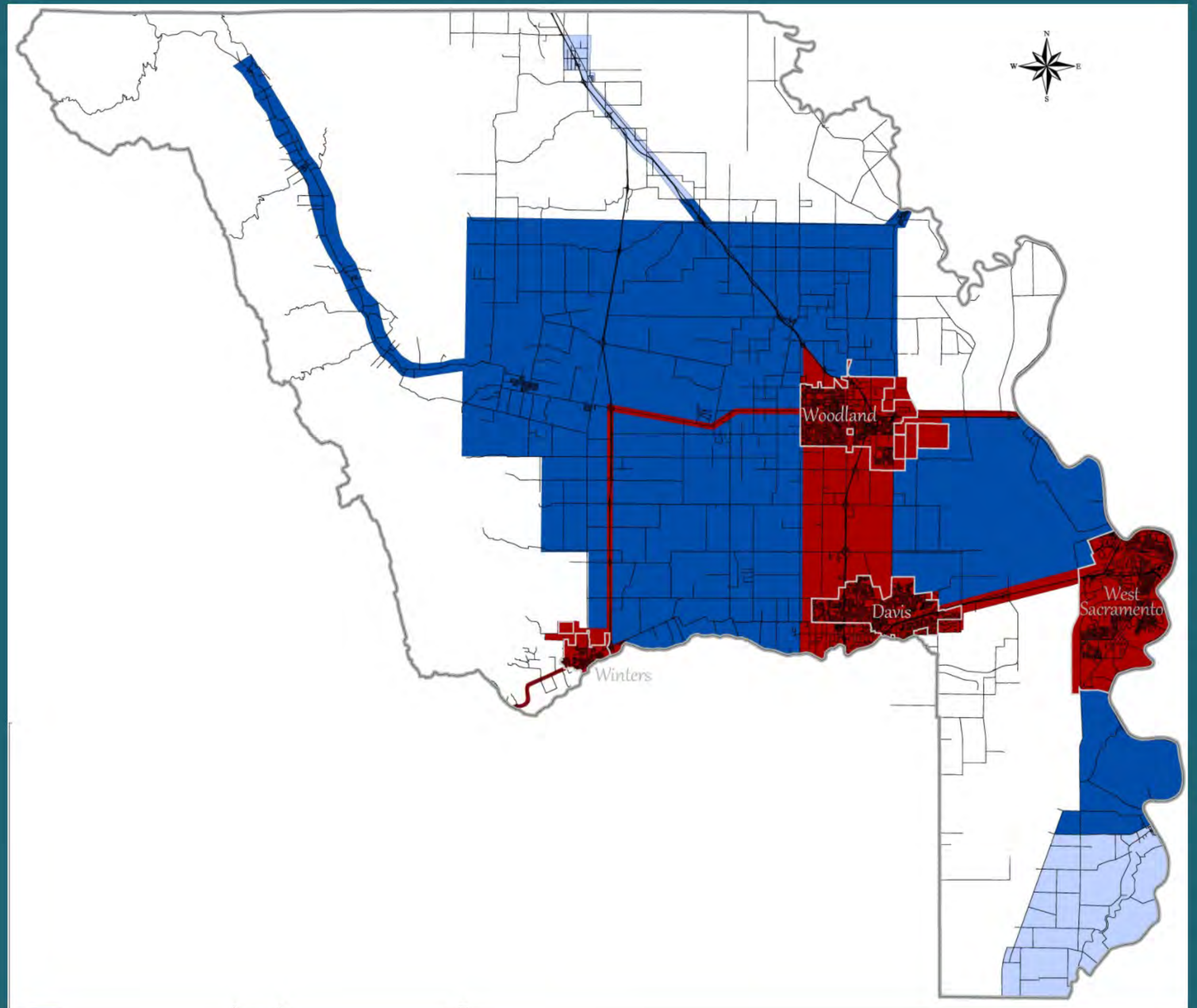
Response time requirements were established by stakeholders and representatives from the county Fire and Hospital providers. The county has four 9-1-1 response zones for ambulance-based Paramedic service. Each zone is geographically and demographically diverse, and average response times reported include urban, suburban, and rural responses. In addition to the response zones there are two response time requirements for ALS and CCT transfers from Yolo County hospitals.

HIGH RESPONSE ZONE 8 Minute Response

Davis
UC Davis
West Sacramento
Winters
Woodland

MODERATE RESPONSE ZONE 15 Minute Response

Brooks
Capay
Clarksburg
Dunnigan
Elkhorn
Esparto
Guinda
Knights Landing
Madison
Rumsey
West Plainfield
Willow Oak
Yocha Dehe
Yolo
Zamora



MODERATE-LOW RESPONSE ZONE 20 Minute Response

Clarksburg
Dunnigan

LOW RESPONSE ZONE 30 Minute Response

Brooks
Dunnigan
Elkhorn
Guinda
Knights Landing
Rumsey
Zamora

Ambulance Response Requirements

2016	Volume	Percent	Time	Required
High	18,297	95%	4:44	8:00
Moderate	1,273	97%	10:03	15:00
Moderate-Low	251	92%	17:32	20:00
Low	79	97%	16:40	30:00
ALS Interfacility	1,027	93%	16:06	30:00
CCT Interfacility	339	90%	34:53	45:00
County Wide	21,266	95%		

Response Volume
Increased 11.2%

Response Volume
Increased 3.2%

2015	Volume	Percent	Time	Required
High	16,662	95%	4:55	8:00
Moderate	1,070	95%	10:06	15:00
Moderate-Low	178	97%	17:01	20:00
Low	86	98%	13:23	30:00
ALS Interfacility	796	89%	16:54	30:00
CCT Interfacility	317	87%	32:34	45:00
County Wide	19,109	94%		

2014	Volume	Percent	Time	Required
High	16,187	94%	4:36	8:00
Moderate	1,211	93%	10:02	15:00
Moderate-Low	150	97%	16:30	20:00
Low	60	100%	17:54	30:00
ALS Interfacility	652	91%	17:45	30:00
CCT Interfacility	255	89%	38:02	45:00
County Wide	18,515	94%		

Specialty Medical Centers

Specialty Medical Centers are hospitals with enhanced capabilities to treat specific presenting problems such as trauma, burns, heart attacks (STEMI), stroke, and pediatric patients. A Base Hospital is a local hospital that provides on-line physician consult to EMS personnel. These hospitals work with Yolo County to provide specialty care when it matters most.

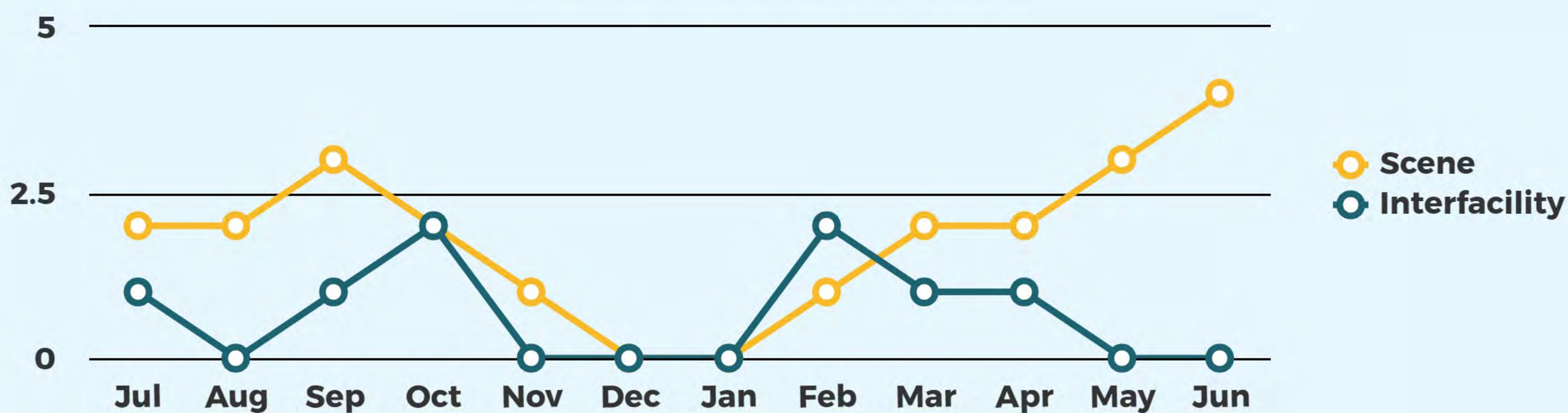
Facility	County	Base Hospital	Level I/II Trauma Center	Level III Trauma Center	Pediatric Trauma Center	Burn Receiving Center	STEMI Receiving Center	Stroke Receiving Center
Woodland Memorial Hospital	Yolo							
Sutter Davis Hospital	Yolo							
Mercy General Hospital	Sacramento							
UC Davis Medical Center	Sacramento							
Sutter Medical Center	Sacramento							
Kaiser Permanente Vacaville	Solano							
North Bay Medical Center	Solano							
Mercy San Juan	Sacramento							
Methodist Hospital	Sacramento							

Air Medical Transport

Air Medical Transport provides specialized services throughout Yolo County in response to EMS calls where Air Medical Transport is essential to getting a critically ill or injured patient to definitive care. Air Medical Transport Providers are dispatched for events in rural areas of the county, at the scene of severe traffic accidents, or when hospitals need to transport a critically ill patient to another facility. REACH and CALSTAR are authorized providers in Yolo County. Air Medical Transports make up less than 1% of patient transports in Yolo County annually.



Air Medical Transports



Certification and Accreditation

Emergency Medical Responders (EMR) are required to possess a YEMSA EMR certificate before they can practice within the county. Applicants obtain an EMR certificate by providing proof of both employment within the county and completion of training by a certifying entity. An EMR certificate obtained through YEMSA is valid for two years.

Emergency Medical Technicians (EMT) are required by state law to possess a State of California EMT certificate before they can practice. An EMT obtains a State of California EMT certificate by applying to one of California's local EMS agencies. An EMT certificate obtained through YEMSA is valid statewide for two years.

Paramedics (EMT-P) are required to obtain a California Paramedic license from the State of California EMS Authority. Once a Paramedic has obtained a license, they must accredit themselves in the jurisdiction in which they are employed. Accreditation ensures that paramedics meet minimum requirements to practice and have complied with YEMSA EMS Protocols and Policies. Paramedics are required to verify compliance and update their accreditation with YEMSA every two years.



Type of Personnel	2014	2015	2016
Emergency Medical Responder (EMR)	20	44	60
Emergency Medical Technician (EMT)	201	262	290
Paramedic (EMT-P)	154	146	150

Ambulance Permits

Yolo County EMS Agency (YEMSA) has an ordinance code regulating ambulances. The ordinance requires that each ambulance provider obtain a permit before initiating patient transport in the county. YEMSA reviews each application and inspects the applicant's ambulances to ensure public health and safety. YEMSA is also responsible for investigating alleged violations of the ambulance ordinance by permit holders and when necessary takes enforcement action to suspend or revoke an ambulance permit.

Type of Ambulance	2014	2015	2016
ALS Ambulance An ambulance staffed with one Paramedic and one EMT.	20	20	17
BLS Ambulance An ambulance staffed with two EMT's.	23	39	42
CCT Ambulance An ambulance staffed with one Registered Nurse, one Paramedic, and one EMT.	6	6	6

Disaster and Medical Surge Response Program

Disaster Preparedness brings a collaborative network of healthcare organizations as well as public and private sector response partners together to assist in medical surge incidents and disaster response and recovery efforts.



Training/Exercise/Response	Frequency
Radio/Satellite Phone/Situation-Status Drills	Monthly
Triage and Tracking Exercises	Bi-monthly
Medical Health Coalition Meetings	Quarterly
Disaster Health Volunteers Communication Drills	Quarterly
State Wide Tabletop and Functional Exercises	Annually
County Emergency Operations Center Functional Exercises	Annually

Cardiac Arrest System of Care

Cardiac arrest is one of the leading causes of death in adults. It is an electrical malfunction in the heart that causes an irregular rhythm (arrhythmia) and disrupts the flow of blood to the brain, lungs, and other organs. When a person has a cardiac arrest, survival depends on immediately getting CPR from someone nearby. Almost 90 percent of people who suffer out-of-hospital cardiac arrests die. CPR, especially if performed in the first few minutes of cardiac arrest, can double or triple a person's chance of survival. Ventricular tachycardia (VT), and ventricular fibrillation (VF), are two arrhythmias that with quick CPR and use of an AED are considered more survivable than other cardiac arrest arrhythmias.

2016 Cardiac Arrest Data

National Standard
Prehospital ROSC
21%

Pre-hospital
Return of Spontaneous
Circulation (ROSC)
All Patients
27.8%

Survival to Hospital
VF/VT Patients
45%

2015 Cardiac Arrest Data

Pre-hospital
Return of Spontaneous
Circulation (ROSC)
All Patients
36.5%

Survival to Hospital
VF/VT Patients
70 %

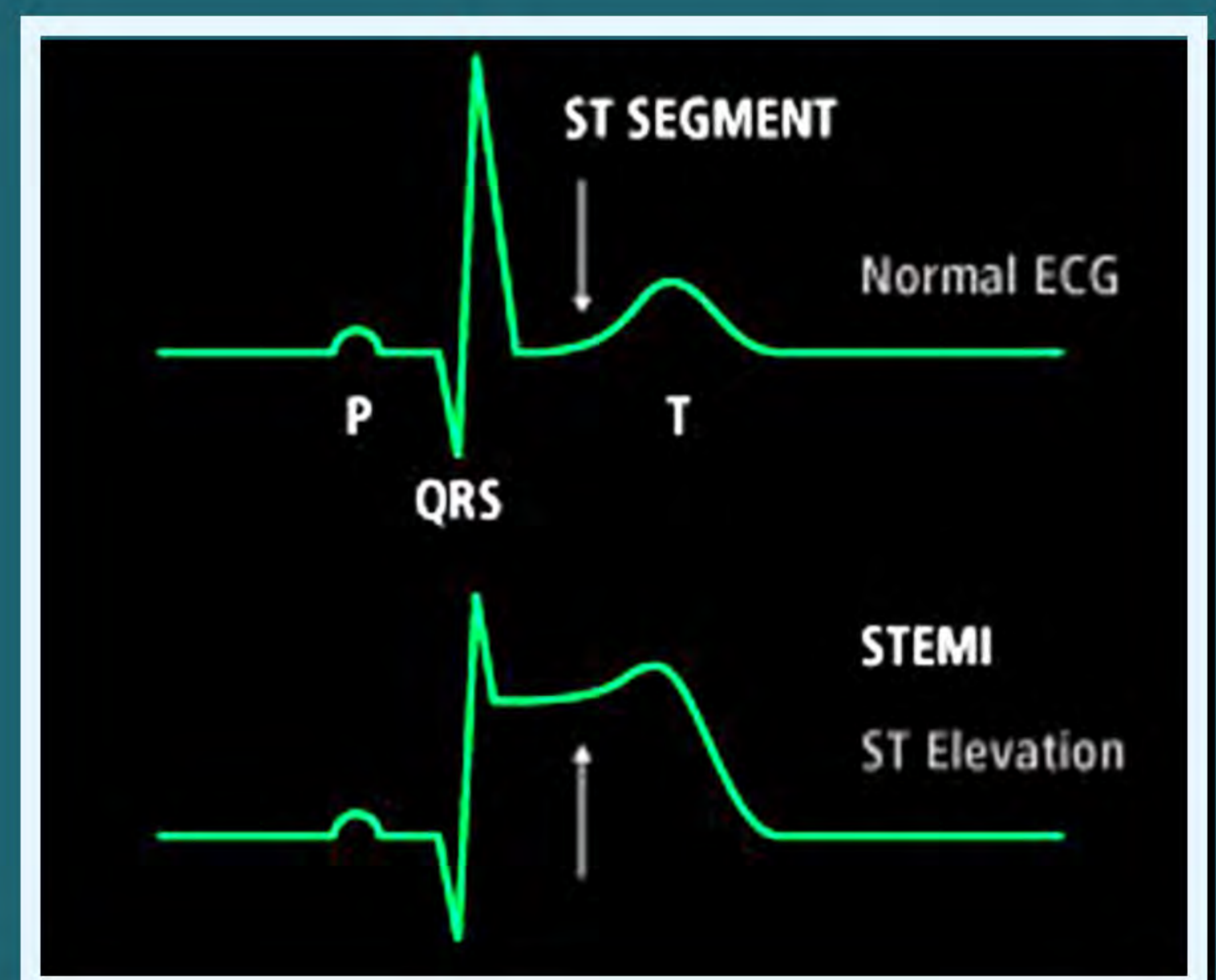
Survival to Hospital
★ Discharge
40%

National Standard
Survival to
Hospital Discharge
34%

STEMI System of Care

ST-Elevation Myocardial Infarction (STEMI), known as a heart attack, occurs when blood flow decreases or stops to a part of the heart, causing damage to the heart muscle. 12-Lead Electrocardiogram (EKG) is the process of recording electrical activity of the heart. Paramedics in the field use this as a diagnostic tool to identify a heart attack and to provide early notification to the hospital through electronic transmission. This early notification allows for the hospital to set up the Cath Lab and have all diagnostic equipment and personnel ready to perform interventional treatment.

**89 STEMI
Activations
2016**



Patient Contact to 12-Lead EKG

Average 14:57 mins 2016
Increase of 4:52 mins from 2015

**Benchmark
10 mins**

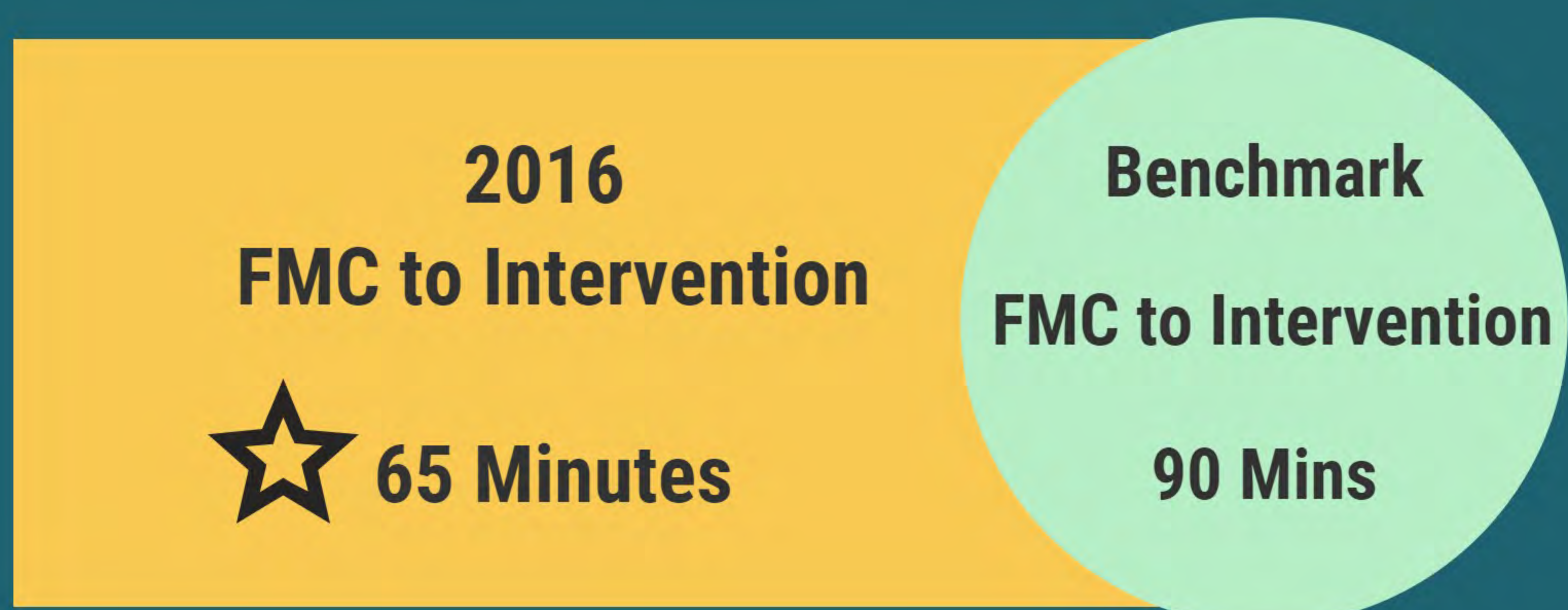
Paramedic 12-Lead Transmission to STEMI Receiving Center

95% Transmission 2016
31% Improvement from 2015

**Benchmark
90%**

STEMI System of Care

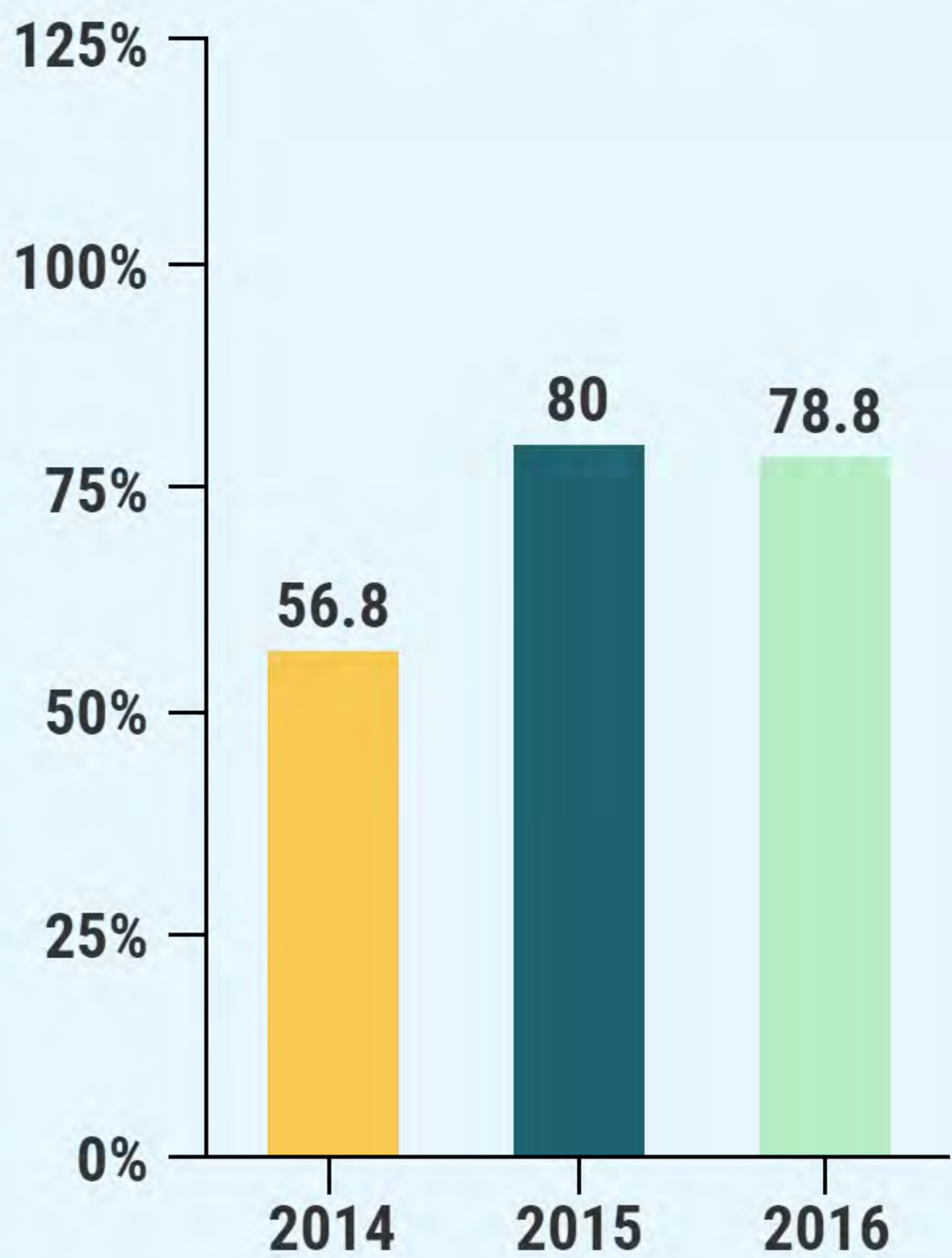
First Medical Contact (FMC) is defined as the time that EMS providers make initial contact with a patient. FMC to intervention is the time from initial contact with a patient to the time the patient receives interventional treatment. Early reopening of blocked coronary arteries reduces the amount of damage to the heart and improves the prognosis of the heart attack.



STEMI Prehospital Core Measures

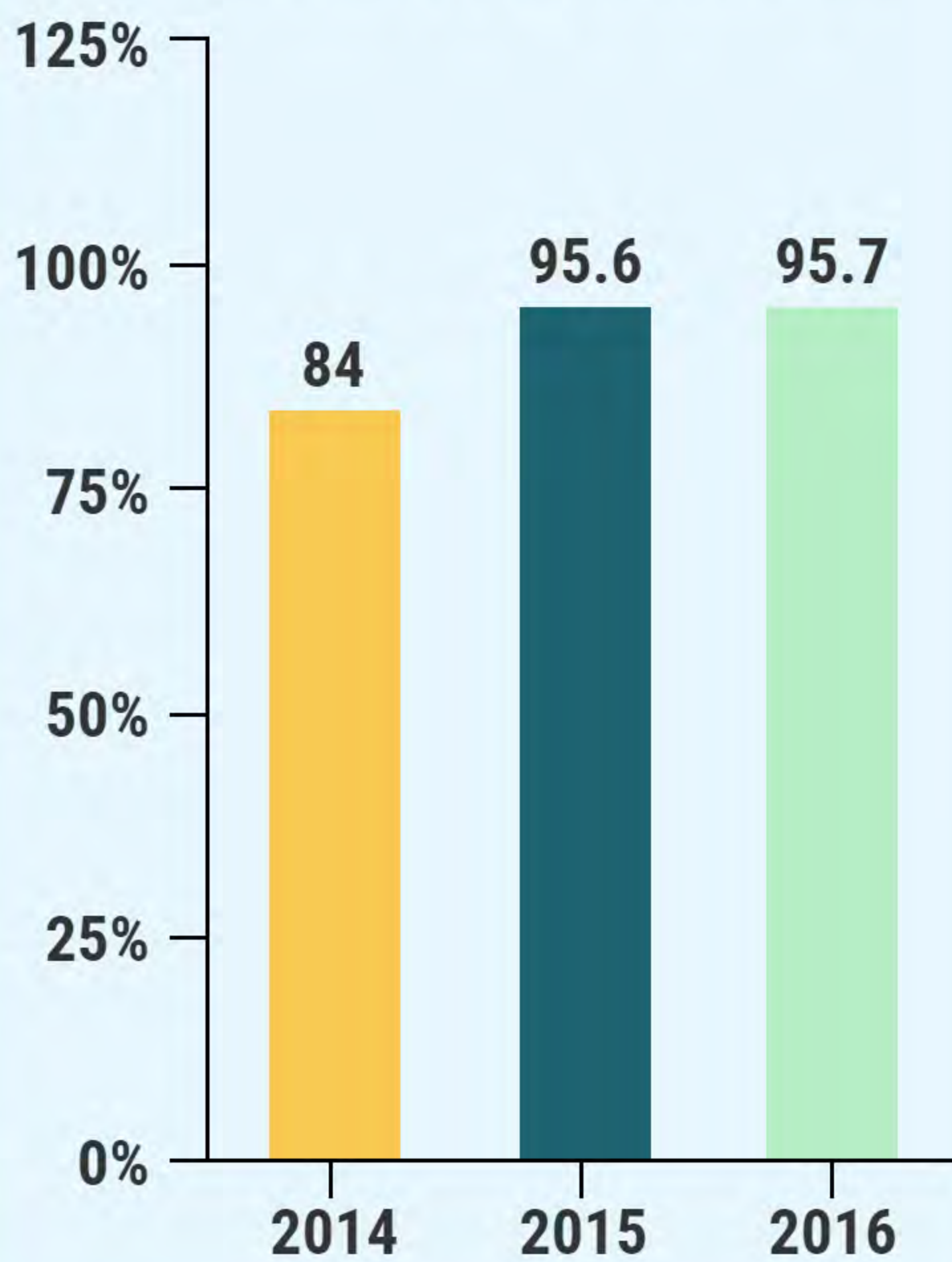
California Core Measures are a set of quality indicators that were developed through a project by the National Quality Forum to measure the performance of EMS systems. The Core Measures are established from evidence based data on processes and treatments that have proven to provide the best possible outcomes for patients. Data collected from prehospital patient care reports are measured to assure and continually seek improvements in the quality of patient care.

Acute Coronary Syndrome (ACS - 1) Patients 35 and older with suspected cardiac chest pain who receive Aspirin by EMS



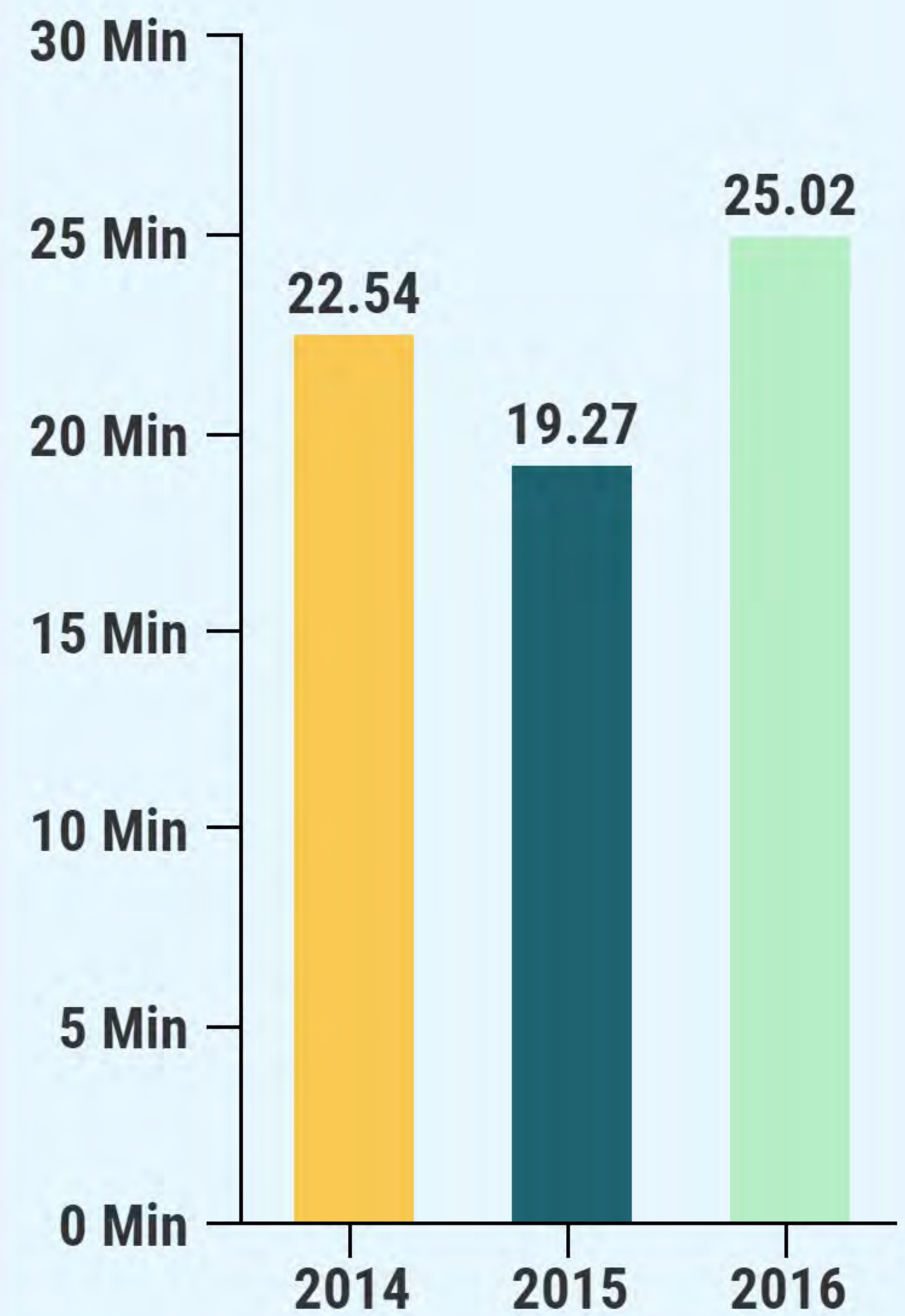
**State Average
66.2%**

Acute Coronary Syndrome (ACS - 2) Patients reporting chest pain/discomfort who have a 12-Lead ECG performed



**State Average
80.9%**

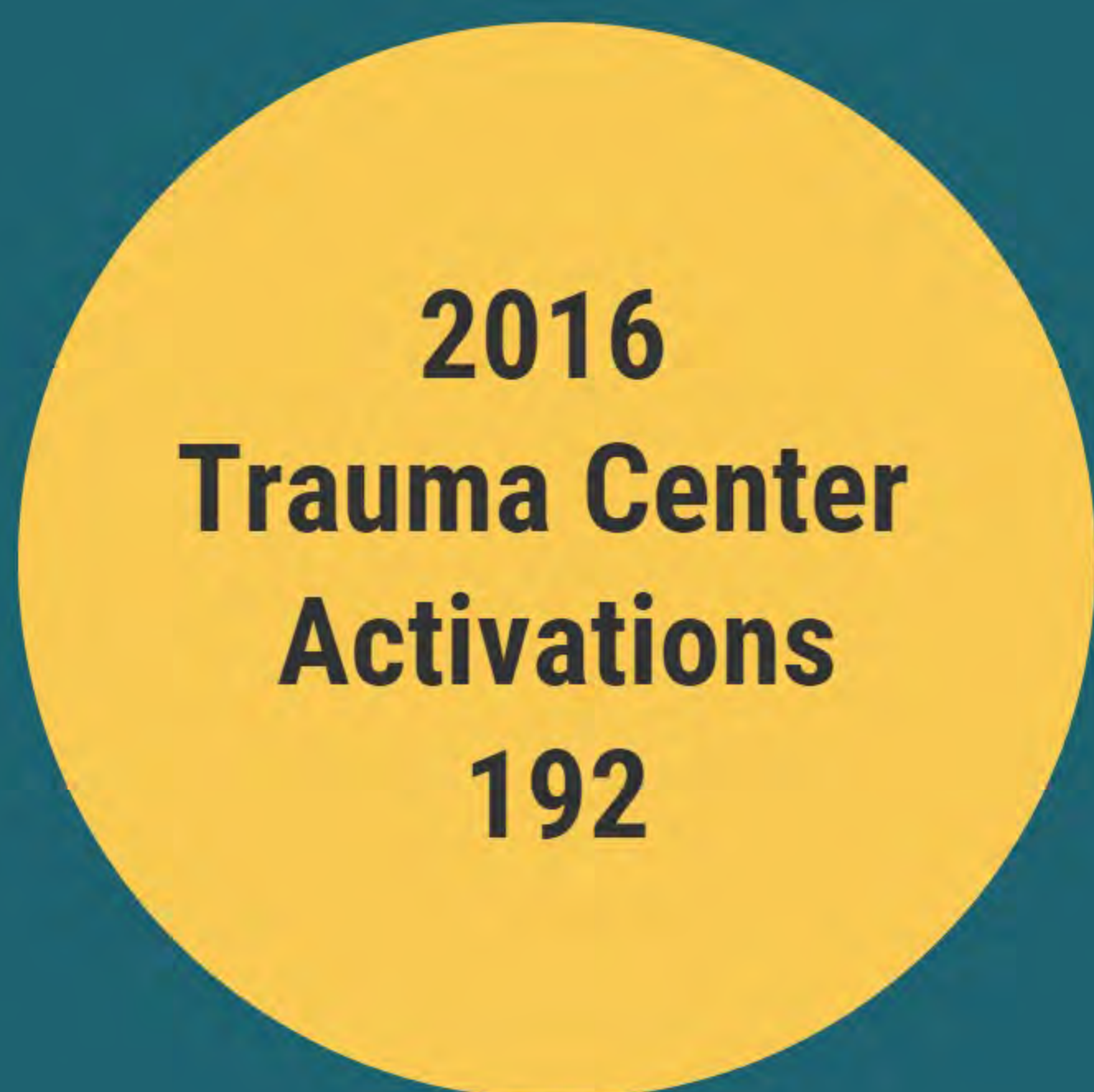
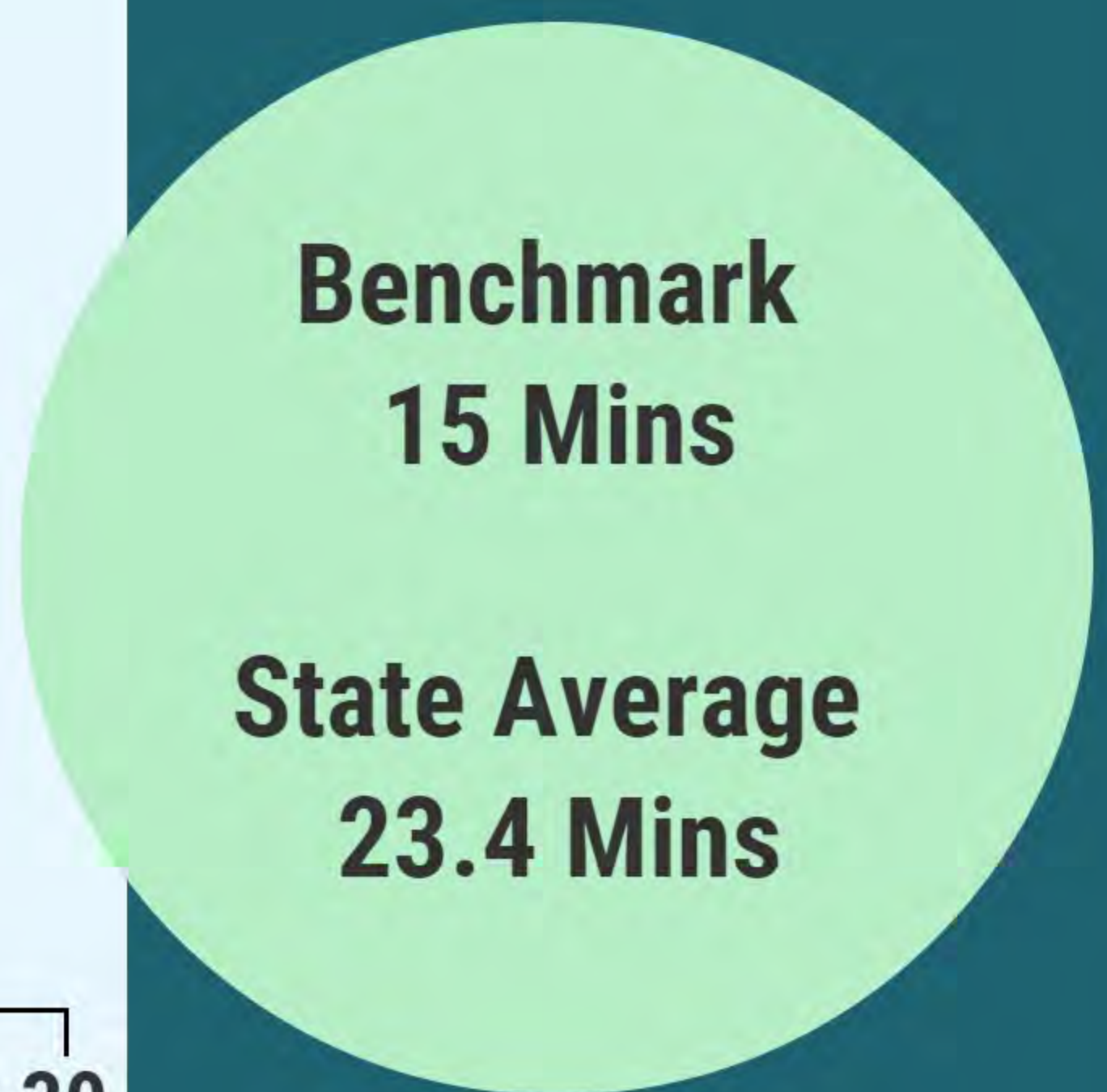
Acute Coronary Syndrome (ACS - 3) Scene time for suspected ACS patients



**State Average
22:27 Mins**

Trauma System of Care

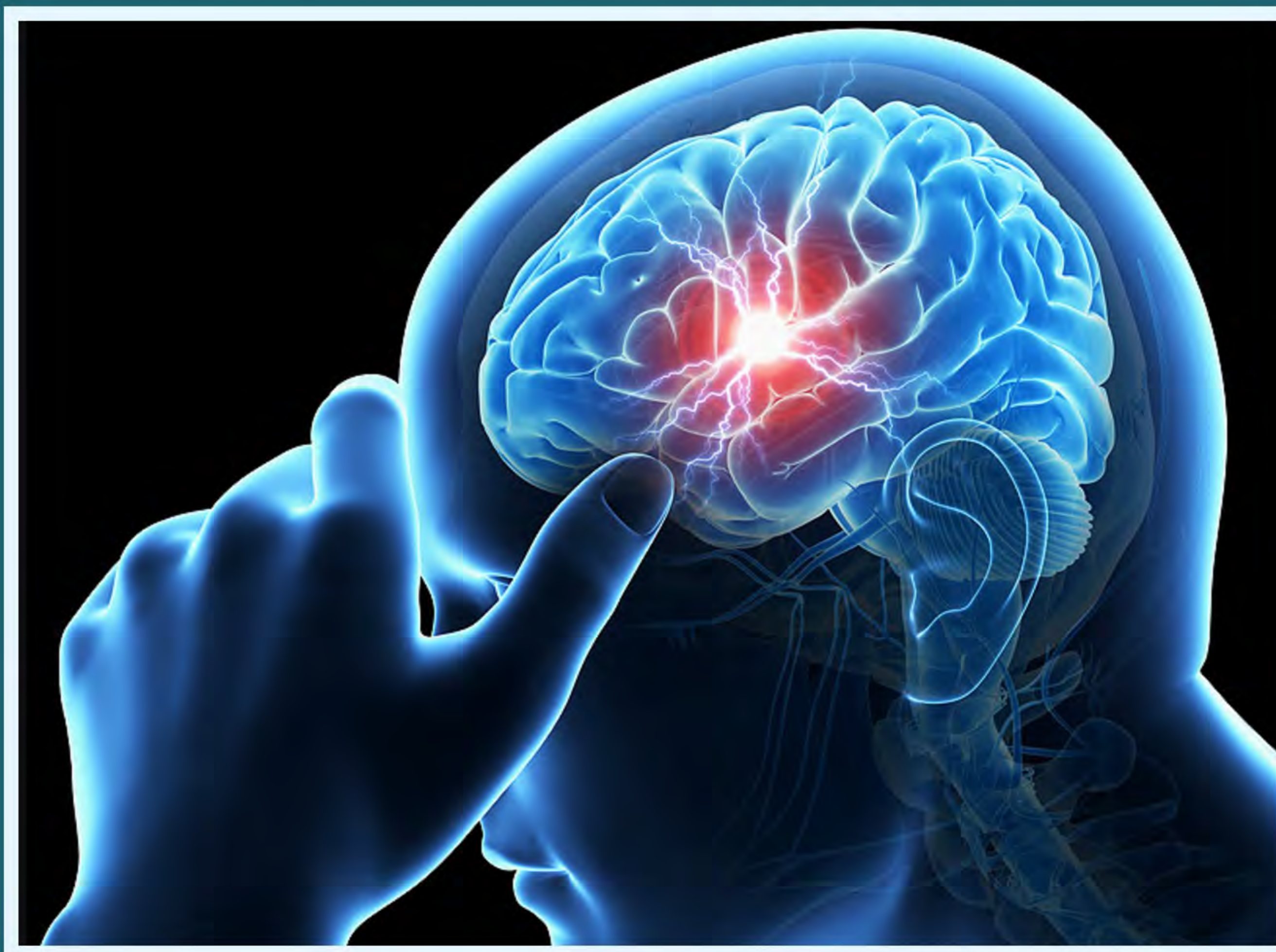
A trauma system is designed to facilitate rapid identification, management, and transport of critical trauma patients to a designated trauma center. Time is a critical factor that directly correlates to increased morbidity and mortality.



Injury Type	2016
Violent Crime	25
Vehicle Related	179
Falls	47
Machinery Related	2

Stroke System of Care

Stroke is one of the leading causes of death and disability in the nation. YEMSA stroke system of care facilitates rapid assessment and transport of patients to designated primary stroke centers. A stroke is a disease that affects the arteries leading to and within the brain. A stroke occurs when a blood vessel that carries oxygen and nutrients to the brain is either blocked by a clot or bursts (ruptures). When that happens, part of the brain cannot get the blood and oxygen it needs which leads to brain cell death. Early recognition by EMS of a stroke allows for early activation of the primary stroke center, shortens time to CT scan, and improves the timeliness of treatment.



**Benchmark
Door to CT
25 Minutes**

Average Door to CT Time

**Woodland Memorial Hospital
17 Minutes**

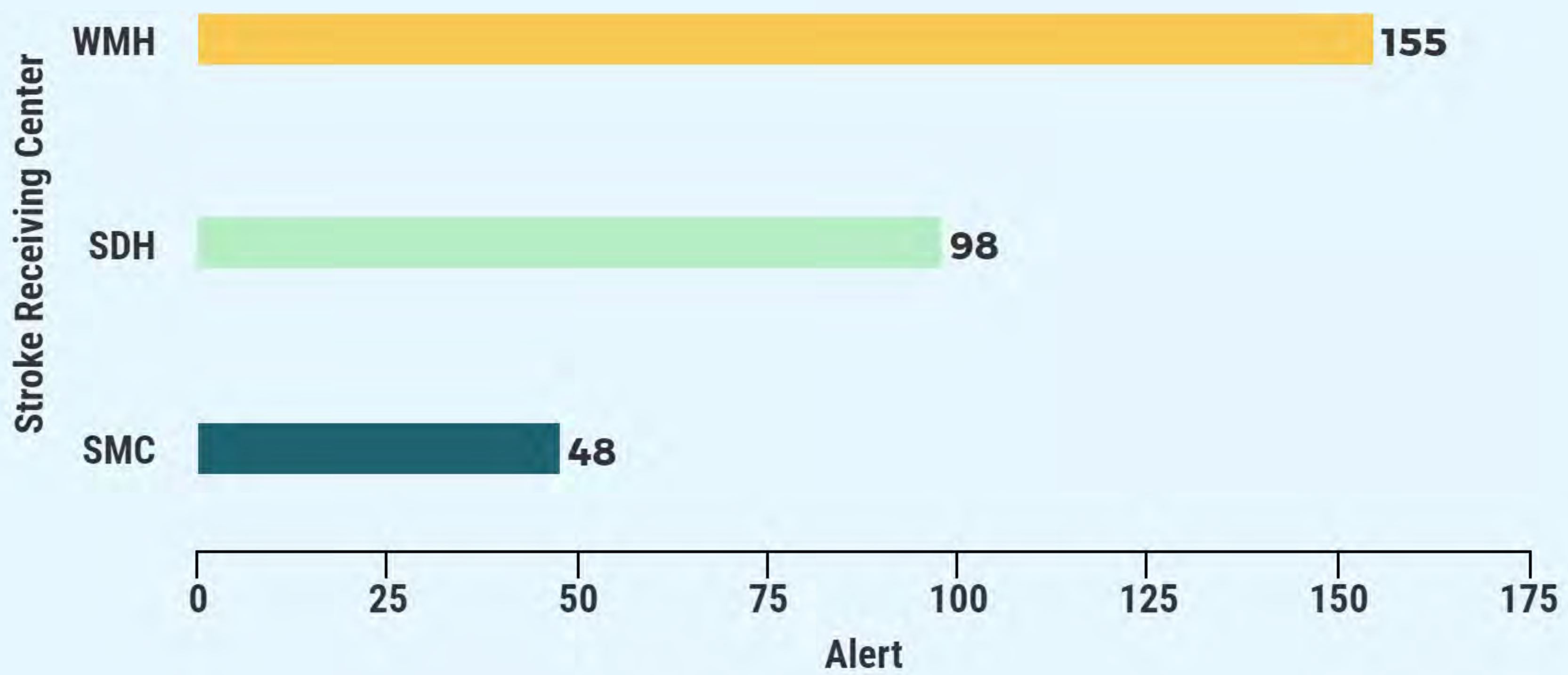
34 Minutes Faster than 2015

**Sutter Davis Hospital
6 Minutes**

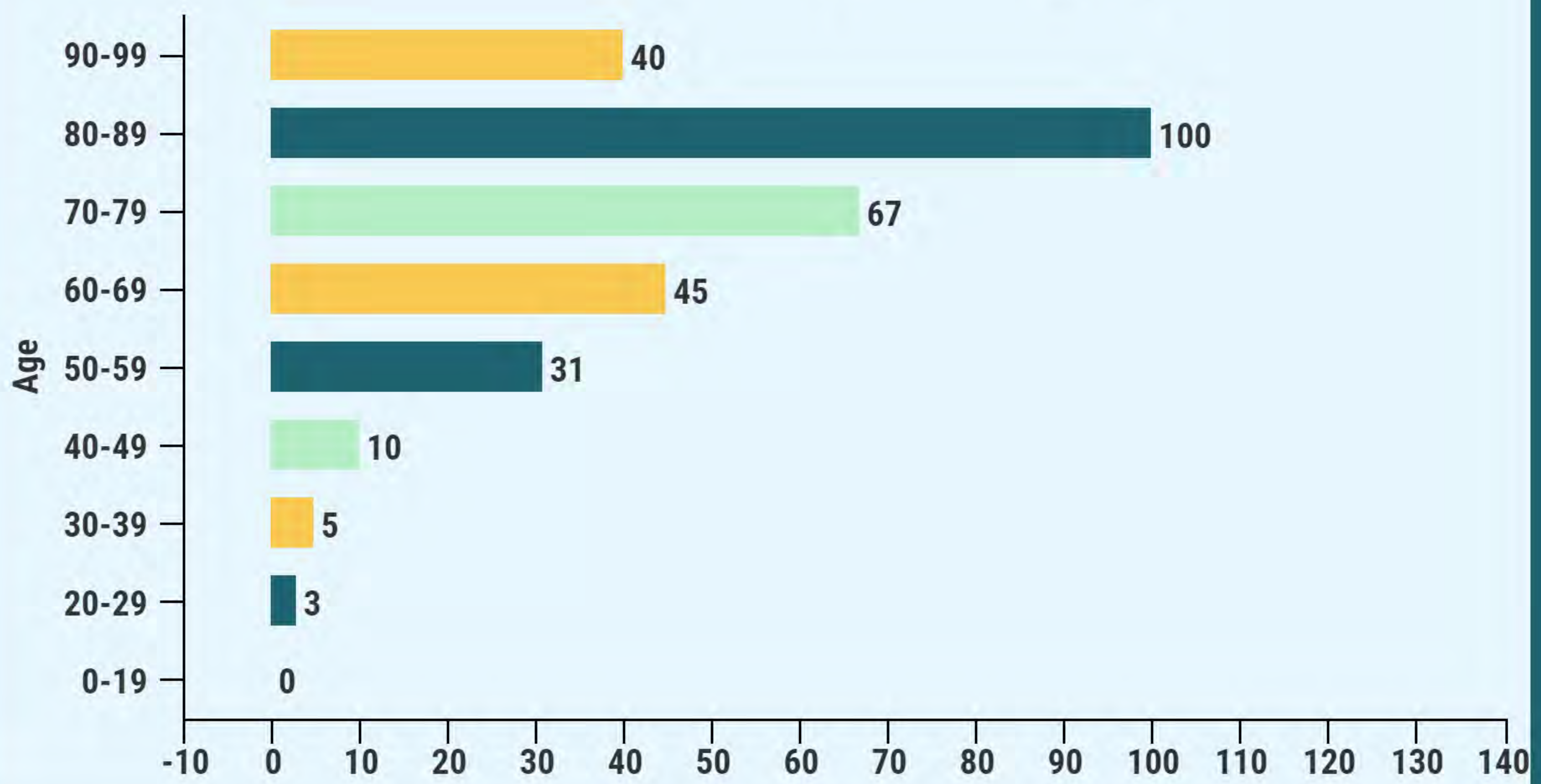
15 Minutes Faster than 2015

Stroke System of Care

Stroke Alert by EMS to Stroke Receiving Center



Age of Patients Reporting Stroke Symptoms



System Enhancements

The Yolo County Emergency Medical Care Committee (EMCC) has created a sub-committee of its members to create priority recommendations for the utilization of Yolo County EMS Agency penalty fees. These fees are used to enhance the EMS system through partnerships, training, memberships, and software tools.

LEMSA Resources

Memberships
Medical Director

Training

Mindflash
Go Animate
AHA Training
Symposium
Sponsorships

Fire-EMS Software

Code Stat
Pulse Point
YEMSA App

Partnerships

YECA EMD-Q
UCD Training



System Enhancements



Targeted toward off-duty professionals and citizens trained in CPR, the PulsePoint app alerts users when a cardiac arrest occurs in a community, directs them to the location, and provides CPR guidance while EMS is en-route.



Someone has collapsed and needs CPR



App users in the area are alerted that CPR is needed



Users rush to help victims before EMS arrives

For every MINUTE that passes before help arrives, sudden cardiac arrest survival odds decrease by 7-10%

Fire Districts	Total Users	Users Signed up for CPR Alerts
Capay Valley Fire	337	203
Dunnigan Fire	403	245
Madison Fire	462	269
UC Davis & Davis Fire	3554	1616
West Plainfield Fire	437	240
West Sacramento Fire	1711	951
Willow Oak Fire	758	373
Winters Fire	732	406
Woodland Fire	1880	853
Yocha Dehe Fire	419	253
Yolo Fire	820	440
Yolo EMS	1473	690
Total	12,986	6,539

12,986 Yolo County Citizens have downloaded the app!

System Enhancements

Mass Casualty Incident Training Event



The Mass Casualty Incident (MCI) bus rollover full-scale training exercise that was created to observe and test the capabilities of a multi-agency response involving all stakeholders within the Yolo County emergency response area. The drill was designed to test the emergency response system in its entirety and to observe the setup of command, triage, patient management, and transport during a full-scale drill.



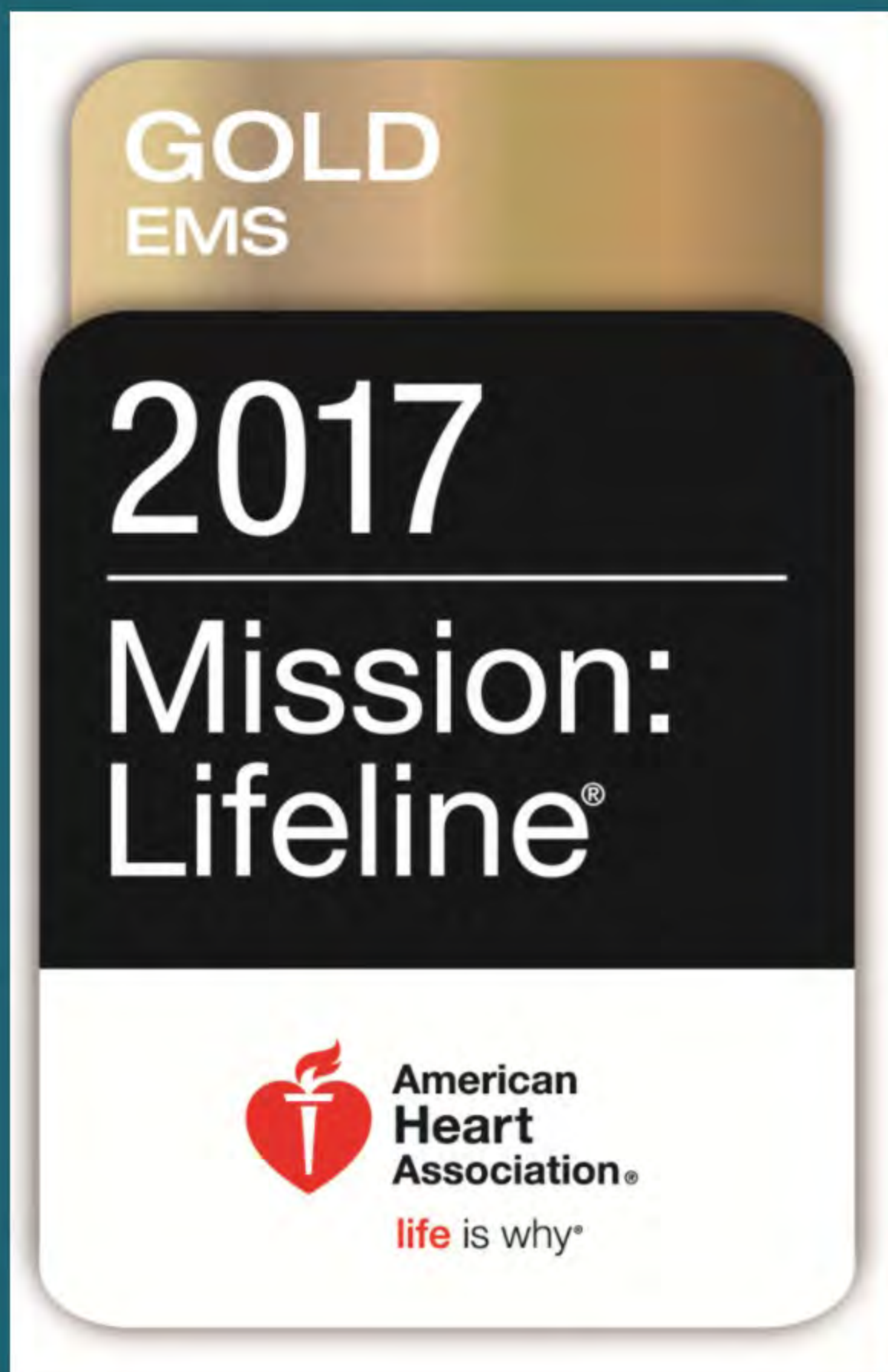
The drill was coordinated by bringing the major stakeholders from the West Valley Regional Fire Training Consortium (WVRFTC), American Medical Response (AMR), Yolo County EMS Agency (YEMSA) and Emergency Preparedness. The event identified both strengths and areas for improvement. A after action plan was created by the WVRFTC to provide an improvement plan for the system.



Community and Education



YEMSA Received the Mission: Lifeline EMS Gold Recognition Award



Achievement: Percentage of patients with non-traumatic chest pain greater than (>) 35 years, treated and transported by EMS who received a prehospital 12-Lead Electrocardiogram (ECG).

Achievement: Percentage of STEMI patients treated and transported directly to a STEMI Receiving Center, with prehospital first medical contact (FMC) to device time less than (<) 90 minutes.

Achievement: Percentage of eligible STEMI patients treated and transported to a STEMI receiving center for fibrinolytic therapy with a door-to-needle time < 30 minutes.

Note: Each measure must achieve at least a 75% compliance rate for the year per award level and be eligible for recognized status.



Implemented a CPR Data Collection Program

The cardiac monitors used by EMS providers collect data on rhythms, compressions, ventilations, and shocks provided during cardiac arrest. CPR reports are generated from the data to give feedback to EMS personnel on the treatment provided. This is an opportunity for EMS providers to recognize high quality cardiac arrest care and see precise opportunities for improvement.



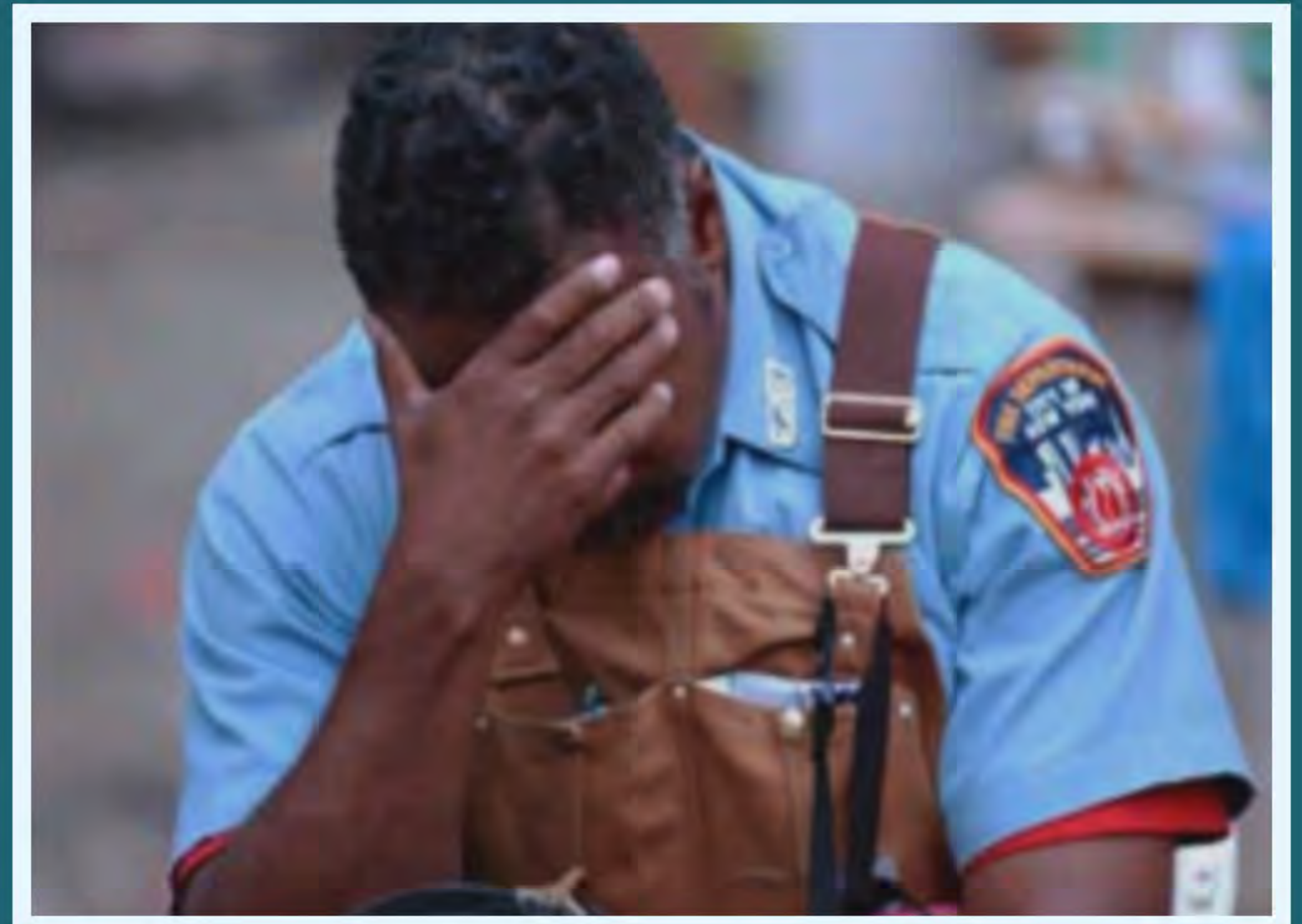
Collaboration and Partnership

Partnership with Yolo County Mental Health Services

YEMSA has partnered with the Yolo County Mental Health Department to better provide mental health services in the prehospital setting. When an EMS crew is called to a patient with a mental health crisis, they will be able to contact a rapid response crisis team who will respond, assess the patient, and create a service plan. This will connect them with the services they need and prevent unnecessary overload in Emergency Departments.



YEMSA and Yolo County Mental Health have also partnered to provide services to first responders who have been involved in a difficult call. There will be a counselor available 24 hours a day and debriefings will be offered to help address emotional trauma that can occur from witnessing or being part of an unfortunate event.



Collaboration and Partnership

Partnership with Yolo County Skilled Nursing Facilities and Hospice to develop a Palliative Care Plan



Palliative care is defined as non-curative care and support services for patients with terminal illnesses and their families. The optimal goal of palliative care is to provide comfort to the patient prior to death, regardless if treatment actually prolongs life expectancy. YEMSA, in partnership with Hospice and skilled nursing facilities, is implementing protocols to address the unique needs of these patients and provide guidelines for EMS responders called to care for them.



Community Response

Due to unprecedented rainfall the Oroville Dam emergency spillway was used for the first time in its history on February 11, 2017. On Sunday, February 12, 2017, imminent failure of the emergency spillway with subsequent flooding was anticipated. Oroville, Gridley, and surrounding communities were evacuated resulting in the evacuation of over 180,000 people. Due to the large number of evacuees passing through Yolo County the CAO authorized the opening of an evacuation center at the Yolo County Fairgrounds. Approximately 596 people came to the shelter after being turned away from other shelters that were already at capacity. In addition to the 596 evacuees, another 124 people and their 8 medical providers from a skilled nursing facility in Yuba City were sheltered at the fairgrounds. Yolo County used the Incident Command System (ICS) to organize the evacuation center in partnership with Emergency Preparedness, EMS, local first responders, and many volunteers. There was also a donation station set up where the general public could bring clothing, food, water and other necessities for the evacuees.



Future System Enhancements



ReddiNet is a web-based emergency medical communications system that is used to report hospital, patient, and emergency event status. ReddiNet is used by hospitals, EMS, first responders, and other health care providers. Yolo County will use ReddiNet during MCIs and other large scale events to provide incident notification, emergency room capacity, estimated number of victims, ambulance dispatch arrival, victim status information, victim identification, and family reunification.



Future System Enhancements

FIRST WATCH®



FirstWatch turns raw data into useful, actionable information to improve operations, performance, clinical measures, and provide early warning for crucial events. FirstWatch uses automated EMS-centric reporting and real-time, web-based data visualization tools. User-defined data filters called triggers help monitor performance against defined operational objectives. Real-time data is displayed in dashboards and can be accessed on any mobile device connected to the internet. FirstWatch makes this data available to all agencies participating in the EMS system.



Future Community and Education

First Annual EMS Symposium



YEMSA is excited to host its first annual EMS Symposium in 2018. The goal is to offer educational material based on current topics and best practice guidelines while enhancing and embracing clinical excellence. This event will provide an opportunity for EMS responders to come together to share ideas and learn new and innovative medicine that will enhance their clinical care in the communities they serve.

Educational Sponsorships

YEMSA is sponsoring Yolo County EMS, Fire, and Hospital providers to attend the 2017 California Emergency Medical Services for Children (EMSC) Pediatric Conference.



Future Health Improvements

Cardiac Arrest Registry to Enhance Survival (CARES)

Starting January 2018 Yolo County EMS will be participating in a national cardiac arrest survival registry program which allows for comparative benchmarking and improvement in cardiac arrest emergency care. Through our partnership with CARES, we will collect uniform and reliable outcome information that will help make significant changes to enhance the delivery of CPR by bystanders and improve pre-hospital cardiac arrest care in our communities. CARES data shows that patients are more likely to survive to hospital discharge when they receive care that met or exceeded the CARES standards.



Future Health Improvements

Approval for California Tranexamic Acid Trial Study

Starting January 2018 all accredited Paramedics working in Yolo County will participate in a trial study to improve outcomes for blunt trauma patients. The number one cause of death in blunt trauma is hemorrhagic shock, and the use of Tranexamic Acid (TXA) has been shown to reduce mortality in bleeding trauma patients. Based on historical trauma data and outcomes in Yolo County, blunt trauma is the most common type of traumatic injury, making us an ideal location to participate in the study.



Yolo County EMS Agency



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