



This is an EMS System response report for the communities of Clayton, Lafayette, Martinez and Walnut Creek. Each community experienced a fire station closure on January 15, 2013.

The Contra Costa EMS System and Fire Station Closures: Impact and Mitigation

A Report Prepared by: Contra Costa
County Emergency Medical Services
August 12, 2013

Background

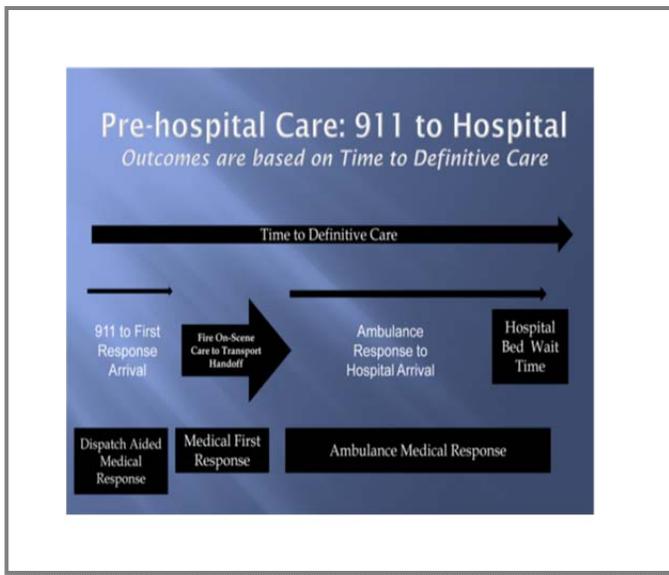
On January 15, 2013 at 0800 the Contra Costa County Fire Protection District (CCCFPD) closed four of its 28 fire stations serving the communities of Clayton (Station 11), Lafayette (Station 16), Martinez (Station 12) and Walnut Creek (Station 4). An Emergency Medical Services (EMS) Incident Action Plan was developed in partnership with CCCFPD and the County's contracted 9-1-1 ambulance service provider American Medical Response (AMR), to mitigate the impact of these changes.

This report reflects consolidated EMS System response data for the affected communities. Fire Service delivery reports are available through CCCFPD. The Contra Costa County EMS Agency is issuing this report as the local authority responsible for the coordinated oversight of the EMS System, contracted 9-1-1 ambulance services and the practice of pre-hospital medicine in the field.

How the EMS Agency Evaluates Local and System Impacts

When medical first response¹ capabilities change, the EMS Agency reviews the impact based on coordination of services in the following areas:

- System-wide
- Emergency Response Zones
- City Response
- Patient Response
- Patient Outcome
- Time-to-definitive care



Fire station closures result in a reduction of first medical response capability. Under its current

configuration the Contra Costa EMS System is not designed to replace or duplicate first medical response provided by fire agencies with ambulance services. However, collaborative efforts coordinated by EMS in partnership with CCCFPD and AMR attempted to reduce the impact of these changes. The EMS Agency focuses on strategically matching patient need with EMS System resources to protect public safety. Those efforts include:

Dispatch	Deployment modifications to preserve fire first medical response for the most critical calls
First Medical Response	Use ambulance-only response to locations with trained medical staff available, e.g. clinics Expand public access (AED) and by-stander CPR Hands-only programs Expand voluntary law enforcement AED participation
Ambulance	Modify posting locations for optimal mobile deployment of paramedic ambulances
Hospital	Expedite transfer of care from ambulance crews to hospital staff within 20 minutes

¹ The National Fire Protection Agency (NFPA) defines medical first response as dispatched aided CPR, bystanders trained in CPR and AED use, Fire EMS first responders (EMT, Paramedic), Law Enforcement with AEDs.

EMS System Protective Measures

- ❑ Provide CPR and basic life support training (*HeartSafe Communities*)
- ❑ Law Enforcement Automated External Defibrillators (AEDs)
- ❑ Public Access AEDs
- ❑ Public Education: Early recognition of heart attack and stroke
- ❑ Stroke and High Risk Heart Attack Systems of care
 - ❑ Time is brain, time is muscle
- ❑ Well established local Trauma System of over 20 years
- ❑ Comprehensive patient safety, medical quality and oversight
- ❑ EMS and Hospital cardiac arrest protocols that increase survival
- ❑ Ambulance response service reliably “exceeds” response time requirements
- ❑ Dynamic deployment of ambulance resources
- ❑ Multi-Casualty and Medical Surge Plans that are regularly tested
- ❑ Local hospitals cooperation in rapid offload of patients arriving by 911 so critical resources can return to availability

The Contra Costa EMS System continues to provide a reliable level of pre-hospital care and emergency ambulance service throughout the county.

Specialized systems of care for Cardiac Arrest, Trauma, High Risk Heart Attack (STEMI) and Stroke are known to save lives and reduce injury.

EMS Systems evaluate their effectiveness on time to definitive care and patient outcome.

First Medical Response Time Reports

- The National Fire Protection Agency “goal” for EMS first “medical” response is 8 minutes.
- The County EMS System response “goal” for paramedic first response is 10 minutes.²
- Response times reflect coordinated EMS capabilities associated with deployment of community based fire stations and ambulance services.
- The community reports show fire first medical response and ambulance response for each community before and after fire station closures.
- Response time by city is measured from the time the unit is dispatched to the time the unit arrives on scene. (This response metric is different than response times used by fire to measure fire service delivery based on fire industry standards of cover).
- The reports represent Code 3 “critical” urban responses (lights and sirens) by city.
- Interpretation of the data may be limited when small numbers are involved, but becomes more reliable over time.
- City-based EMS response times may vary from the experience of the community closest to the affected fire station.
- The private ambulance provider deploys ambulance resources to meet contracted response requirements by time of day and seasonal variations as part of normal operations.
- It is normal to see wide response time variations in areas where overall call volume is especially low.
- Response times are affected during busy times in the EMS system when fire and ambulance resources are stretched.
- 9-1-1 calls are primarily dispatched Code 3 (lights and sirens) to support rapid medical first response, yet only 7-13% of EMS calls require Code 3 ambulance transports (due to critical patient condition).

² The 10-minute paramedic response “goal” was established with the EMS system design approved by the Board of Supervisors in 2004.

911 Dispatch Call Processing Public Safety Answering Point (PSAP)		
Primary PSAP	Local Law PSAP: determines if the call is police, fire or medical and then transfers to fire-medical dispatch	15-30 seconds
Secondary PSAP	Contra Costa Fire Dispatch: Performs Emergency Medical Dispatch screening to determine critical or non-critical nature of the call and deploy appropriate resources.	72 seconds 90% of the time (2011 data)
Ambulance Dispatch	AMR Dispatch: Assigns ambulance resources to the call as needed. Computer aided dispatch systems are linked between Fire Medical and Ambulance Dispatch entities to enhance rapid EMS resource deployment	15-30 seconds

9-1-1 calls are routed through a primary PSAP, and then passed through the secondary PSAP and ambulance dispatch. Routing of 9-1-1 calls for emergency medical services, determining the appropriate level of first medical responders and ambulance and deploying EMS resources typically takes between 102 seconds (1.7 minutes) to 132 seconds (2.2 minutes).

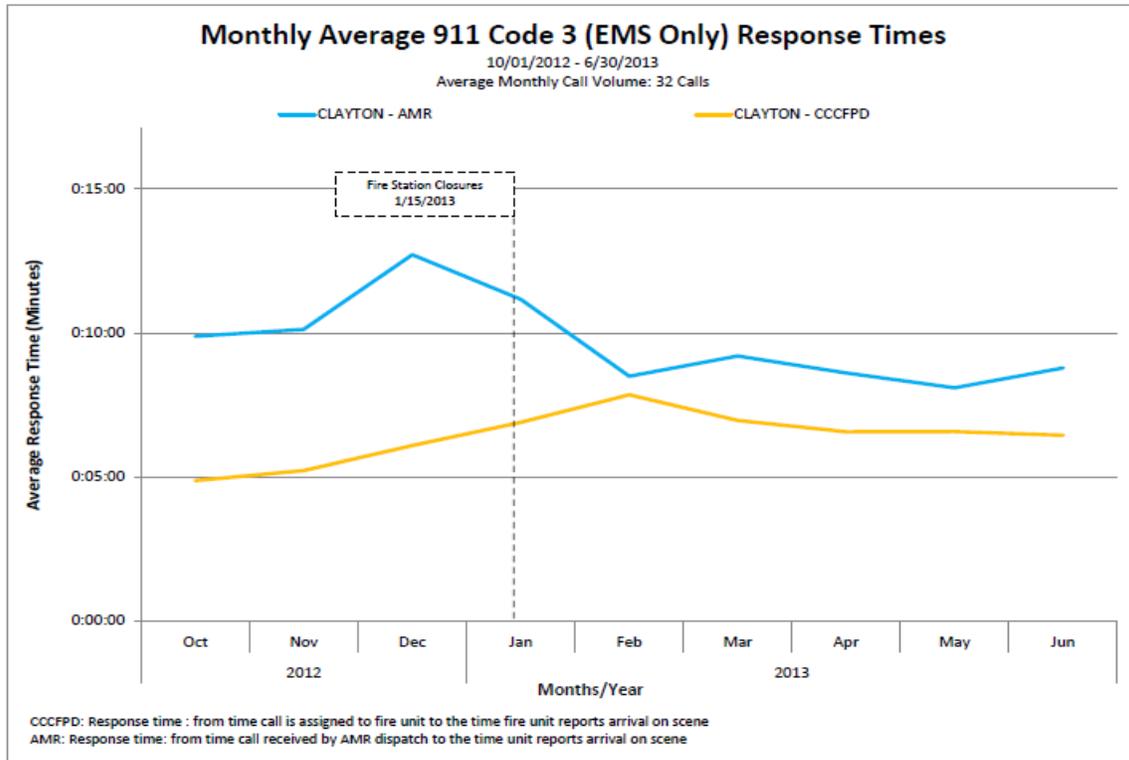
County Ambulance Response Zone Requirements				
Contracted Response Requirements in Minutes	Code 3 Urban (lights and sirens) @ 90%	Code 3 Rural (lights and sirens) @ 90%	Code 2 Urban (non-urgent) @ 90%	Code 2 Rural (non-urgent) @ 90%
Emergency Response Zone C	11:45 Minutes	20:00 Minutes	30:00 Minutes	45:00 Minutes

Cities affected by fire station closures are located in Emergency Response Zone C. Zone C corresponds to the Contra Costa County Fire Protection District first medical response area. The County ambulance contract requires American Medical Response to comply a 90% response standard of 11 minutes 45 seconds for all Code 3 (lights and sirens) calls.

Community	9-1-1 Ambulance (AMR) Response Performance Average Response Times for Code 3 Urban Responses Displayed as minutes: seconds	
	2011	2012
Clayton	10:56	9:16
Lafayette	9:02	9:04
Martinez	8:36	8:34
Walnut Creek	7:53	7:58

Contra Costa Fire first responder times are measured by the fire district as the time from the station alert to the time on scene based on the location of the fire station. The Fire District overall response times for the affected communities during 2011 (prior to fire station closures), was between 5:08 and 7:48 minutes.

The Community of Clayton



On January 15th Clayton Station 11 closed except from 2pm to 8pm Monday through Saturday and the following units were assigned to respond under automatic/mutual aid as the closest resource:

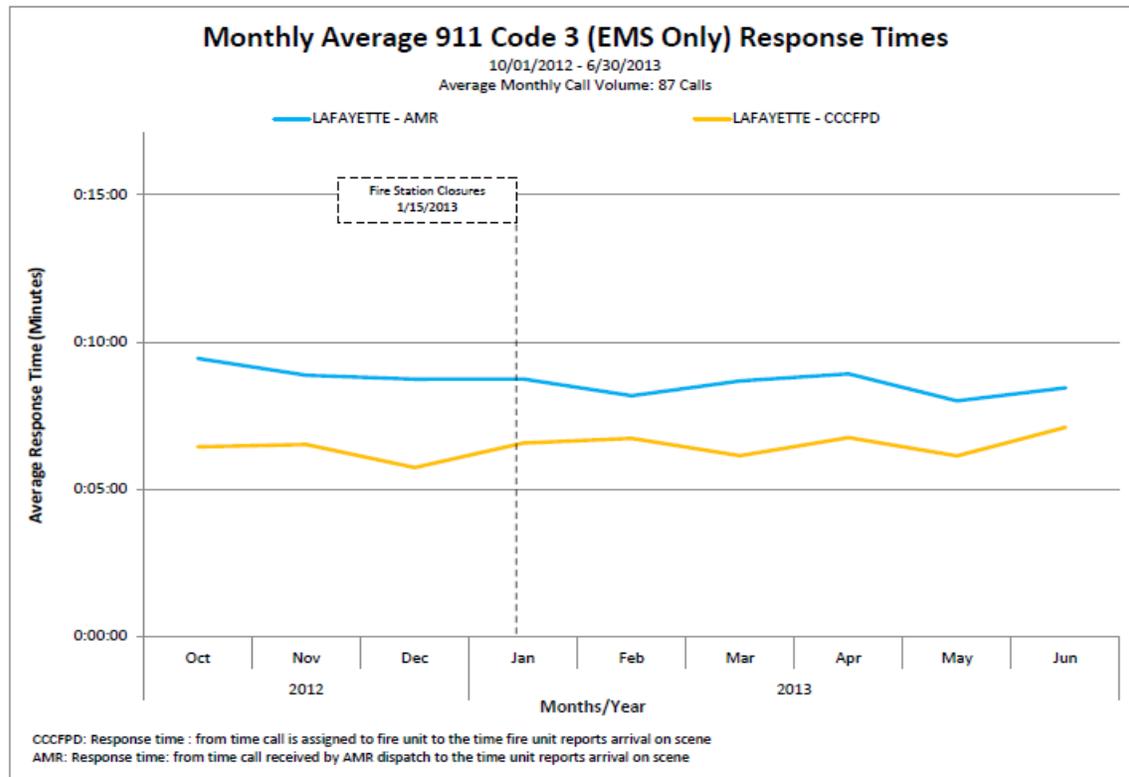
- Station 8 (Clayton Road): 3.3 miles away with a 6 minute travel time
- Station 22 (Crystyl Ranch): 3.6 miles away with a 7 minute travel time
- Station 51 (Marsh Creek) : 5 miles away with a 7 minute travel time

Clayton is a community of approximately 10,987 residents, with an average of 525 EMS responses per year or 48 EMS calls per 1000 population. The city averages to be approximately 1 EMS call per day throughout the year. In 2011, 380 of Clayton's 911 calls were code 3 (lights and sirens) responses with another 145 code 2 (non-critical).

Average AMR response time for the city of Clayton has been between 9 and 10 minutes. In 2012 the average AMR response time for urban Clayton was 9:16 minutes. Fortunately, only 7% (approximately 36 calls per year) required critical transport (code 3 lights and sirens) to the hospital.

After the Station 11's partial closure Clayton's monthly EMS call volume averaged 32 calls. Fire first medical response times increased approximately 1-2 minutes while ambulance service level improved 1-2 minutes compared to previous service levels. Modifications to ambulance unit posting were implemented in response to fire station closures. In addition, partial staffing of Station 11 was implemented, reducing the community impact. However, interpretation of response data is limited due to the small call volume, location of the call, time of day and seasonal variations. The EMS agency continues to monitor the fire and ambulance response times in all affected areas.

The Community of Lafayette



On January 15th Lafayette Station 16 was closed permanently and de-staffed. The following units were assigned to respond under automatic/mutual aid as the closest resource:

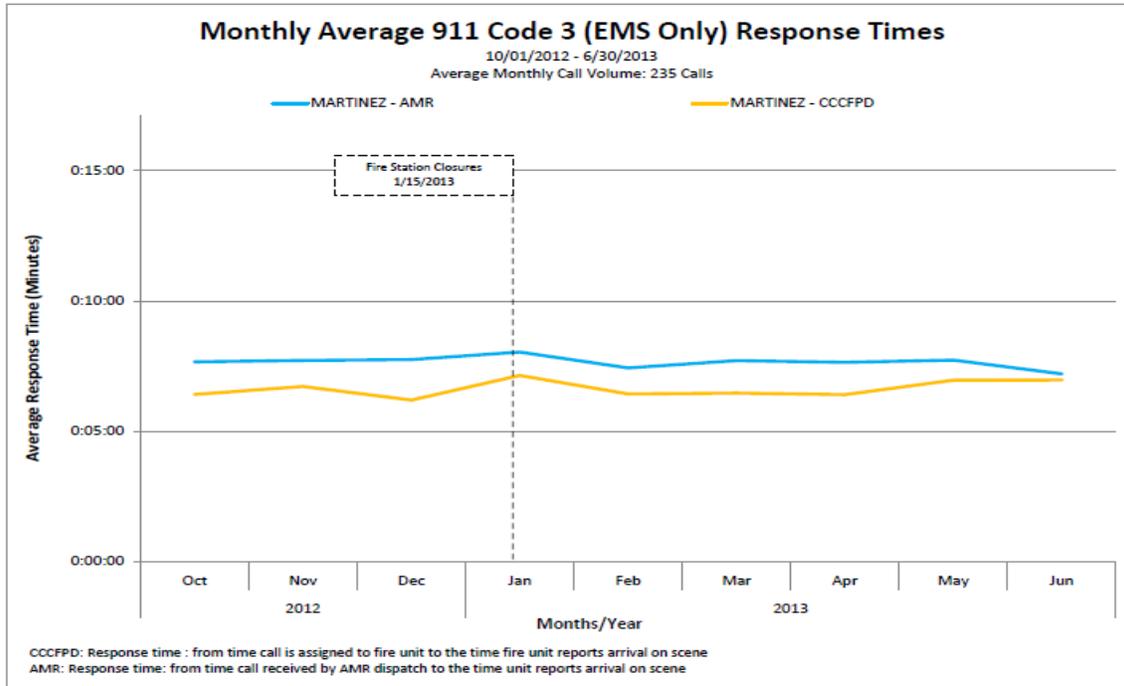
- Station 43 (Charles Hill Road, Orinda) : 1.7 miles away with a 4 minute travel time
- Station 15 (Mt. Diablo Blvd): 3 miles away with a 8 minute travel time

Lafayette is a community of approximately 23,893 residents, with an average of 1325 EMS responses per year or 55 EMS calls per 1000 population. The city averages to be approximately 4 EMS calls per day throughout the year. In 2011, Lafayette had 947 code 3 (lights and sirens) EMS responses and 378 code 2 (non-critical) calls.

Average AMR response time for the city of Lafayette over the last 10 years has been approximately 9 minutes. In 2012, the average AMR response time for urban Lafayette was 9:04 minutes. 8% of total EMS calls require critical transport (code 3 lights and sirens) to the hospital.

After Station 16's closure, Lafayette's monthly EMS call volume averaged 87 calls. Fire first medical response times and ambulance service levels remained relatively consistent to previous response times. Modifications to ambulance unit posting was implemented in the area. However, interpretation of response data is limited due to the call volume, location of the call, time of day and seasonal variations. The EMS agency continues to monitor the fire and ambulance response times in all affected areas.

The Community of Martinez



On January 15th Martinez Station 12 was closed. The following units were assigned to respond under automatic/mutual aid as the closest resource:

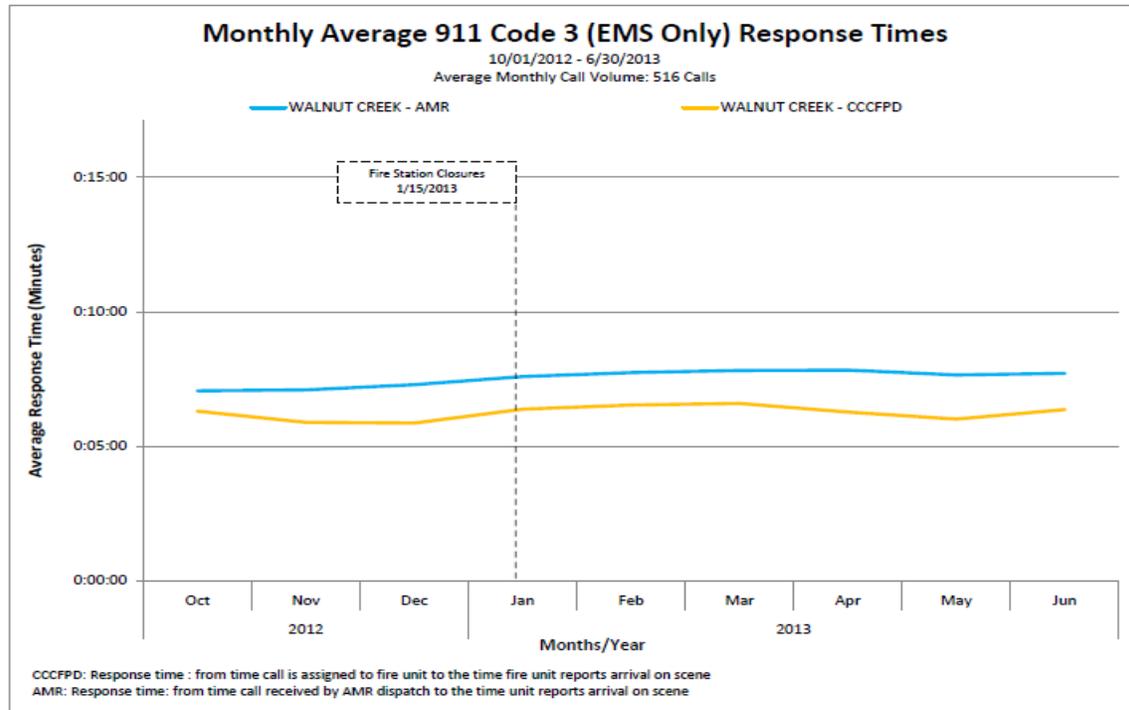
- Station 14 (Jones Street) : 1.1 miles away with a 4 minute travel time
- Station 13 (Church Street): 2.3 miles away with a 7 minute travel time
- Station 9 (Center Street): 4 miles with a 9 minute travel time

Martinez is a community of approximately 35,424 residents, with an average of 3,589 EMS responses per year or 101 annual EMS calls per 1000 population. The city averages approximately 10 EMS calls per day throughout the year. In 2011, Martinez had 2,587 code 3 (lights and sirens) EMS responses and 1,002 code 2 (non-critical) responses.

Average AMR response time for the city of Martinez over the last 10 years has been approximately 7 ½ minutes. In 2012, the average AMR response time for urban Martinez was 8:34 minutes. Only 9% of total EMS calls in Martinez require critical transport (code 3 lights and sirens) to the hospital.

After the Station 12's closure, Martinez's monthly EMS call volume averaged 235 calls. Fire first medical response times and ambulance service levels remained relatively consistent with previous response periods. Reduced deployment of fire resources to medical facilities for non-critical patients was successfully implemented preserving fire first medical response for the general community. Out-patient medical facilities including County clinics, Kaiser and Veterans Administration sites now receive ambulance-only responses in the vast majority of cases. Interpretation of response data is limited due to call volume, location of the call, time of day and seasonal variations. The EMS agency continues to monitor the fire and ambulance response times in all affected areas.

The Community of Walnut Creek



On January 15th Walnut Creek's Station 4 was closed. The following units were assigned to respond under automatic/mutual aid as the closest resource:

- Station 32 (Civic Drive): 4.2 miles away with a 6.16 minute travel time
- Station 1 (Stone Valley Road): 2.3 miles away with a 8 minute travel time

Walnut Creek is a community of approximately 64,173 residents, with an average of 7,722 EMS responses per year or 120 annual EMS calls per 1000 population. The city averages approximately 21 EMS calls per day throughout the year. In 2011, Walnut Creek had 5,861 code 3 (lights and sirens) EMS responses and 1,861 code 2 (non-critical) responses.

Average AMR response time for the city of Walnut Creek over the last 10 years has been between 7 to 8 minutes. In 2012, the average AMR response time for urban Walnut Creek was 7:58 minutes. Only 7% of total EMS calls require critical transport (code 3 lights and sirens) to the hospital.

After the Station 4's closure Walnut Creek's monthly EMS call volume averaged 516 calls. Fire average first medical response times and ambulance service levels remain consistent with previous response periods. However interpretation of response data is limited due to factors including call volume, location of the call, time of day and seasonal variations. The EMS agency continues to monitor the fire and ambulance response times in all affected areas.

EMS Response and Call Disposition by City

City	Total EMS Calls ³	Ambulance Determined Not Needed Cancelled Prior to Arrival	Ambulance Determined Not Needed Cancelled On-scene	Patient Transported Code 3 (Critical patient)	Patient Transported Code 2 (Stable patient)
Clayton (Urban)	311	6%	12%	11%	71%
Lafayette	904	8%	13%	8%	71%
Martinez	2354	6%	14%	9%	71%
Walnut Creek	5413	5%	13%	7%	75%

Although 90% of Contra Costa’s EMS 9-1-1 calls are dispatched Code 3 (lights and sirens) only 7-11 % of 9-1-1 calls result in Code 3 transports (critical). These demographics are generally true for every community in Contra Costa. The vast majority of critical (Code 3) transports are due to critical trauma associated with vehicular accidents and lifestyle influenced health conditions such as heart disease, stroke and diabetes.

Contra Costa EMS has participated in the National Cardiac Arrest Registry to Enhance Survival (CARES) since 2009 and has extensive data on the countywide EMS cardiac arrest population. This data shows that 1% percent of County 9-1-1 calls are due to cardiac arrest and that cardiac arrest survival consistently demonstrates that immediate “bystander” response is the single most important factor to assure meaningful survival. These “bystanders” include anyone who knows CPR and how to use an Automatic External Defibrillator (AED). In these cases prompt bystander CPR and public access defibrillation until EMS medical first response personnel arrive provides the best chance of survival with a good neurological outcome.

Deployment Modifications to Preserve Fire All Hazards Resources

The Contra Costa EMS agency has used ambulance-only deployment for selected medical facilities over the years to “preserve” fire all hazards resources. Medical facilities typically have trained physicians and nurses on site who can effectively serve as first responders if 9-1-1 services are needed. The exception to this is for cardiac arrest when all resources are deployed.

This approach has been welcomed by both the medical facilities and fire districts and is known to significantly support preserving fire first medical response for the more critical cases. The strategy was used in East County during their fire station closures and reduced fire first medical response requirements to medical facilities from 88% to 6% between 2012 and 2013.

³ Data represent EMS call disposition of 911 Code 3 ambulance responses by city from January 1, 2012 through November 30, 2012. SOURCE: AMR MCIS/CAD

When Contra Costa Fire Station 12 in Martinez closed it was noted that the vast majority of calls for that station responded to the surrounding medical facilities. Ambulance only deployment was implemented at three carefully selected medical facilities: 2500 Alhambra (Contra Costa Regional Medical Center Clinics), 200 Muir Road (Kaiser) and 150 Muir Road (Veterans). The deployment change indicates that fire first response was substantially preserved to respond to the more critical EMS calls. Overall the difference in Martinez is around 10 fewer fire responses per month.

Year-to-Year Comparison Feb-Mar 2012 vs. Feb-Mar 2013 - EMS Responses to Medical Facilities in Martinez targeted for Ambulance Only Responses

	2012 Ambulance Only	2012 Ambulance and Fire	Total 2012	Percent Fire Response 2012		2013 Ambulance Only	2013 Ambulance and Fire	Total 2013	Percent Fire Response 2013
2500 Alhambra (CCRMC / Clinic)	13	7	20	35%		18	2	20	10%
200 Muir Road (Kaiser)	19	6	25	24%		21	1	22	5%
150 Muir Road (Veterans)	11	11	22	50%		36	0	36	0%
All 3 Facilities	43	24	67	36%		75	3	78	4%

Excludes police requests for 5150 or calls from outside facility

Additional preservation of fire first medical response can be accomplished using the existing structure of tiered dispatch. Responses to nursing homes, clinics, or other facilities that are staffed by qualified medical personnel could be limited to only the most critical situations, such as cardiac arrest, because personnel at those facilities are capable of managing medical care prior to EMS arrival. The EMS Agency is reviewing all EMS dispatch protocols in collaboration with Contra Costa Fire to determine which non-critical calls could also be managed by ambulance-only responses.

Partnering with Hospitals to Rapidly Return Ambulance Units to Service

Timely ambulance return to service after patient transport is one of the most significant ways to improve ambulance availability. Nationwide, patients arriving by 9-1-1 ambulance wait for a hospital bed much longer than they should. Delays in patient handoffs are a known risk to patient safety, yet it is common for over 10% of patients (over 7,600 per year) to have handoff times in exceeding 30 minutes in Contra Costa. In the most extreme circumstances patient handoff may take over one hour. Operationally this creates a “domino-effect” where multiple ambulance units end up “waiting” to transfer their patients to emergency department staff. This domino effect can occur numerous times a day throughout the county preventing valuable ambulance resources from returning to service.

“It is the expectation of the Contra Costa EMS Agency that all hospitals will be ready to receive a 9-1-1 transported patient upon ambulance arrival to support optimal utilization of EMS System assets.”

Patient handoff of critical patients who arrive by 9-1-1 ambulance is known to be very prompt, however this is not always the case for stable 9-1-1 transported patients who make up 75-83% of all EMS transports. Contra Costa EMS has been working in partnership with our community hospitals on timely patient handoff for over four years.

On January 3, 2013 the Contra Costa EMS Agency sent a letter to all Hospital Chief Executives, Chief Nursing Officers and Emergency Department Medical and Nurse Leadership informing them of the crisis of fire station closures. In that letter the following requests were made:

- Conduct 9-1-1 transported patient handoff as soon as possible upon ambulance arrival;
- Be prepared to take appropriate measures to effectively manage Emergency Department saturation; and
- Expedite patient handoff during peak periods when multiple 9-1-1 ambulances arrive.

The EMS Agency is pleased to report that all Contra Costa community hospitals are actively partnering with the EMS community to reduce the incidence of long ambulance off-load times.

Summary and Key Findings

Fire Station closures are known to impact rapid first medical response arrival. While the EMS Agency is the authority for providing oversight of the EMS system, Fire Districts are responsible for determining what level of first medical response they are capable of providing. Contra Costa Fire agencies typically provide up to 80-85% of EMS first medical response in their fire district response area.

Communities with reduced fire services should expect delays in first medical response. When fire units are not available, the public will receive first medical response by 9-1-1 ambulance personnel. Ambulance response times will likely take a few extra minutes compared to the first medical response times delivered by local Fire stations.

Ambulance service delivery, including response times, cannot be expected to duplicate the rapid response of community based fire first responders. This is especially true in rural or less densely populated areas of the county where the need for ambulance service is infrequent. In these circumstances, family members or bystanders may need to comfort the patient, provide first aid and be prepared to provide hands only CPR or use a public access defibrillator until help arrives.

All Contra Costa dispatch agencies are able to give over-the-phone CPR instruction known as “dispatched aided CPR”. Community law enforcement agencies who participate in the Public Safety AED Program can also support medical first response for cardiac arrest.

Fire first medical response can be provided at the basic life support level with excellent outcomes. Over the last ten years, pre-hospital studies have consistently demonstrated that the best patient care outcomes for critical patients depend on reliable basic life support and rapid first medical response. Contra Costa County is fortunate to have the robust advanced life support (paramedic) emergency service levels provided by the majority of fire agencies and the 9-1-1 contracted ambulance provider.

After a careful review, the EMS Agency finds no clinical evidence that EMS patient care for Cardiac Arrest, Trauma, Stroke or Heart Attack has been compromised due to fire station closures. Determining

impacts to critical patients would require an extensive period of time since these patients represent such a small percentage of EMS calls. For these critical cases, Contra Costa County EMS Patient Care Systems for Trauma, STEMI (high risk heart attack), Stroke and Cardiac Arrest are “protective.”

Both local and national evidence demonstrate that the best patient outcomes are primarily tied to “early recognition” of a serious condition and “time to definitive care” rather than response times alone. Patient outcomes are known to be significantly improved when EMS is successful in transporting:

- A critical trauma patient to the trauma center: **“The Golden Hour”**.
- A heart attack patient to a cardiac center for intervention: **“Time is Muscle”**.
- A stroke patient to a primary stroke center for treatment: **“Time is Brain”**.

However it is also recognized by the EMS Agency that difficult to measure impacts such as patient inconvenience, delays in assessment of a medical condition, pain and discomfort are more likely to be affected. Residents near a closed fire station will experience these impacts.

It is known that in the case of cardiac arrest, rapid pre-hospital advanced life support is vital to improving survival. Cardiac arrest affects approximately 500-600 individuals per year in Contra Costa and survival with good outcomes relies on prompt bystander basic life support supported by rapid pre-hospital advanced life support (ALS). The Contra Costa cardiac arrest survival rate when prompt bystander CPR and rapid ALS is performed is 42.4%.⁴

Contra Costa has a robust system of EMS care that is highly integrated to maximize efficiencies between bystanders, Fire-EMS dispatch, fire and law enforcement first responders, 911 ambulance providers and our outstanding community hospitals. The EMS agency would like to thank all stakeholders for their ongoing commitment and collaboration to support patient care. The EMS agency depends on this strong network of experienced and skilled pre-hospital and hospital providers to respond within their capabilities for the benefit of the patient and community.

Communities should be aware that the EMS Agency is working with Fire-EMS dispatch, fire district leadership, community hospitals and American Medical Response (AMR) to support prompt response and safe patient care at all times. In communities experiencing fire station closures the EMS Agency strongly encourages all individuals to learn early recognition of signs and symptoms of heart attack, stroke, and cardiac arrest in addition to basic first aid, CPR and how to use an AED. For more information visit our website to learn more at www.cccems.org.

“The Contra Costa Emergency Medical Services Agency provides oversight of the EMS system and supports the delivery of coordinated and high quality EMS services to the public. EMS service delivery is a public private partnership between fire districts, ambulance providers and hospitals.”

⁴ From 1/1/2012-12/31/2012 Contra Costa County Cardiac Arrest Registry for Enhanced Survival (CARES)