

Emergency Medical Services

An Analysis of EMS in the City of San Diego

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Contents

Acknowledgements.....	3
Executive Summary	4
Section I: Background	8
“The White Paper”	8
Wedworth-Townsend Paramedic Act of 1970	8
Funding Local EMS Demonstration Projects in 1972 and 1973.....	8
EMS in San Diego	9
San Diego Medical Services Enterprise, LLC.....	9
A Lawsuit, an Audit and an Extension	10
Section II: The City of San Diego’s Current EMS Program	11
Fire-Rescue Department Functions	11
Rural/Metro Functions.....	13
Section III: Public and Private Providers	16
Literature Review Key Findings	16
County of San Diego EMS Programs.....	17
Inherently Public Services.....	19
Section IV: Insourcing Challenges	20
Acquiring a Fleet of Ambulances	20
Acquiring Appropriate Technology	21
Establishing Systems and Centers	22
Estimating Initial Costs.....	24
Estimating Ongoing Costs	25
Offering the Same Level of Oversight	28
Increased City Liability Risk.....	29
Section V: Findings.....	30
City of San Diego’s Emergency Medical Services (EMS) Program.....	30
Cost Recovery and Subsidy	30
If the San Diego Fire-Rescue Department were to Bid.....	31
Appendix A: References	32
Appendix B: Literature Review.....	36

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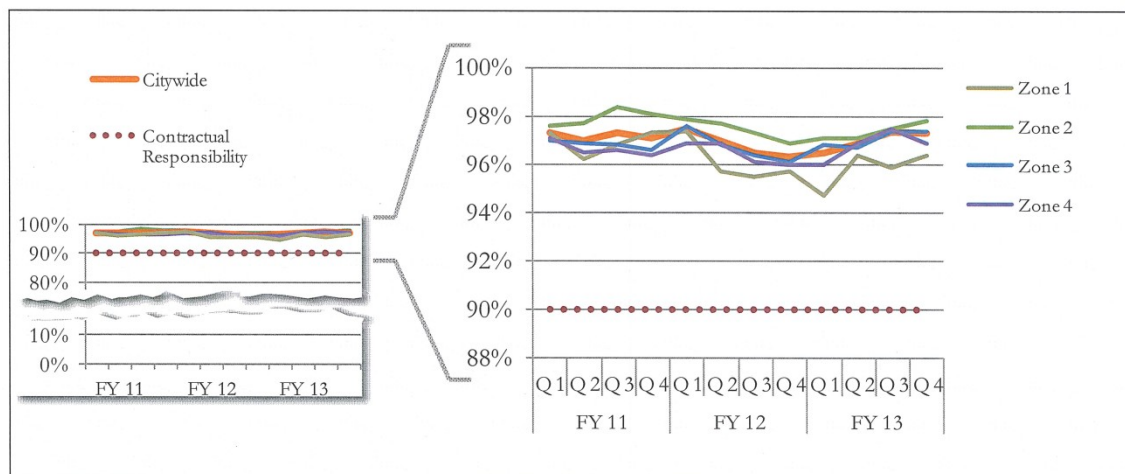
Executive Summary

The City of San Diego (City) is currently faced with making a decision regarding the provider of emergency ambulance transport services. Some councilmembers, the Fire-Rescue Department and San Diego Firefighters Local 145 have publically stated a preference for ambulance transport services to be provided by the City Fire-Rescue Department. The San Diego County Taxpayers Association (SDCTA) has produced this study in an attempt to inform the civic dialogue on the matter. SDCTA has engaged in extensive research and analysis, including a literature review and numerous interviews with various experts, stakeholders, and industry professionals representing both public and private providers.

An important distinction, and often a point of confusion is the difference between the two parts of the Emergency Medical Services (EMS) program – emergency ambulance transport services and first responder services.

The current City of San Diego provider of emergency ambulance transport services is Rural/Metro. According to recent City of San Diego compliance reports, Rural/Metro consistently achieves response time contractual requirements agreed to with the City. The goal presented in the following figure is to get an ambulance to life-threatening medical emergencies in less than twelve minutes at least 90 percent of the time. Response time requirements also extend to four geographic zones.

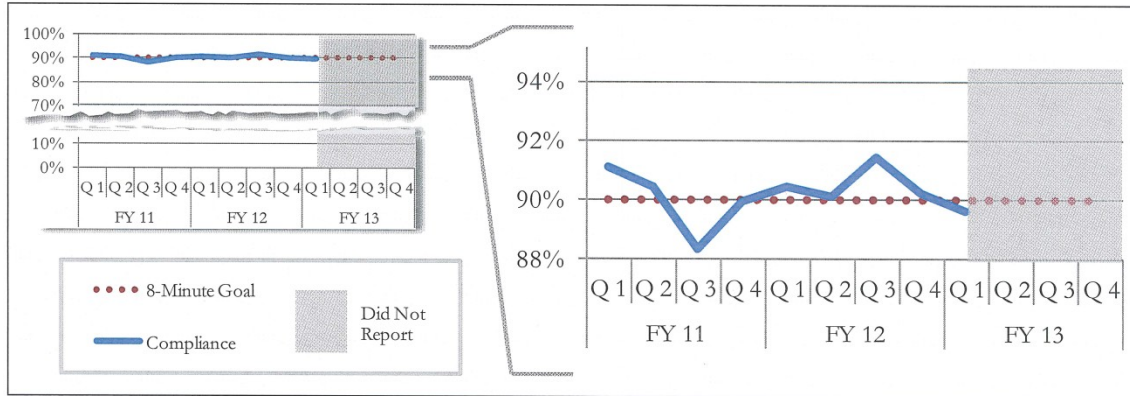
Figure 1: San Diego Rural/Metro Emergency Ambulance Transport 12-Minute Contractual Compliance



Source: City of San Diego Emergency Medical Services Quarterly Compliance Reports

The provider of first responder emergency medical services is the City of San Diego Fire-Rescue Department. According to the same compliance reports, the City of San Diego Fire-Rescue Department has been unable to consistently achieve response time goals given existing funding levels and resources. Compliance reports stopped including Fire-Rescue Department response times in Fiscal Year (FY) 2013 and have not resumed. The following figure presents both the Fire-Rescue ability to get a paramedic to life-threatening medical emergencies in less than eight minutes at least 90 percent of the time, and that compliance data have stopped being reported.

Figure 2: San Diego Fire-Rescue Department First Responders 8-Minute Goal Compliance



Source: City of San Diego Emergency Medical Services Quarterly Compliance Reports

Confusion, as well as dissatisfaction with the City’s emergency medical services program as a whole, has led to criticism of the City’s current emergency ambulance transport services provider despite consistently surpassing response time requirements.

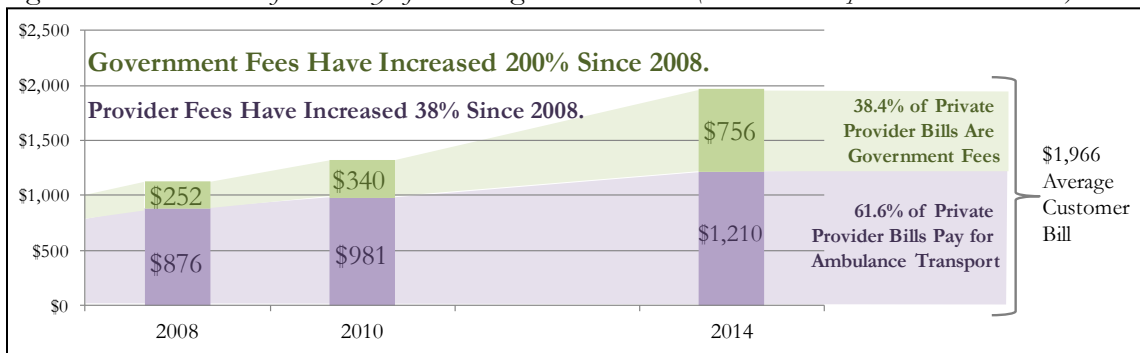
Industry wide, public and private EMS providers face different levels of oversight. If a private provider does not meet the contractually required response times, the provider pays penalties and can ultimately lose the contract. If a public provider doesn’t achieve the same response times, there may be no enforcement mechanism. One example of a public provider not meeting adequate response times is the City of San Diego Fire-Rescue Department first responders. **While quarterly compliance reports continue to show Rural/Metro achieving the contractually obligated response times, the same reports stopped showing Fire-Rescue Department first responders’ response times that were not consistently meeting their goal.**

In addition to differing levels of oversight, a common difference between public and private providers is the amount of customer revenues recovered. In practice, agencies that directly provide the service tend to subsidize EMS operations to a far greater extent. **It is easier for elected officials to push for increased revenues from private providers than to directly increase fees charged to the public for services provided by government.**

Substantial rate increases have been largely driven by the franchise fees charged by government agencies. Franchise fees are when private providers are required to pay the government for the right to provide the service. Franchise fees are used to offset first responder expenses. In other words, **government agencies take payment from private service providers to help pay for first responder services.**

Regardless of if the patient pays their bill, or how much their insurance pays, the franchise fee is paid to the government by the provider. In other words, while the \$756 will be paid to the government agency for each transport, the private provider collects much less than the \$1,210 per transport.

Figure 3: Franchise Fees for County of San Diego Service Areas (Seven Per-Transport Basis Service Areas)



Source: SDCTA

Public providers face different political pressures. When faced with the same increased cost of providing services, public providers are more apt to allow the general fund to pick up some, or all of that cost. **Rather than allow emergency ambulance transport fees to increase dramatically, public providers offset rising costs with tax dollars.**

If the City of San Diego were to allow the Fire-Rescue Department to submit a proposal to provide emergency ambulance transport services, the bidding process should be carefully developed to avoid numerous pitfalls. The Request for Proposal (RFP) should establish oversight mechanisms that are effective for both public and private providers. For example, any agreement should include an automatic rebid in the case of poor performance by the selected provider.

If the City of San Diego were to allow the Fire-Rescue Department to begin providing emergency ambulance transport services, it could face numerous challenges including:

- a) No longer receiving annual payment from the service provider of \$10.4 million currently used to offset City EMS services.
- b) Approximately \$21.3 million in start up costs including \$16.1 million to purchase enough ambulances (72) to provide 47 on duty at any given time – one to be “housed” at each fire station.
- c) Approximately \$37.2 million in annual ongoing costs including \$28.4 million in compensation for an additional 321 employees.
- d) Acquiring and maintaining appropriate technology.
- e) Establishing systems and centers such as billing/collections and a supply center that would include substantial management and human resources staff time and likely consultant contracts.
- f) Being solely liable for all litigation related costs. Legal costs could arise for a variety of incidents, including everything from vehicle accidents, which are a relatively common occurrence in the ambulance industry, to failure to meet a standard of medical care for patients.
- g) Setting rates to collect enough revenue to offset additional costs. The amount of the average bill that will actually be paid is dependent on the size of the homeless, Medicare, Medi-Cal, and uninsured populations. Another challenge to accurately setting rates is the dramatically changing landscape of healthcare in the United States given the pending implementation of the Patient Protection and Affordable Care Act (ACA). Proposition 26 (2010), which requires fees to not exceed the cost of providing the service, may also limit the City’s ability to collect as much revenue as a private provider would.

Section I: Background

“The White Paper”

Before the 1960s, medical transport systems were an unregulated and inconsistent set of services.¹ Most transport systems were in a large part a product loosely based on the lessons learned through providing mobile medical treatment to soldiers in war. According to the 1966 report by the National Academy of Sciences “Accidental Death and Disability: The Neglected Disease of Modern Society,” “expert consultants returning from both Korea and Vietnam publically asserted that, if seriously wounded, their chances of survival would be better in the zone of combat than on the average city street.” This report, referred to today simply as “the white paper,” is widely credited with revolutionizing the nation’s approach to emergency medical services.²

Wedworth-Townsend Paramedic Act of 1970

Prior to the Wedworth-Townsend Paramedic Act, California law allowed only state licensed physicians and registered nurses to administer invasive medical procedures. This proved to be a barrier to providing medical care on site and during transit to a medical facility.

Jointly introduced by Senator James Q. Wedworth and Assemblyman Larry Townsend, the Wedworth-Townsend Paramedic Act of 1970 was signed by Governor Ronald Reagan, making California the first state to permit paramedics to provide advanced medical life support without the medical supervision of a doctor or registered nurse.

Funding Local EMS Demonstration Projects in 1972 and 1973

After the National Traffic and Motor Safety Act of 1966 that specified ambulance design and construction, and the Highway Safety Act of 1966 that established ambulance inspection standards, funding became available for local EMS pilot programs. In 1972, the federal Department of Health, Education, and Welfare allocated \$16 million to develop regional EMS systems in five states. In 1973, the Robert Wood Johnson Foundation appropriated \$15 million to fund 44 EMS projects across the nation.

The Emergency Medical Services Systems Act of 1973 was the federal legislation which led to the establishment of EMS systems as we know them today.³ The legislation aimed to initiate the development of local emergency medical systems to significantly decrease death and disability rates. The legislation included 15 recommended components including staffing, training, communication systems, and independent review and evaluations.

¹ Shah, Manish N. “[The Formation of the Emergency Medical Services System.](#)” American Journal of Public Health. 2006.

² “[Accidental Death and Disability: The Neglected Disease of Modern Society.](#)” National Academy of Sciences. September 1966.

³ “[Emergency Medical Services: A Guidebook for Fire-Based Systems.](#)” 4th Edition. International Association of Fire Fighters.

EMS in San Diego

The San Diego Police Department managed emergency transport services informally until 1972 when the County of San Diego began to develop and implement an EMS system using federal funding. The new system established an ambulance service and emergency personnel training programs at local colleges. A trauma center was also added to UCSD Medical Center. San Diego Fire-Rescue Department has not been in the ALS or limited ALS ambulance services prior to 1980, or January 1, 1981. In 1982, Proposition G was passed in the City of San Diego requiring that a paramedic respond to all medical emergencies.

San Diego Medical Services Enterprise, LLC

San Diego became home to the nation’s first public-private partnership for EMS in 1997 when the Fire-Rescue Department officially partnered with Rural/Metro Corporation to provide emergency paramedic services.⁴ This partnership resulted in the creation of the entity San Diego Medical Services (SDMS) Enterprise, LLC.⁵ The legal entity was governed by a board of managers comprised of five members, three of whom were appointed by the City.⁶ Both the City and Rural/Metro agreed to accept responsibilities under the partnership summarized in the following figure:

Figure 4: Responsibilities of San Diego Medical Services Enterprise Partners

City	Rural/Metro
Maintaining 9-1-1 Communications Infrastructure	Purchasing/Maintaining Ambulances
Providing First Responder Paramedic and EMT to High Priority Responses	Staffing Ambulances
Staffing Some Operational, Administrative and Managerial Positions	Billing/Collections/Financial Records

Source: Performance Audit of Fire-Rescue’s Emergency Medical Services

With the revenues going to SDMS, each partner was reimbursed by SDMS for expenses undertaken in the performance of their responsibilities. The remaining balance was equally split between partners.

Since the partnership’s formation, the agreement was amended in 1999, 2008, and a “bridge amendment” covering Fiscal Year (FY) ‘08 and FY ‘09. The arrangement was touted by

⁴ “[Emergency Medical Services \(EMS\) History.](#)” City of San Diego. 2013

⁵ “[Performance Audit of Fire-Rescue’s Emergency Medical Services.](#)” Office of the City Auditor: City of San Diego. April 2011.

⁶ “[Comprehensive Annual Financial Report: Fiscal Year Ended June 30, 2011.](#)” City of San Diego.

City officials including multiple councilmembers as an innovative national model for providing EMS services at a savings for the City.

A Lawsuit, an Audit and an Extension

Between mid 2009 and late 2010, the City Attorney's office issued four confidential memo's relating to SDMS and the partnership's structure. The memos were issued as a former Rural/Metro executive initiated a whistle-blower lawsuit claiming Rural/Metro kept \$12 million in revenues from 1997 to 2007 that should have been split with the City of San Diego. City Auditor Eduardo Luna began an audit focused on the oversight of the contractual agreements of the partnership and related financial transactions.

The April 2011 audit found concerns over the allegedly improper financial accounting and lack of City financial oversight at SDMS. City management's official response to the audit agreed with nearly all recommendations and noted that the City would be addressing the majority of findings and recommendations by negotiating a more traditional client-vendor contracting relationship.

By July of 2011, the City had sold its interest in SDMS to Rural/Metro for \$5.5 million in favor of a traditional contract with Rural/Metro to provide EMS services for two years.

Rural Metro was cleared of any wrongdoing by February of 2012 through a six-month forensic accounting review performed by the independent accounting firm Cornerstone Research and overseen by retired Judge Leo Papas.

Effective July 1, 2013, the City's contract with Rural/Metro was extended for one year, with a one-year optional extension to allow for more time to weigh options for what the next EMS Request for Proposal (RFP) will include.

Section II: The City of San Diego's Current EMS Program

Within the City of San Diego, Emergency Medical Services (EMS) are provided by private ambulance company Rural/Metro San Diego in conjunction with the City of San Diego Fire-Rescue Department. When the Fire Department receives a 9-1-1 call for a potentially life-threatening medical situation, a fire engine staffed with a City paramedic is dispatched to the scene as a first responder followed by an ambulance staffed by Rural/Metro with one paramedic and one emergency medical technician (EMT). Non life-threatening 9-1-1 calls may only trigger the dispatch of an ambulance. The County of San Diego's EMS Policy requires at least two paramedics respond to all potentially life-threatening 9-1-1 calls.

The "first responder" portion of EMS services is handled entirely by the Fire-Rescue Department, while ambulance transport services have been contracted out to Rural/Metro San Diego.⁷ Rural/Metro also provides non-emergency medical transportation services such as hospital-to-nursing home and residence-to-medical facility transport. An agreement between the City of San Diego and the County of San Diego established the Emergency Medical Services Program to oversee and administer the City's contracts with Rural/Metro and monitor clinical excellence, efficiency, service quality, and response time.⁸

Fire-Rescue Department Functions

It is important to understand the distinction between first responder medical aid and emergency ambulance transport services. Delineating these roles creates a context for unacceptable response times, and allows for appropriate solutions to be created. The City of San Diego Fire-Rescue Department is the first responder – the initial team including a paramedic that provides on-scene emergency medical services.

It has been clear that first responders have been unable to meet the expectations of San Diego neighborhoods for several years. A 2005 Commission on Fire Accreditation International report entitled "[San Diego Fire-Rescue Department: Standards of Response Coverage](#)" found that the City was "unable to keep pace with the growth of San Diego." The report went on to conclude that:

"the risk assessment conducted as a part of this study indicates the existence of significant gaps in delivering effective response coverage citywide. The acquisition of assets and resources will be necessary to address these shortfalls."

Six years later, it was made apparent that the issue of first responders' response time inadequacy had yet to be successfully addressed in a comprehensive 2011 Citygate Associates report entitled "[Fire Services Standards of Response Coverage Deployment Study for the City of San Diego Fire-Rescue Department](#)." The study identified

⁷ "[Emergency Medical Services \(EMS\)](#)". City of San Diego. 2013

⁸ "[Emergency Medical Services Program](#)". City of San Diego. 2013

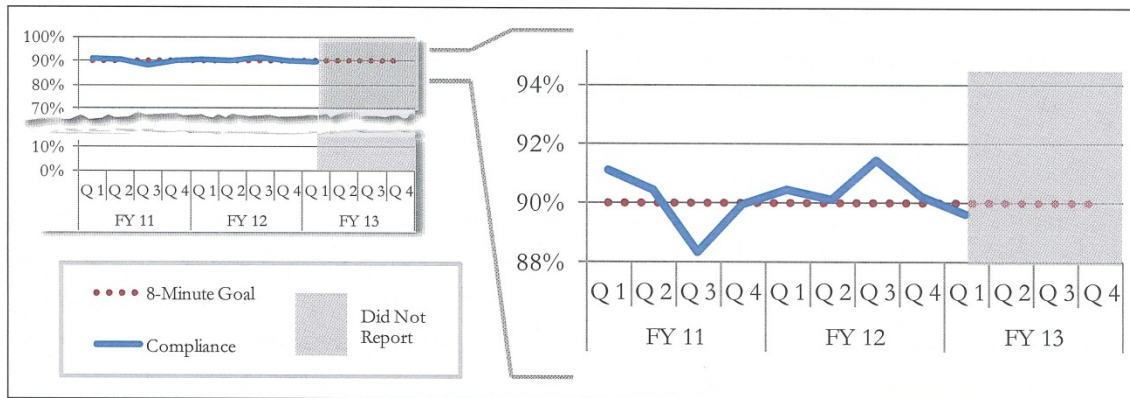
communities in which response times by first responders fell short of other communities, primarily due to the location of fire stations. The following is one of several findings where first responders were falling short of both national and local goals:

“The message from the deficient response time analysis tables is that within the 24.46 percent or 25,834 Priority 1 calls with response times exceeding City goals, there are 8,203 that exceed 9 minutes and this occurs every hour somewhere, every day. In the nine peak hours where performance is the most deficient, every hour period for all 365 days, has at least one Priority 1 incident with the first due unit arriving 2 minutes later than the desired goal point.”

Several media outlets have reported on the unacceptable emergency medical response times in San Diego. However, it is unclear if readers and the general public understand the two-pronged approach to emergency medical services, and if they are able to make the distinction between emergency medical first responders and emergency ambulance transport services.

The City and County of San Diego agreed on a current goal for first responders to arrive on-scene in less than eight minutes 90 percent of the time. Quarterly compliance reports provided by the City of San Diego however show San Diego Fire-Rescue Department first responders do not consistently meet this goal. In addition, compliance reports demonstrate a lack of oversight by no longer reporting on this standard as of FY 2013.

Figure 5: San Diego Fire-Rescue Department First Responders 8-Minute Goal Compliance



Source: City of San Diego Emergency Medical Services Quarterly Compliance Reports

The slow response times of first responders is an issue regarding a service provided directly by the City of San Diego’s Fire-Rescue Department. This service provider has at times failed to provide acceptable EMS service levels in some neighborhoods, and citywide. Unacceptable response times directly relate to patient care outcomes. The Fire-Rescue Department has repeatedly acknowledged the response time issues and maintains that the proposed additional fire stations must be funded, constructed and staffed to resolve the issues.

This is separate from the emergency transport services currently provided by the private ambulance company Rural/Metro. Rural/Metro consistently meets the response time requirements that they are obligated to provide through a contract with the City of San Diego.

Rural/Metro Functions

Rural/Metro is currently the emergency ambulance transport provider for the City of San Diego. High-performance EMS models, such as the one used in San Diego, are defined by their ability to keep first responders in their neighborhoods by engaging other paramedics to provide medical services in transport. Having an ambulance meet San Diego Fire-Rescue Department first responders' on-scene allows first responders employed by the City to avoid spending substantial time in transport, preparing documentation and working with hospitals for each transport. Rural/Metro ambulances are typically out of service for 20 to 30 minutes at a hospital for each call. This does not include time spent in transit to the hospital or back to the community.

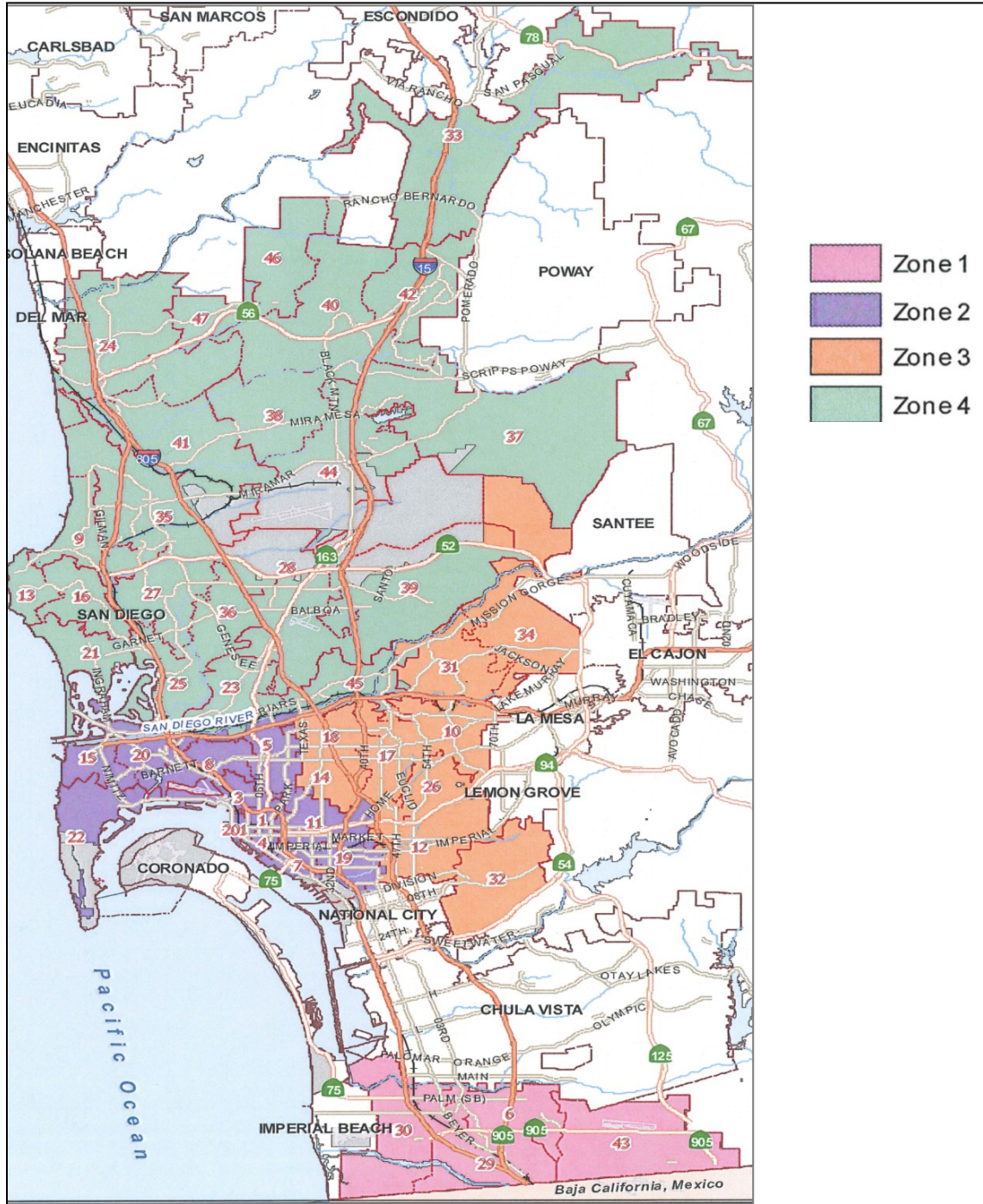
High-performance EMS models are able to take advantage of nearby Fire-Rescue Department personnel for quick help by leveraging a system designed to provide timely fire response. It utilizes the Fire-Rescue Department's ability to respond quickly for medical emergencies, while allowing Fire-Rescue personnel to stay in their neighborhoods and maintain their ability to respond quickly to the next emergency.

An ambulance can only respond to one emergency at a time. Providing the best response times throughout the day requires the flexibility of a high-performance model to reposition ambulances in response to changing availability. If each ambulance was stationed throughout the day at a fixed location, the second emergency within a short time period could face substantially longer response times.

When designing a Request for Proposal (RFP), the City of San Diego determines the response time needs of the City for ambulance transport services. All providers bidding for the service write a proposal to demonstrate how they would achieve the required response times and what patients would be charged. The faster the response time demanded by the City, the more ambulances the private provider must dedicate to the contract which corresponds to higher patient bills. The City of San Diego determined that, after accounting for times of unusual call volume, ambulances need to arrive on-scene within 12 minutes at least 90 percent of the time. Each new contract can change response time requirements including what exemptions if any are not to be included in that calculation.

The current contract also ensures some level of equity in response times across the city by requiring the provider to arrive on-scene in less than 12 minutes, 90 percent of the time for calls in each of four zones. Each new contract can also change the number and boundaries of zones.

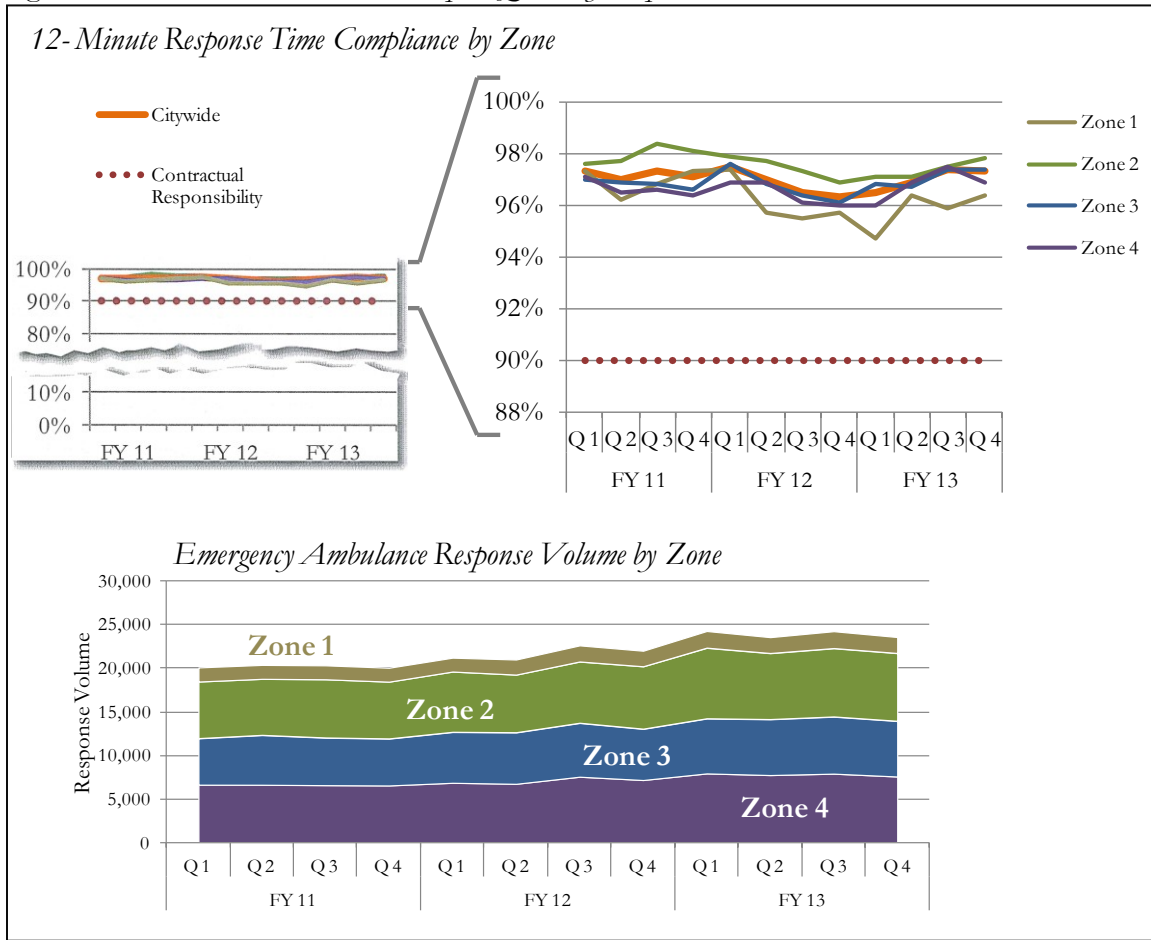
Figure 6: City of San Diego Ambulance Emergency Response Zones



Source: City of San Diego

Rural/Metro has consistently maintained the contractually required level of service citywide and in each zone while providing 17.3 percent more transports citywide over the past three fiscal years. Each zone has experienced double digit increases in response volume since the first quarter of FY 2011 ranging from 13.0 percent growth in Zone 1, to 19.8 percent growth in Zone 3.

Figure 7: Rural Metro Ambulance Transport Quarterly Responses



Source: City of San Diego Emergency Medical Services Quarterly Compliance Reports

Section III: Public and Private Providers

Literature Review Key Findings

There are several key metrics for evaluating EMS system performance commonly identified in the reports cited in the Literature Review (Appendix B).

Most sources agree that a fractile measurement more appropriately reflects response time performance than average response time. A fractile response time measurement is the percentage of responses in which the required or goal response time is met; such as responding within 12 minutes, 90 percent of the time.

The evaluation of clinical performance, average defibrillation rate, pain-relief rate, and customer satisfaction rate are frequently cited as appropriate metrics of provider quality. Despite this recognition in largely academic research, providers typically do not track or report these or other performance quality metrics.

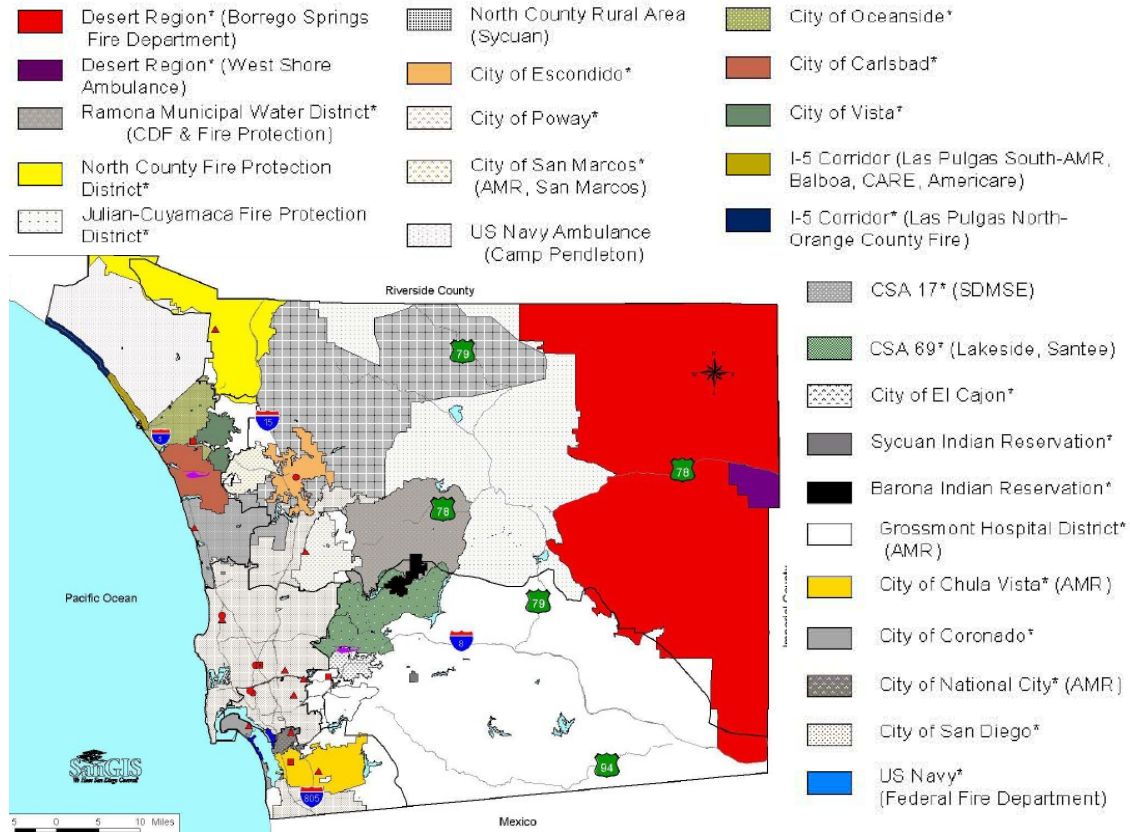
Some cost-effectiveness and economic impact evaluations of EMS systems adopt a societal perspective, which typically brings a broader range of costs and benefits into the analysis, while others use a strictly fiscal perspective. With limited studies that evaluate the cost-effectiveness of outsourcing versus insourcing EMS services, there is no consensus that one model is more efficient or cost effective. Many studies recognize that private EMS providers have certain advantages, such as the ability to use economies of scale when operating in multiple cities over a large area.

Several studies find that efficient system design typically involves departments assuming first responder duties and private ambulance companies facilitating patient transport. Though most studies support this model, there is not an absolute consensus. One study argues that the division of services between two very different organizations creates a lack of continuity in operations, which can lead to longer response times.

County of San Diego EMS Programs

There are numerous distinct emergency medical services areas within the County of San Diego. The County of San Diego Emergency Medical Services Agency shares with a state agency in regulating and supervising the activities of operating areas.

Figure 8: EMS Operating Areas within the County of San Diego



Source: County of San Diego Emergency Medical Services Agency 2003⁹

The True Costs of Providing EMS Services are Hidden

Ambulance customers nationwide have been faced with increasing ambulance transport fees. In San Diego County, fees of emergency ambulance transport providers have increased 245 percent since 2002. For private emergency ambulance transport providers, franchise fees are a major driver of these increases.

The difference in the cost of providing ambulance transport services between public and private providers is unknown. Public providers often do not account for the cost of providing ambulance transport services separate from other operations and private companies are not required to make public cost information.

⁹ The County of San Diego EMS Agency has said that they will update the service area map on their website however it has not been updated as of this time.

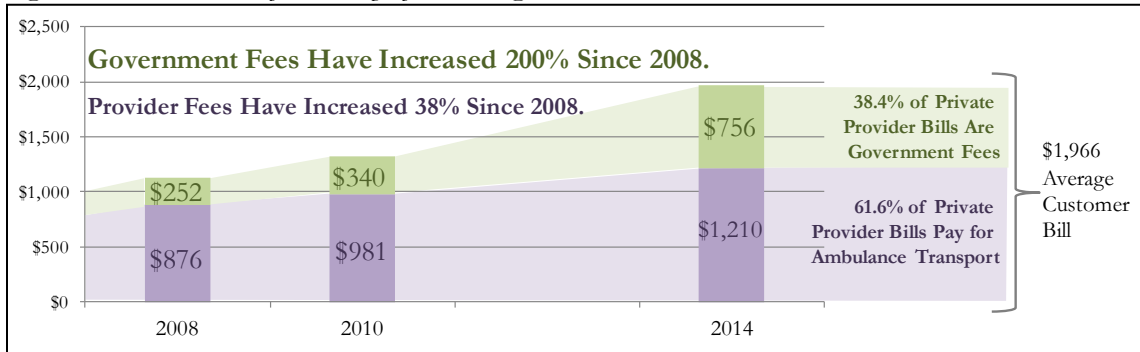
“Franchise Fees”

Private providers are often required to pay fees to offset costs borne by the public entity known as “franchise fees,” “first responder fees,” or “rent.” These payments put upward pressure on the fee paid by customers and offset the costs of first responder operations. The existence of this government fee packaged within the ambulance bill has been called a “hidden tax.”

The franchise fee is the part of private provider bills that go to the government. The following figure illustrates the effect of franchise fees in seven San Diego County operating areas in which the franchise fee is charged on a per-transport basis. In these operating areas, franchise fees have tripled in just six years between Fiscal Years 2008 and 2014.

Regardless of if the patient pays their bill, or how much their insurance pays, the franchise fee is paid to the government by the provider. In other words, while the \$756 will be paid to the government agency for each transport, the private provider collects much less than the \$1,210 per transport.

Figure 9: Franchise Fees for County of San Diego Service Areas (Seven Per-Transport Basis Service Areas)



Source: SDCTA

In the City of San Diego, the franchise fee is a guaranteed flat amount of \$10.4 million to the City rather than being charged on a per-transport basis. The customer bill is similarly impacted.

Outsourcing Unnecessarily Influences Level of Fees

Public providers typically acknowledge that customer revenues are not intended to provide full cost recovery. Operations are generally subsidized with general fund dollars. This reality is reflected in different fees being charged to residents and visitors in some local service areas such as Oceanside and Poway. Providing a taxpayer subsidy is a policy decision justified with the fact that the mere existence of the service provides a level of safety and comfort regardless of any given resident’s use of the service.

This policy decision could be made regardless of whether ambulance transport services are provided by a public or private entity, however evidence suggests that different political

pressures are created if a public or a private provider is used. As a result, elected officials with private providers often push for increased franchise fees to offset first responder expenses, while government agencies directly providing the service prefer to minimize fees charged to the public.

When government agencies providing emergency ambulance transport services do not increase respective fees to reflect higher costs of providing the service, they either pay for the difference with taxpayer dollars or allow service levels to erode.

Inherently Public Services

Police and fire services are rarely contracted out to the private sector. Ambulance transport services are commonly contracted to private firms. According to the California Ambulance Association, 74 percent of ambulances are operated by private providers.¹⁰ The importance of emergency services often invokes a debate over whether ambulance services are ‘inherently public’ services. What is not controversial is that government has the responsibility to ensure the service is provided, and that government should determine appropriate levels of service.

At SDCTA, we are only concerned with ensuring the service gets provided at high service levels for the lowest possible cost to taxpayers. Other arguments concerning some inherently public nature of the service, or whether profiting is inappropriate, are ideological and/or self-serving and not particularly relevant.

¹⁰ [“California Ambulance Industry.”](#) California Ambulance Association. Accessed October 2013.

Section IV: Insourcing Challenges

Some councilmembers, the Fire-Rescue Department and San Diego Firefighters Local 145 have publically stated a preference for ambulance transport services to be provided by the City Fire-Rescue Department. It has been stated by San Diego Firefighters Local 145 that an insourced emergency ambulance transport service could provide an [ambulance at each of the City's 47 fire stations](#).

Creating a publicly provided emergency ambulance transport service requires the performance of numerous complex tasks. The cost of performing each task will vary substantially based on the approaches taken and ultimately the choices made to the many decisions required. Many costs may be determined through competitive bidding processes or custom sole-source proposals.

Price estimates included within the following discussion come from publicly available documentation when available as well as information obtained from vendors, both public and private providers, and other industry experts. This section is intended to provide approximate estimates of potential costs to inform the civic dialogue and raise the level of debate regarding the optimal EMS program model.

Acquiring a Fleet of Ambulances

The City of San Diego does not currently own ambulances. In order to ensure 36 ambulances are on duty at peak times, Rural/Metro currently maintains an additional 19 ambulances (53%). In order to ensure that an ambulance is available at each of the City's 47 fire stations by maintaining the same 53 percent buffer, the City would have to purchase 72 ambulances.

Ambulances are customized vehicles primarily varying in type, manufacturer, level of life support equipment, and price. Several decision regarding the type of ambulance would have to be made including:

Type: Types include Type I (cab-chassis with modular body), Type II (integral cab-body), and Type III (cab-chassis with integrated modular body).

Manufacturers: Examples of manufacturers include American Emergency Vehicles that offers 16 models and McCoy Miller that offers 10 models.

Life support equipment (ALS or BLS): Ambulances need to be equipped to fit the model in which the provider provides the level of service desired. All 55 ambulances currently dedicated to the City of San Diego contract are ALS ambulances. The model based on putting an ambulance at each fire station also implies the use of Advanced Life Support (ALS) equipped vehicles rather than Basic

Life Support (BLS) equipped vehicles. Two of the most notable differences between ALS and BLS ambulances is the presence of a monitor/defibrillator that retails for \$30,100, and the staffing of a paramedic, both on ALS ambulances.

Price: The SDCTA obtained price of a 2013 Type III fully-equipped and stocked ALS ambulance used by a private provider is \$193,400. In an effort to receive a lower price through pooling buying power, the City of Carlsbad is currently in the process of purchasing a Type I partially-equipped ambulance for \$223,000 after taxes and fees through the Houston-Galveston Area Council Cooperative Program. The City of Costa Mesa recently initiated the sole-source purchase of six non-equipped ambulances for \$209,800 each at the recommendation of a specially appointed research committee.

Acquiring Appropriate Technology

The ability to efficiently provide emergency medical services relies heavily on technology. From the system that automatically routes 9-1-1 calls to the appropriate dispatcher and the system that assists dispatchers in sending the appropriate help as quickly as possible, to the monitor/defibrillators that paramedics use to directly save lives, to the handheld devices that allow efficient reporting for patient records and billing.

Mobile Data Computer Terminal

The Mobile Data Computer Terminal typically costs between \$4,000 and \$5,000 per system. In the following sections, this cost is included in the price of the actual recent ambulance purchases by the City of Carlsbad.

Computer Aided Dispatch (CAD) System

The CAD system currently in use by the City of San Diego Fire-Rescue Department includes EMS services. The technology firm providing the system is TriTech. It is not anticipated that there would be an additional CAD expense to allow the Fire Department to provide 9-1-1 ambulance services. This system helps dispatchers send the appropriate ambulance, however it does not aid in the strategic placement of vehicles. Regardless of whether the San Diego Fire-Rescue Department provides emergency ambulance transport services, the existing CAD system is dated and may need to be replaced.

Predictive Analytics Software

Although fire stations are strategically placed, responding from any fixed location does not take advantage of available live data such as traffic or the positioning of other units that may be leaving a hospital or a call. Responding from any set of fixed locations ignores the dynamic needs of neighborhoods throughout the course of the day, week and year. For this reason, private and public providers alike have recognized the need for a predictive analytics program to aid in placement of ambulances.

Regardless of the number of ambulances within a system, or whether an ambulance is “housed” at each fire station, response times improve with the use of predictive analytics software. Examples of this software include Mobile Area Routing and Vehicle Location Information System (MARVLIS), Live Move Up Module (Live MUM) or Optima Live.

MARVLIS can be purchased for approximately \$300,000 according to a [recent news article](#). A representative of Optima estimated a purchase price of approximately \$350,000 for Optima Live, the Optima product that mirrors in purpose that of MARVLIS. One publicly available example for a 2008 purchase of Optima Live along with the complementing planning tool Optima Predict was \$500,000. In addition, these programs need between \$45,000 and \$60,000 of annual maintenance according to different sources.

Electronic Patient Care Reporting (ePCR) System

Ambulances need to include electronic devices loaded with ePCR software in order to appropriately and efficiently report services provided for patient records and billing purposes. There is discussion of using iPads which currently retail for \$600 each with special software for this device. The software could initially cost approximately \$330,000 and would require paying fees of approximately \$225,000 each year. The replacement of devices with approximately a three year lifespan alone make the ePCR system an ongoing commitment and expense anticipated at approximately \$17,000 annually. Unknown additional costs exist for maintenance and on-going training.

Establishing Systems and Centers

As demonstrated in the section on acquiring appropriate technology, emergency ambulance transport services require a substantial and extremely organized system of support. In addition to technology, this support includes several systems and physical operations centers for tasks such as dispatch, inventory, billing, and other administration.

Emergency Dispatch

The current emergency dispatch center provides dispatch services for both fire and EMS services through the use of several City of San Diego Fire Department employees as well as two Rural/Metro employees at any given time. The emergency dispatch center itself is located in space provided by the City.

The staffing structure includes Fire Department employees taking calls, dispatching, and supervising. The staffing structure also includes two Rural/Metro employees working with MARVLIS to position ambulances. Rural/Metro employs eight emergency dispatch center employees in total to maintain these operations in 12 hour shifts. If Fire Department employees were to accept this responsibility, the City would have to add eight positions.

Inventory

The current inventory system includes 12 Rural/Metro staff that operate one 2,000 square foot strategically located supply center although they are considering doubling the size to accommodate demonstrated need. Currently, Rural/Metro keeps approximately \$210,000 of inventory in the supply center. Based on Rural/Metro current inventory levels, we anticipate initial inventory costs of \$125,000 as referenced in Figure 10. Ongoing inventory expenses are anticipated to cost \$1.6 million annually.

Billing/Collections

The current billing system includes pre-billing, billing, and collections. Approximately 20 Rural/Metro staff work on billing and collections for the City of San Diego service area, although not exclusively on the City of San Diego service area. Although the City of San Diego has Public Utilities billing operations, the complexity of healthcare billing is substantially more advanced than that of utility billing.

Ambulance transport bills are not only considerably higher than utility bills, but they include the added complexity of collecting from professional representatives of several private insurance companies and public insurance plans. In addition, the collection rate and revenue recovery rate are of elevated importance and complexity. The actual collections and revenue recovery rate are not publically known. When providers bid on contracts, they estimate these rates to determine the value of the contract and how much they have to charge per-transport to recover costs. This is a difficult task because of the numerous variables that impact how much of the average bill will actually be paid including; homeless population, Medicare population, Medi-Cal population, and uninsured population.

An additional layer of rate setting and billing complexity is due to what is known as a “cost shift.” Because those that cannot afford to pay are not denied the service, the cost to provide the service “*shifts*” to those that do pay. The cost shift exists by the nature of the service, but also by national and state healthcare policy.

Some of the chronically homeless population are known as “frequent fliers” because they use the service regularly. In addition to those that do not pay, public health insurance does not reimburse emergency ambulance transport providers with the full cost of providing the service. According to statewide figures from the California Ambulance Association, Medicaid pays an average of \$426 per transport and Medi-Cal pays an average of \$150 per transport.

The model used to collect water bills would not produce an adequate revenue recovery rate to maintain an ambulance system. Using the Public Utilities model would result in substantial taxpayer subsidy, skyrocketing ambulance rates or both.

In determining the emergency ambulance transport fee, the revenue recovery rate must be accurately predicted. If a government agency provides the service and sets the fee too high, customers would be asked to pay more than the service actually costs potentially in violation of Proposition 26. If the fee is set too low, taxpayer dollars must be used to pay the difference.

Another challenge to accurately setting rates is the dramatically changing landscape of healthcare in the United States given the pending implementation of the Patient Protection and Affordable Care Act (ACA). As of January 1, 2014, the Medi-Cal population will begin to substantially grow and the uninsured population will contract.

Since Medi-Cal insurance rates do not cover the actual costs of emergency transport, a higher number of Medi-Cal transports may ultimately have a negative net impact on revenue recovery. Taxpayers would suffer this increased cost if the San Diego Fire-Rescue Department provides this service in the future.

A major benefit of allowing private providers to compete for the contract is protecting the City from that risk. If a private provider proposes a fee that is too high, a different provider will be awarded the contract. If a private provider proposes a fee that is too low, that provider will take a loss.

In addition, the San Diego Fire-Rescue Department would need to create a new billing and collections division. The City would need to hire several staff members with varying responsibilities including approximately 10 employees to bill and collect for the 90,000 emergency transports provided annually.

Administration and Support

The establishment of a publically-run emergency ambulance transport service would require substantial attention of management within the Fire-Rescue Department and the City of San Diego as a whole during the establishment and in perpetuity. If the Fire-Rescue Department submits a proposal, it should include a clearly outlined plan identifying additional management personnel and correspondingly higher overhead costs. We anticipate at least three additional management personnel. There are also currently approximately seven Rural/Metro employees responsible for providing office and program support.

Estimating Initial Costs

The initial and ongoing costs related to the potential insourcing of 9-1-1 ambulance transport services would be substantial. Appropriate use of financing can lessen the burden of initial costs of acquiring ambulances estimated at \$16.1 million.

As described earlier in this report, it is necessary to own more ambulances than are in use at any given point. The current provider dedicates 55 ambulances to the City of San Diego in

order to ensure 36 are available at peak. The following estimated one-time expenses include the purchase of enough ambulances (72) to ensure one can be “housed” at each fire station (47) in San Diego. In addition, the following figure includes other major anticipated expenses but is not all inclusive. For example, it does not include management and human resources staff time or consultant contracts to design and implement the new service which is anticipated to be a substantial and complex effort.

Figure 10: Estimated Major One-Time Insourcing Costs

	Cost Per Unit	Units	Total 1-Time Cost
Ambulance	\$223,000	72	\$16,056,000
Supervisor Vehicle	\$45,000	4	\$180,000
Utility Truck	\$65,000	1	\$65,000
Powered Gurney	\$13,000	83	\$1,079,000
Monitor/Defibrillator	\$30,100	83	\$2,498,000
Ambulance Inventory	\$8,500	72	\$612,000
ePCR Devices	\$600	83	\$50,000
ePCR System	\$330,000	1	\$330,000
Predictive Analytics Software	\$300,000	1	\$300,000
Supply Center Inventory	--	--	\$125,000
Total	--	--	\$21,295,000

Source: SDCTA

In addition, should the San Diego Fire-Rescue Department change the model of service to have all paramedics and EMTs be trained as fire fighters creating a “dual role” service design, the City would be faced with additional implementation costs. These costs would include sending all paramedics and EMTs to the fire academy estimated at \$12.9 million and outfitting all paramedics with personalized fire fighter equipment such as breathing apparatus. Currently, all fire fighters are required to be trained as EMTs, but this does not mean that all EMTs that would be hired would have to be fire fighters.

Estimating Ongoing Costs

Personnel expenses are by far the most substantial of anticipated ongoing costs at \$28.4 million in payroll for the additional 321 city employees. To estimate personnel costs, SDCTA worked with industry experts to understand the staffing levels and design necessary to operate emergency ambulance transport services. SDCTA then matched these positions with similar City of San Diego classification(s). Specific positions were not identified for Fleet Services as it is anticipated that the service would be provided by an existing division of the Public Works Department. A proportional expansion of Fleet Services budget was deemed a more appropriate estimate.

Figure 11: Anticipated Additional Major Ongoing Costs

Additional Employees		Similar City Position
<i>Management</i>		
3	Captain	Fire Captain
<i>Ambulances</i>		
141	Paramedics	Paramedic 1 & 2
141	Emergency Medical Technician	Emergency Medical Technician
<i>Emergency Dispatch</i>		
8	Controller (ambulance positioning)	Police Lead Dispatcher
<i>Supply Center</i>		
1	Manager	Storekeeper III & Stores Operations Supv
1	Supervisor	Storekeeper II
3	Supply Center Technician	Storekeeper I
1	Currier	Auto Messenger I & II
<i>Billing/ Collections</i>		
1	Manager	Customer Information & Billing Manager
1	Supervisor	Customer Services Supervisor
8	Account Representative	Customer Services Representative
<i>Program Support</i>		
1	Office Manager	Administrative Aid II
2	Program Manager	Program Manager
1	Quality Assurance Manager	Customer Information & Billing Manager
2	Quality Assurance Analyst	Customer Services Supervisor
1	Trainer	Customer Services Representative
<i>Fleet Services Expansion</i>		
5	Proportional Expansion of Division	Various Positions
321	Total Additional Anticipated Personnel	

Source: SDCTA

In Calendar Year 2012, the City of San Diego Fire-Rescue Department employed 866 front-line personnel and dispatchers including 342 fire fighters, 167 fire engineers and eight dispatchers. The corresponding management structure was 310 personnel including 230 fire captains, 31 fire battalion chiefs, 14 fire captains, 8 deputy fire chiefs and four assistant fire chiefs. Expanding the existing management structure to accommodate 290 new front-line and dispatch personnel would require a substantial expansion. It is anticipated that rather than expanding the current management structure, an additional three chiefs would support the existing staff to accommodate manage the additional personnel.

SDCTA then used a combination of publicly available sources including actual City of San Diego employee compensation and current department detail budgets to estimate the compensation for each new position and the corresponding loaded cost of each employee to the city and taxpayers.

It should be recognized that the process of creating a complex and high-performance system will require numerous important decisions that will ultimately determine appropriate staffing. The intent of the estimate presented in this report is to provide one possible design.

Figure 12: Anticipated Additional Major Personnel Ongoing Costs

Additional Employees	Average Salary	Average Total Compensation	Average Loaded Cost per Employee	Number of Employees	Ongoing Annual Cost
<i>Management</i>					
Captain	\$84,290	\$124,380	\$152,436	3	\$457,309
<i>Ambulances</i>					
Paramedics	\$43,909	\$74,206	\$99,091	141	\$13,971,901
Emergency Medical Technician	\$29,172	\$54,552	\$77,479	141	\$10,924,508
<i>Emergency Dispatch</i>					
Controller (ambulance positioning)	\$57,356	\$77,762	\$97,889	8	\$783,114
<i>Supply Center</i>					
Manager	\$50,281	\$61,400	\$80,665	1	\$80,665
Supervisor	\$44,769	\$50,030	\$68,663	1	\$68,663
Supply Center Technician	\$34,999	\$47,589	\$65,098	3	\$195,295
Currier	\$31,201	\$36,536	\$53,928	1	\$53,928
<i>Billing/ Collections</i>					
Manager	\$81,141	\$86,009	\$109,337	1	\$109,337
Supervisor	\$69,784	\$82,295	\$104,318	1	\$104,318
Account Representative	\$39,470	\$46,195	\$64,735	8	\$517,883
<i>Program Support</i>					
Office Manager	\$48,782	\$52,078	\$74,643	1	\$74,643
Program Manager	\$97,452	\$100,062	\$129,985	2	\$259,970
Quality Assurance Manager	\$81,141	\$86,009	\$109,337	1	\$109,337
Quality Assurance Analyst	\$69,784	\$82,295	\$104,318	2	\$208,636
Trainer	\$62,677	\$65,847	\$87,784	1	\$87,784
<i>Fleet Services Expansion</i>					
Proportional Expansion of Division	\$50,724	\$56,705	\$76,642	5	\$383,212
Additional Anticipated Personnel				321	28,390,503

Source: SDCTA

In addition, should the San Diego Fire-Rescue Department change the model of service to have all paramedics and EMTs be trained as fire-fighters creating a “dual role” service design, the City would be faced with additional personnel costs of \$16.3 million annually. Because the City is the oversight body to the current provider, the City may also find it appropriate to create an emergency response independent citizens oversight board to ensure independent oversight remains. A new oversight committee would also come with costs.

There are also a substantial amount of ongoing non-personnel costs associated with insourcing emergency ambulance transport services. The following figure presents several major anticipated non-personnel ongoing costs, however it is not all inclusive.

Figure 13: Anticipated Additional Major Non-Personnel Ongoing Costs

Expense Category	Ongoing Annual Cost
Ambulance Replacement Fund	\$3,568,000
Supervisor Vehicle Replacement Fund	\$30,000
Utility Truck Replacement Fund	\$8,000
Powered Gurney Replacement Fund	\$216,000
Powered Gurney Maintenance	\$85,000
Monitor/Defibrillator Replacement Fund	\$500,000
Monitor/Defibrillator Maintenance	\$144,000
ePCR Devices Replacement Fund	\$17,000
ePCR System	\$225,000
Predictive Analytics Software	\$45,000
CAD Maintenance EMS Portion	\$100,000
Inventory	\$1,600,000
Fleet Services Expansion (Non Personnel or Debt)	\$955,000
Fuel Cost	\$1,300,000
Total	\$8,793,000

Source: SDCTA

In addition, the City would no longer receive the \$10.4 million franchise fee paid annually by the current private provider.

Offering the Same Level of Oversight

The City of San Diego currently ensures ambulance transport services are provided not only by contracting with a private emergency ambulance transport services provider, but also by providing oversight over the contract specifically with respect to response times. A public provider receives direct oversight only from higher offices within the same governmental agency.

If a private provider does not meet the contractually required response times, the provider pays penalties and can ultimately lose the contract. If a public provider doesn't achieve the same response times, there may be no enforcement mechanism. One example of a public provider not meeting adequate response times is the City of San Diego Fire-Rescue Department first responders. While quarterly compliance reports continue to report Rural/Metro achieving the contractually obligated response times, the same reports stopped reporting Fire-Rescue Department first responders' response times that were not consistently achieving the goal.

Differences such as this make comparing proposals from public and private providers challenging. Mechanisms can be put in place to minimize this concern; however there is some level of inherent differences between public and private providers.

Increased City Liability Risk

A major change that would occur if the San Diego Fire-Rescue Department were to take over EMS services deals with a shift in liability. Currently, Rural/Metro is legally liable for lawsuits filed relating to ambulance transport services. Should the San Diego Fire-Rescue Department take over emergency ambulance transportation, the City would be solely liable for all litigation related costs. Legal costs could arise for a variety of incidents, including everything from vehicle accidents, which are a relatively common occurrence in the ambulance industry, to patient care outcomes impacted negatively by unsatisfactory response time or the actual care provided by a paramedic.

Legal costs would be incurred by the City Attorney's office to defend the City against all lawsuits. In addition, any settlement or judgment costs would be made out of the City's public liability fund. Estimating the true cost of this increased liability is beyond the scope of this report, however it believed to be substantial.

Section V: Findings

City of San Diego's Emergency Medical Services (EMS) Program

1. There is often confusion between two distinct parts of Emergency Medical Services programs – emergency ambulance transport services and first responder services. Currently the City of San Diego contracts with Rural/Metro to provide emergency ambulance transport services. The City's Fire-Rescue Department provides first responder services.
2. The current City of San Diego provider of emergency ambulance transport services consistently achieves response time contractual requirements.
3. The current provider faced the need for 17.3 percent more responses citywide over the past three fiscal years alone.
4. The City of San Diego Fire-Rescue Department has been unable to achieve response time goals for first responder emergency medical services given existing funding levels and resources.

Cost Recovery and Subsidy

5. Public emergency ambulance transport providers typically acknowledge that customer revenues are not intended to provide full cost recovery. It is more common for elected officials to push for increased revenues from private providers to relieve the general fund than to directly increase fees charged to the public.
6. Substantial rate increases have been largely driven by franchise fees – which are requirements for private providers to pay the government for the right to provide the service. Franchise fees are used to offset first responder expenses. In other words, government agencies take payment from private service providers to help pay for first responder services.

If the San Diego Fire-Rescue Department were to Bid

7. If the City of San Diego Fire-Rescue Department were to begin providing emergency ambulance transport services, it would face numerous challenges including:
 - A. No longer receiving annual payment from the service provider of \$10.4 million currently used to offset City EMS services.
 - B. Approximately \$21.3 million in start up costs including \$16.1 million to purchase enough ambulances (72) to provide 47 on duty at any given time – one to be “housed” at each fire station.
 - C. Approximately \$37.2 million in annual ongoing costs including \$28.4 million in compensation for an additional 321 employees.
 - D. Acquiring and maintaining appropriate technology.
 - E. Establishing systems and centers such as billing/collections and a supply center that would include substantial management and human resources staff time and likely consultant contracts.
 - F. Should the San Diego Fire-Rescue Department take over emergency ambulance transportation, the City would be solely liable for all litigation related costs. Legal costs could arise for a variety of incidents, including everything from vehicle accidents, which are a relatively common occurrence in the ambulance industry, to failure to meet a standard of medical care for patients.
 - G. Setting rates to collect enough revenue to offset additional costs. The amount of the average bill that will actually be paid is dependent on the size of the homeless, Medicare, Medi-Cal, and uninsured populations. Another challenge to accurately setting rates is the dramatically changing landscape of healthcare in the United States given the pending implementation of the Patient Protection and Affordable Care Act (ACA). Proposition 26 (2010), which requires fees to not exceed the cost of providing the service, may also limit the City’s ability to collect as much revenue as a private provider would.
 - H. Oversight mechanisms are typically stronger for private providers of EMS services making comparing proposals submitted by public and private entities challenging.

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Appendix B: Literature Review

EMS Performance Metrics

[“Emergency Medical Services Performance Measures: Recommended Attributes and Indicators for System and Service Performance.”](#) National Highway Traffic Safety Administration. December 2009.

This document provides recommendations from the National Highway Traffic Safety Administration on metrics for assessing quality and effectiveness of medical services provided by responders as well as levels of customer satisfaction. These metrics include average defibrillation time, pain relief rate, pain worsened rate, and patient satisfaction rate based on survey responses.

The National Highway Traffic Safety Administration developed these measures by organizing EMS leadership groups to form the EMS Performance Measures Project Steering Committee in 2004. Through a process of surveying its members, this committee formulated 35 “indicators” for EMS performance measurement intended to facilitate more consistent performance evaluation across EMS providers nationwide.

Lerner, Brooke; Nichol, Graham; Spaite, Daniel; Garrison, Herbert; Maio, Ronald. [“A Comprehensive Framework for Determining the Cost of an Emergency Medical Services System.”](#) November 2006.

This article lays out a framework for cost-effectiveness analysis of EMS systems. The author identifies the key cost components of providing EMS services as: human resources, physical plant, vehicles, equipment, communications, medical oversight, administrative overhead, training information systems, and bystander response to medical emergencies.

The paper is intended to provide quality metrics and methods for the analysis of EMS system cost. The author recommends, for example, that EMS performance evaluations be conducted from a societal, rather than economic perspective. Many cost-effectiveness analyses of EMS services – such as the numerous economic analyses cited in “Economic Value of Out of Hospital Emergency Care” cited below – do not use a societal perspective as the basis of their analysis. This prevents studies from considering the full range of costs of health programs, such as the opportunity cost of allocating government resources to EMS services rather than a host of competing funding priorities.

Lerner, Brooke; Nichol, Graham; Spaite, Daniel; Garrison, Herbert; Maio, Ronald. "[Economic Value of Out of Hospital Emergency Care: A Structured Literature Review.](#)" November 2006.

This report examines 32 economic and medical analyses of EMS practices to determine the most common methodologies and findings of prior EMS research. EMS personnel training and equipment costs were the most commonly used cost categories. The studies are also categorized based on their perspective; whether costs and benefits are calculated from an agency or societal perspective.

Outsourcing and Cost Effectiveness

City of Colorado Springs Sustainable Funding Committee. "[Outsourcing Methods & Case Studies.](#)" Public Financial Management Inc. April 2009.

This guidebook from Public Financial Management Inc. discusses the choice to outsource municipal services in general and advises entities on the circumstances in which outsourcing is most appropriate. The authors warn against outsourcing public safety services as the risk of contract failure is not worth the threat of these essential services failing to be provided. The authors also warn of the costs of contractor management and administration that accompany privatization of services and can often be substantial.

The report also compares case examples of successful and unsuccessful outsourcing efforts by municipal governments. Issues with contract compliance and enforcement seem to be a recurring problem among unsuccessful outsourcing cases, which supports the report's conclusion that high costs of contract management are a major downside of outsourcing.

David, Guy; Chiang, Arthur. "[The Determinants of Public versus Private Provision of Emergency Medical Services.](#)" University of Illinois Chicago. October 2006.

This report compares the advantages of municipal and private contractor providing EMS services to determine which cities and what kinds of circumstances lead to the adoption of one format over another. The authors find that private EMS contractors have an a scale economy advantage over municipal entities because they are not restricted to one city and typically provide services to much larger populations. While the scale of service for an in-house EMS provider is a function of the total population of the city, the scale of service for a private company is a function of the total population of all cities served. The report also advises against a public private partnership wherein the fire department assumes first responder

responsibilities and a private company handles transport, arguing that continuity of providers results in faster response times.

In terms of the characteristics of cities that make public or private EMS provision more effective, the level of isolation of a city – whether or not it is surrounded by neighboring cities – reduced the scale advantage of private provision over public EMS. The study also reports observational data showing that larger cities with more hospitals by area, higher poverty rates, and higher levels of public sector unionization are more likely to adopt public EMS systems.

[“Emergency Medical Services Agenda For The Future.”](#) National Highway Traffic Safety Administration. July 2010.

This comprehensive review of the current state of EMS systems in the US provides recommendations for modernization and increased efficiency in service provision. The section on system financing specifically recommends changes to reimbursement models to eliminate the incentive for service providers to transport all patients even in the absence of medical necessity. Most EMS providers are reimbursed based on transports, which results in unnecessary transports of patients and wastes resources. The report recommends a transition by all agencies overseeing EMS to reimbursement structures that eliminate this incentive. One way to accomplish this goal is reimburse providers based on “preparedness”, meaning that providers are reimbursed based on the cost of maintaining an acceptable state of readiness to carry out its responsibilities.

[“EMS System Performance-Based Funding and Reimbursement Model.”](#) National Ems Advisory Council. May 2012.

The National EMS Advisory Council recommends metrics for assessing the cost effectiveness of EMS service provision. The report recommends that costs be broken down to measure the cost of each system component in, allowing jurisdictions to determine the minimum cost of service irrespective of system design. Because different local governments structure reimbursement of providers differently, comparison of total costs of service across local entities can be misleading. Examining only the cost of system components allows for more direct comparisons of true cost effectiveness.

[“Finance Committee Report to NEMSAC.”](#) National EMS Advisory Council. September 2009.

This report examines the relationship between reimbursement structures and system performance. The Advisory Council also recommends the use of reimbursement structures that allow emergency responders to “treat, release, and refer” patients under specific medical protocol rather than transporting them to a hospital.

The report also recommends that specialized EMS responders who handle patients at the highest severity levels, such as Stroke Center responders, should be compensated at a higher level to reflect the increased resource intensity of these operations. The conclusions recommend adoption of methods for ensuring that lower severity patients are not up-triaged to increase compensation levels.

[“Guiding Principles and Core Issues in EMS System Design.”](#) National EMS Advisory Council. September 2009

This report from the National EMS Advisory Council outlines best practices for EMS system performance and emphasizes the role of regulation and oversight as components of system design. Regulatory entities play a crucial role in ensuring accountability of providers and facilitating working agreements for EMS operation over multiple jurisdictions.

The report lays out broad guiding principles for EMS system design such as use of “team approach”, “medical dispatch prioritization”—meaning ability to match resources with caller/patient needs without excessive reliance on first responders—and the use of a medical oversight team comprised of physicians to advise EMS system administrators and ensure that responders have adequate training and experience.

MacKenzie, Ellen; Carlini, Anthony. [“Configuration of EMS Systems: A Pilot Study.”](#) March 2008.

This study surveys 235 EMS systems in seven states in the mid-atlantic region in order to better understand which aspects of system design promote cost effectiveness and clinical excellence. The study examined criteria such as system size, provider type, operating procedures, use of volunteers, response to calls outside service area, and funding source (whether fee or subsidy-based). The results of the survey show a strong relationship between urban-rural designation and funding source, with 72 percent of systems in large metro areas relying primary on taxpayer subsidies for funding, while 43 percent of rural systems used mostly

taxpayer dollars. In terms of agency organization, results show that 60 percent of systems surveyed use more than one agency in first response, most commonly the fire department and a private EMS company. The results also showed significant differences in the technological sophistication of urban and rural systems. Rural jurisdictions were also found to have longer response times, face higher personnel turnover rates, and often lack access to high-quality pre-hospital care.

Poole, Robert W. “[Privatizing Emergency Medical Services: How Cities Can Cut Costs and Save Lives.](#)” The Reason Foundation. November 1995.

This paper makes several recommendations regarding the design and implementation of what it calls “High Performance Paramedic Systems”. These recommendations are based on EMS system designs observed in cities with the lowest per capita public subsidy for EMS services that are also “setting the standard for patient care”.

Four key metrics are used to assess the performance of EMS delivery systems: Response time, measured as a fractile rather than average response time, is crucial. Response time should be measured so as to tabulate the percentage of responses that meet a certain goal, for example, a good EMS provider would answer 90 percent of calls in under eight minutes. Productivity is another valuable metric, calculated by dividing the total number of transports carried out in a time period by the number of unit hours provided during that period. Unit cost, or cost per response can be measured by totaling the expenses incurred in a time period and dividing that number by the number of responses carried out during the time period. The level of taxpayer subsidization is also an important metric which is determined by simply calculating the proportion of service provision funded by user-fees as opposed to tax revenue.