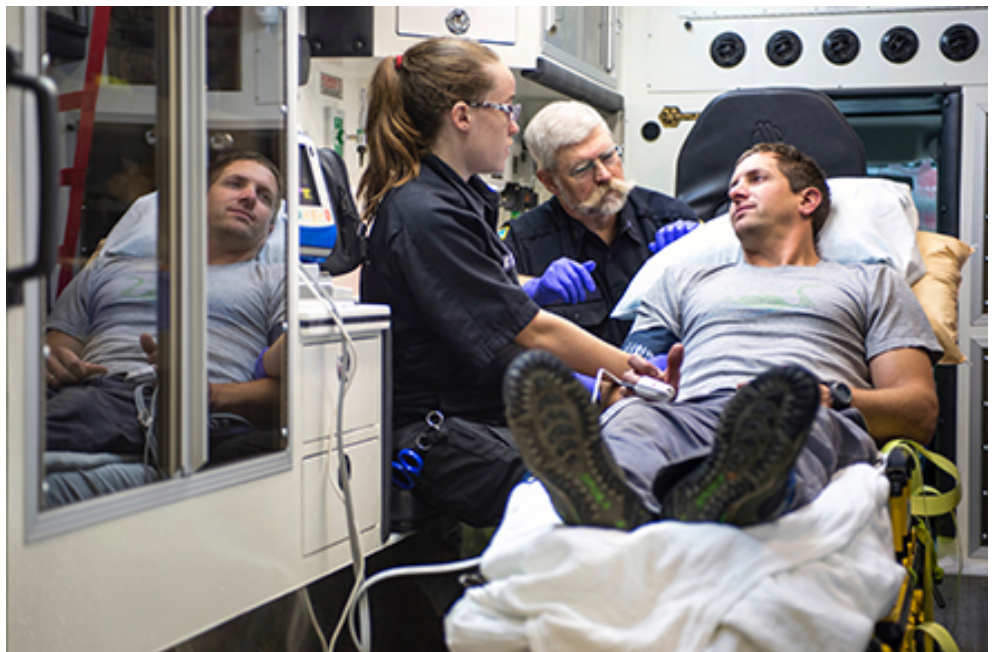


FINANCIAL AND OPERATIONAL ANALYSIS FOR PARAMEDIC SERVICES

San Diego CSA 17



CPSM[®]

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ICMA

Exclusive Provider of Public Safety Technical Services for
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International City-County Management Association (ICMA)

The International City Management Association is a 103-year old, nonprofit professional association of local government administrators and managers, with approximately 13,000 members located in 32 countries.

Since its inception in 1914, ICMA has been dedicated to assisting local governments and their managers in providing services to its citizens in an efficient and effective manner. ICMA advances the knowledge of local government best practices with its website (www.icma.org), publications, research, professional development, and membership.

Center for Public Safety Management, LLC (CPSM)

The ICMA Center for Public Safety Management (ICMA/CPSM) was launched by ICMA to provide support to local governments in the areas of police, fire, and emergency medical services.

ICMA also represents local governments at the federal level and has been involved in numerous projects with the Department of Justice and the Department of Homeland Security.

In 2014, as part of a restructuring at ICMA, the Center for Public Safety Management (CPSM) was spun out as a separate company. It is now the exclusive provider of public safety technical assistance for ICMA. CPSM provides training and research for the Association's members and represents ICMA in its dealings with the federal government and other public safety professional associations such as CALEA, PERF, IACP, IFCA, IPMA-HR, DOJ, BJA, COPS, NFPA, and others.

The Center for Public Safety Management, LLC, maintains the same team of individuals performing the same level of service as when it was a component of ICMA. CPSM's local government technical assistance experience includes workload and deployment analysis using our unique methodology and subject matter experts to examine department organizational structure and culture, identify workload and staffing needs, and align department operations with industry best practices. We have conducted more 315 such studies in 42 states and provinces and 224 communities ranging in population from 8,000 (Boone, Iowa) to 800,000 (Indianapolis, Ind.).

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SECTION 1. EXECUTIVE SUMMARY

The Center for Public Safety Management LLC (CPSM) was retained by the County of San Diego, Health and Human Services Agency (HHSA), to conduct a review of the Emergency Medical Services (EMS) delivery system in County Service Area (CSA) 17. Specifically, CPSM was tasked with providing an in-depth review of the **Financial and Operational oversight** of HHSA's Emergency Medical Services Section in its administration of the paramedic ambulance providers and EMS first responders; the overall goal of the review is to provide recommendations aimed at improving efficiency and ensuring proper financial oversight.

CPSM provides this analysis and recommendations in **two segments**. In the first segment, we evaluate the financial components associated with providing these services. This aspect of the study reviews the organizational structure of the CSA, the contractual relationship with the various service providers, its financial accounting practices, fund management, recordkeeping, and managerial oversight. Our focus is on the financial components utilized in the oversight of these services, the administration of the revenue and expenditures, and the long-term sustainability of these funding sources.

The second segment of the study, the operational review, we analyze the delivery of EMS services. This includes the evaluation of the different deployment practices associated with operations in the CSA, and the effectiveness of dispatching procedures, deployment, and resource control. We also review the level of medical control, the effectiveness of existing performance measures, and the review of service outcomes. We also examine the working relationship among the various service providers and their workloads.

In our review, CPSM interacted extensively with County staff and the service providers to obtain and interpret certain documents, data, and information. We used this information/data to familiarize ourselves with the various aspects and costs associated with service delivery. This information was used to determine if there are financial management practices and deployment options that could enhance overall service efficiencies and position the County to improve its oversight and financial management for these services.

For the first segment of the project, we conducted a site visit on March 26-28, 2019 for the purpose of observing system operations and financial accounting practices, interviewing key staff members, and reviewing preliminary data and reporting practices. Telephone conference calls as well as e-mail exchanges were conducted between CPSM project management staff, the service providers, and other key officials involved in EMS operations. CPSM will typically utilize national and state benchmarks that have been developed by organizations such as the California Emergency Medical Services Authority (EMSA), National Fire Protection Association (NFPA), the Association of Public-Safety Communication Officials-International (APCO), the Center for Public Safety Excellence Inc. (CPSE), and the ICMA Center for Performance Measurement, as well as others in developing its analysis. CPSM has continued meeting quarterly with the CSA since March as well as addressing a special meeting of the City Managers and fire chiefs for CSA 17 on February 13, 2020.

We are exceptionally impressed with the County's staff. We found the County's EMS employees to be highly skilled and extremely committed in serving San Diego County and in support of the provider agencies. The County personnel with whom CPSM interacted are truly interested in serving the County and its residents and visitors to the best of their abilities. Though the County personnel with whom we interacted are not directly involved in the delivery of EMS services, their efforts to provide funding, develop performance outcome measures, ensure quality assurance practices, and oversee system financial standing are all critical to service delivery. The County's EMS section is challenged to appropriately staff and manage the financial oversight of paramedic service delivery and review the best practices that ensure the financial sustainability and solvency of these efforts. Though these aspects of financial management are difficult to navigate, they are not insurmountable. CPSM will provide a series of recommendations that can assist the County with its duties to ensure the proper oversight and administration in this critical public safety function.

Fourteen recommendations are listed below and in the applicable sections within this report. The recommendations are based on best practices derived from the NFPA, CPSM, ICMA, APCO, the U.S. Fire Administration, the American Ambulance Association (AAA), and the Federal Emergency Management Agency (FEMA).

RECOMMENDATIONS

1. County EMS should continue the current long-term service contracts (three to five years in length) with fire agency service providers and in subsequent agreements, tie any future price escalations to a specified service index or financial cost indicator. (See p. 33.)
2. The CSA 17 Budget Subcommittee should be more engaged with County EMS on the financial analysis of the CSA. (See p. 34.)
3. County EMS should implement a more simplified financial reporting process that incorporates the use of dashboards and cost centers for evaluating the expense and revenue projections for CSA 17. (See p. 38.)
4. County EMS should continue its practice of maintaining a six-month operating reserve balance in the CSA. (See p. 39.)
5. County EMS should contract for random internal post-claim audits of ambulance billing and patient care records in the CSA. (See p. 39.)
6. County EMS should consider increasing both resident and non-resident transport rates in CSA 17 to reflect the prevailing transport rates in the area. (See p. 42.)
7. County EMS, working with the service provider agencies in CSA 17, should develop a clinical performance dashboard to monitor compliance with key clinical bundles. (See p. 45.)
8. County EMS, working with its EMS service providers, should develop a patient experience reporting process and dashboard to monitor patients' perceptions of the services being provided. (See p. 51.)
9. County EMS should monitor the clinical performance outcomes reported for patient care in CSA 17 and compare these indicators with those benchmarks established in the ESO Solutions EMS Index. (See p. 51.)

10. County EMS should work with response agencies in CSA 17, the dispatch centers, and the Medical Director in implementing an effective prioritization process that is capable of supporting Emergency Medical Dispatching (EMD) for incoming EMS calls. (See p. 55.)
11. County EMS should work with response agencies in CSA 17 to implement response guidelines that preclude agencies from responding with lights and sirens when the EMD inquiry indicates that a "hot" response is not warranted. (See p. 55.)
12. County EMS should include in future ambulance service agreements in CSA 17 an exclusivity provision with the 911 transport provider for all interfacility, non-emergency transports that originate in the CSA. (See p. 56.)
13. County EMS should work with the ambulance contractor and the North Comm dispatch center in the utilization of system status management deployment practices for ambulance units. (See p. 56.)
14. County EMS should include in future service agreements in CSA 17 the requirement that the providers receive enhanced revenues if they can demonstrate clinical excellence, cost efficiency, and exceptional patient experience in their service delivery. (See p. 57.)

SECTION 2. CSA AUTHORIZATION



HISTORY & PURPOSE

The County Service Area (CSA) is a legislative tool established in the California Government Code, Section 25210.1, which authorizes counties to finance and provide public facilities and services in select sections of the unincorporated areas of their jurisdictions. The CSA is a dependent taxing mechanism under the direction of the County Board of Supervisors, which authorizes specific tax levies for express purposes in both incorporated and unincorporated areas of the County.

CSA 17, which includes the cities of Del Mar, Solana Beach, and Encinitas, along with the unincorporated areas of Del Mar Heights, Rancho Santa Fe, and portions of Elfin Forest, was established in 1969 to provide basic emergency ambulance services.

CSAs were formed with the express purpose of funding the delivery of basic emergency ambulance services and later expanded to provide advanced life support (paramedic) services. Through a series of authorizations that were approved by referendum by the affected residents in these areas, additional tax levies were authorized to fund ambulance transport and first response EMS services. There are two CSAs in San Diego County, CSA 17, and CSA 69. Each CSA was established independent of the other and they are structured differently in the methods in which services are provided. The County's Health and Human Services Agency (HHSA), and its Emergency Medical Services section (County EMS), are charged with the oversight of this funding authority and the administration of these services. The two CSA's utilize different models to provide EMS services; CSA 17 uses a two-tier model (private contracted transport with medical first response by the fire department) and CSA 69 uses a fire-based ambulance transport system.

ORGANIZATIONAL STRUCTURE AND OVERSIGHT

As part of the administrative and operational supervision of service delivery in CSA 17, an Advisory Committee was established to provide a means of communication between the citizens in the CSA and the County of San Diego HHSA and the Board of Supervisors. Membership on the advisory committee includes a cross-section of the service area, with representation from the primary service providers in the CSA (Municipal and Fire District Representatives) along with hospital representatives, the ambulance provider, and civic and citizen groups as specified in the specific legislation establishing the CSA. CSA 17 also maintains an Operations Chief Subcommittee, which reviews and provides recommendations regarding service delivery, deployment, and equipment needs. Both the CSA Advisory Committee and their Operations Chiefs Subcommittees are staffed and organized under the County's EMS section, which is responsible for maintaining the meeting agendas and the minutes for these meetings. Each provider agency is responsible for the supervision and administration of its field activities, including personnel administration, logistical support, capital facilities, and vehicle acquisition and maintenance. CSA 17 also has a Budget Subcommittee that historically meets annually to review budgets for upcoming years.

Given the critical financial environment, the Budget Subcommittee should be engaged in reviewing the finances of the CSA and providing input into recommendations to help assure the sustainability of the CSA.

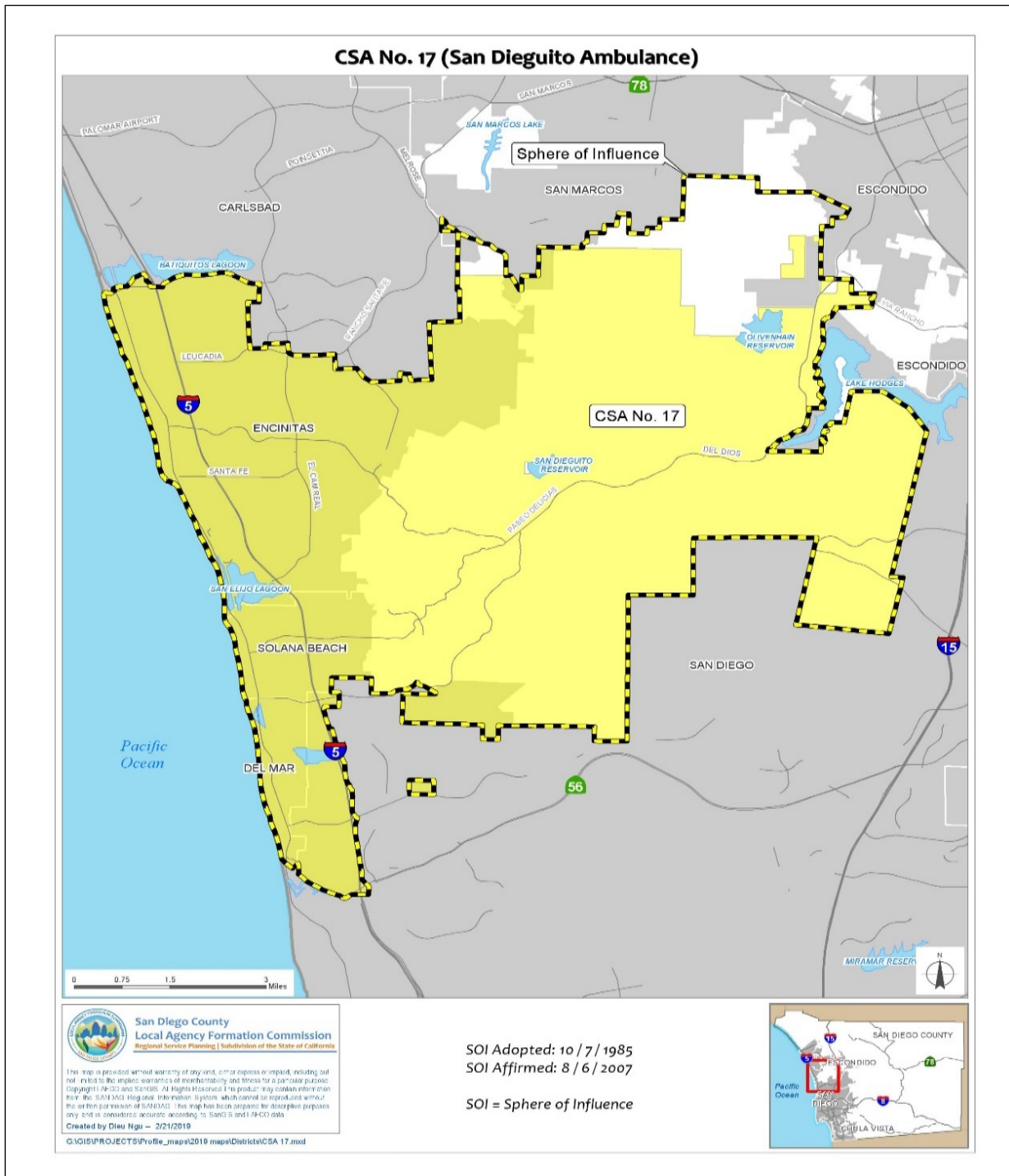
The County has entered into service contracts with the service providers; this contract specifies the terms and conditions for delivering services along with the annual payment for these services.

In **CSA 17**, fire departments are responsible for EMS first response and this service is provided at the Advanced Life Support level (ALS). This means that fire response vehicles, typically fire engines, are staffed with at least one paramedic and are equipped with medical supplies, equipment, and medications that support ALS treatments. The County has also entered into a service contract with a private ambulance provider that is responsible for the delivery of ALS treatment and patient transport services in CSA 17. Both fire first response units and an ambulance are dispatched to all 911 emergency calls. The ambulance provider contract in CSA 17 is currently held by American Medical Response (AMR). AMR staffs its ambulances with one paramedic and one EMT. CSA 17 has individual provider contracts with three separate municipalities: Encinitas, Solana Beach, and Del Mar. In addition, there are service contracts with the Rancho Santa Fe Fire Protection District (RSFFPD) and the North County Dispatch Joint Power Authority (North Com).

DESCRIPTION OF SERVICE AREAS

CSA 17 encompasses an estimated service area of 73 square miles situated in the north-coastal area of San Diego County. It includes the cities of Encinitas, Del Mar, Solana Beach, the community of Rancho Santa Fe, the areas identified as Crosby Ranch, 4-S Ranch, Del Mar Heights, Del Mar Terrace west of Interstate 5, and Elfin Forest. The entire CSA area has an estimated resident population of more than 130,000 and experiences significant influxes of non-resident tourist populations.

FIGURE 2-1: Map of CSA 17



EMS ambulance transport and first response cost in CSA 17 is funded in part by CSA revenues obtained through property taxes, voter-approved benefit fees, intergovernmental transfers (GEMT), along with resident and non-resident patient transport fees. In CSA 17, for FY 19/20, the combined total from all revenue sources generated \$5,327,300 Table 2-1 is a summary of the revenues generated and their sources for the CSA.

TABLE 2-1: Revenue Sources for CSA 17 (FY 19/20)

Resident Ambulance Transport Fees	\$1,225,859
Non-Resident Ambulance Transport Fees	\$831,447
Ambulance Transport Fees Subtotal	\$2,057,306
Property Tax	\$1,453,535
Benefit Fee	\$1,689,966
Other (Interest, GEMT)	\$126,493
Non-Transport Related Revenue Subtotal	\$3,269,994
Total Revenue	\$5,327,300

COMPARISON OF CSA MODEL WITH OTHER EMS FUNDING STRUCTURES

The CSA model currently utilized in CSA 17 is a unique funding and management structure that resembles the **EMS Public Utility Model** that is being used effectively in several communities across the United States.¹ The Public Utility Model is an EMS delivery system in which both public tax funding and user fees generated from patient transport activities are utilized to fund operations. Typically, public utility models operate as follows:

- The public utility owns and manages the capital assets utilized in providing these services (vehicles, equipment, CAD systems, radio systems, etc.).
- Generally, through an open procurement process, an EMS contractor (typically a privately held ambulance company) is selected to provide the EMS personnel, dispatchers, and field supervision needed in providing these services.
- An independent medical control group is established to oversee clinical services, quality control, training, and performance measurement.

In most public utility models, a **Two-Tier EMS Delivery System** is utilized. In this arrangement, area fire departments are the primary first responder and the ambulance provider is a co-responder. The fire departments will typically arrive first on scene, provide the initial patient assessment, and begin treatment. Fire department first responders may deliver their services at either the basic life support level (BLS) or at the advanced life support level (ALS).

In some public utility models, fire agencies receive a first responder fee for their services; performance measures are established to regulate and govern service delivery criteria. In most public utility models, a common and predominant medical control component is utilized to ensure quality control in patient care and treatment modalities.

1. Currently, the public utility model for EMS is used in Richmond, VA; Oklahoma City and Tulsa, OK; Reno/Washoe County, NV; Fort Worth, TX; Little Rock, AR; Pinellas County, FL; Charlotte, NC; and Fort Wayne, IN.

The ambulance provider in the public utility model will typically co-respond with first responders and assume patient care, along with patient transport, when needed. Once the ambulance provider assumes responsibility of patient care, the fire department unit is typically released from the scene and returns to its assigned response area. There are occasions, such as in the care of the most critical patients, in which a fire department member will accompany the ambulance during transport. The public utility is a quasi-governmental operation that has limited tax authority to fund EMS operations and capital expenditures and maintains oversight of patient care. There are different iterations of the Public Utility Model in which the public utility may provide and own the ambulances, facilities, and capital equipment (radios, computer systems, medical and extrication equipment, etc.). In some systems the public utility is also responsible for the operation of the EMS dispatching system and the management and deployment of field units.

In addition to emergency 911 transport services, in the Public Utility Model, **interfacility transport services** are also provided. These services typically are non-emergency in nature and involve the movement of patients from one medical facility to another. Interfacility transports are typically scheduled services, and these services are provided on a fee-for-service basis. The public utility will also manage the billing and collection process. These financial services may be subcontracted to an outside provider or may be managed by public utility staff. The combined revenues generated by the Public Utility Model, user fees, and tax revenues are utilized to fund all operations. The unique aspect of the EMS Public Utility Model is that the funding for EMS services is provided through a combination of user fees (patient transport revenue) and publicly generated tax revenue. These are governmental agencies that utilize high performance, high value practices in the delivery of these services.

In several communities, a **Fire-Based EMS System** is utilized in the delivery of EMS treatment and transport services. For descriptive purposes, CSA 69 uses the fire-based system model. These systems also use a two-tiered process, but in the fire-based systems, all responding personnel and equipment are operated under the authority of the local fire department. As with the Public Utility Model, first response activities are either configured as BLS or as ALS providers. In fire-based EMS systems, when a patient transport is required, this service is carried out by fire department personnel and a fee is generally assessed for these services. Revenues received from transport services are utilized to supplement the funding for all fire department operations.

Several communities utilize a **Hospital-Based EMS System**. In this arrangement a two-tiered delivery system may be utilized, and the combined fire first responders and hospital EMS personnel co-respond in delivering services. These systems can be either for-profit or non-profit operations. Fees are assessed for transport services and billings and collections are generally carried out under hospital supervision.

There are also EMS delivery systems that are a **Stand-alone Government Entity**. These systems are typically operated as a separate EMS department under county, provincial, or state governmental structures. These services are also funded through a combination of tax-generated revenues and user transport fees. Fire agencies may provide first response services and medical control and quality control are provided as a separate element of this structure.

Perhaps the most common EMS delivery system is what is often termed as a **Public-Private EMS Model**. In this structure, first response activities are provided by the local fire department and transport services are provided by a private ambulance provider. In the public-private EMS model, the ambulance service is on a fee basis and the private ambulance provider will conduct its own billing and collection activities associated with providing these services.

In the public-private EMS model, the fire department first response activities are typically not eligible for reimbursement by third-party payers, therefore, funding is provided through the governmental budgetary process, typically through local tax revenues (property and sales taxes).

In the public-private EMS model, the local government will enter a contractual arrangement with the ambulance provider, stipulating the terms of this service agreement including the fee structure for transport charges and some criteria for service performance (response time criteria, staffing levels, medical control, etc.). In the public-private model, depending on the demographics of the community and the types of transport revenues that are realized, a government subsidy or stipend may be provided to the ambulance provider to sufficiently fund the ambulance operations. In some communities where revenues are sufficient to fund ambulance operations, the local government may require a franchise fee be paid by the ambulance provider so that some of the profits realized from transport services are redistributed to fund a portion of the governmental operations associated with service delivery.

The current environment in the delivery of healthcare is changing dramatically, and the recent COVID-19 Pandemic has accelerated changes in healthcare delivery. The COVID-19 Pandemic has dramatically changed EMS delivery. Many communities saw a significant decrease in 911 response and transport volume. At the same time, EMS agencies undertook essential expanded roles such as patient navigation to destinations other than a hospital emergency department, COVID testing, vaccine administration and monoclonal antibody (mAb) infusion therapy.

Changes in the insurance industry, including Medicare, Medi-Cal, and employer-sponsored insurance coverage, have altered the approach to providing medical care, including prehospital care and emergency medical transports. The public has recognized the benefits of utilizing the 911 system to access rapid and professional prehospital care. Prior to the COVID Pandemic, the volume of 911 calls has been increasing across the nation; these increases often stress the capacity of first responders and hospital emergency departments. Much of the call volume associated with 911 calls are not true medical emergencies and frequently involve public assists, substance abuse calls, and calls involving mental health and other efforts that require social service assistance rather than emergency medical care.

In numerous systems across the nation, many calls are non-emergency in nature and do not necessitate a “HOT” response (with lights and sirens). For example, recent data from the Metropolitan Area EMS Authority (MedStar) Public Utility Model system in Fort Worth, Texas, reveals that only 24 percent of its response activity is classified as life-threatening or Priority 1 calls. In other words, this analysis indicates that 76 percent of the call activity is non-life-threatening or non-emergency in nature.

TABLE 2-2: Analysis of Response Modes Utilizing a Dispatcher Call-screening Process (MedStar/Fort Worth, TX)*

Response Priority	# of Calls	Percent of Total
Priority 1 – Life-threatening	30,298	24.3
Priority 2 - Non-life-threatening	60,747	48.8
Priority 3 - Low acuity emergency	33,555	26.9

**Note: Response summary for MedStar units in 2020 involving 124,600 responses.*

Consequently, 911 dispatch call centers across the nation are enhancing their capability to screen incoming calls to determine the nature and severity of the incident from the information provided by the caller. With this information in hand, agencies can alter their response to better match the level of response with the true nature and severity of the call.

Additionally, many communities are establishing new programs involving the delivery of **Community Paramedicine** or **Community Health Initiatives**. These programs are aimed at reducing the number of 911 transports to hospital emergency departments to divert non-emergency patient transports to resources that are best suited to provide the level of care that is required.

The service model utilized in CSA 17 is a type of **Hybrid EMS Public Utility Model**. The combined use of both tax revenues and user fees in funding services, combined with system oversight by a regulatory government entity, is in line with the structure of the public utility model described above. This, combined with the establishment of specified fees for the various services and the management of the billing process, are all very consistent with the public utility model.

Where the San Diego CSA systems differ is the level of control that is exercised in both clinical and operational performance. In most EMS Public Utility Models, the level of medical control exercised by the medical control group is very rigid and comprehensive in its scope. The Medical Director and their staff have significant involvement in directing clinical performance and requiring specific service delivery outcomes. There is typically a very robust effort in the areas of quality control and quality assurance. This level of performance is applied to all aspects of the service delivery network including 911 medical dispatching, EMS first response, transport activities, training, and skills evaluation. In the San Diego system, the level of oversight exercised by the County's Medical Director appears very limited and its review of performance outcomes, including response time criteria, is not monitored, or reviewed on a regular basis.

SECTION 3. CSA 17: PROVIDER PROFILE

CSA 17 receives EMS services from a composite of municipal fire agencies, one fire protection district, and a private ambulance provider (AMR). EMS first response services are provided by four fire agencies: Del Mar Fire, Encinitas Fire, Rancho Santa Fe Fire Protection District and Solana Beach Fire. The cities of Encinitas, Del Mar, and Solana Beach have established a cooperative management services agreement that provides field supervisory and administrative oversight of fire and EMS response services throughout the three-city area and into neighboring unincorporated areas of CSA 17.

The combined Encinitas/Del Mar and Solana Beach contingent operates from eight fire stations utilizing six ALS engines, two ALS ladder trucks, and one ALS squad unit as the primary response units daily. Encinitas/Del Mar and Solana Beach operate with a minimum daily on-duty staffing of 27 personnel. The Rancho Santa Fe Fire Protection District (RSFFPD) operates from six fire stations and The daily minimum on-duty staffing levels in the RSF is set at 18-line personnel. Five of the six RFS stations are staffed with a minimum of three personnel; one station (Station #6) operates with a minimum of two personnel. RSF will also utilize upwards of 30 reserve positions to supplement on-duty staffing.

Each of the fire agencies provides ALS first response services and works jointly with AMR in their response to EMS calls throughout CSA 17. AMR ambulance units are jointly staffed at several of the fire stations in the three-city area and co-respond with municipal resources. Table 3-1 identifies each fire station and the primary response vehicles and personnel assigned to each fire facility.

TABLE 3-1: CSA 17 Fire Stations, Response Units, and Assigned Personnel

Station #	Response Units	Assigned Personnel
Encinitas-1	1 Engine	3 1
Encinitas-2	1 Engine AMR-Ambulance	3 2*
Encinitas-3	1 Engine 1 Command/BC	3
Encinitas-4	1 Engine	3
Encinitas-5	1 Truck AMR-Ambulance	3 2
Encinitas-5	1 Squad	2
Solana-1	1-Engine 1-Ladder Truck AMR-Ambulance AMR Supervisor	3 3 2 1
Del Mar-1	1-Engine	3**
Rancho SF-1	1-Engine AMR-Ambulance	3 2
Rancho SF-2	1-Engine AMR-Ambulance	3 2
Rancho SF-3	1-Engine	3
Rancho SF-4	1-Engine AMR-Ambulance	3 2
Rancho SF-5	1-Engine	3
Rancho SF-6	1-Engine	2

Note: *12-hour unit; **A non-dedicated 12-hour AMR unit is posted in the Del Mar Heights area

WORKLOAD & SERVICE OUTCOMES

The combined EMS workload in CSA 17 is generally light, given the number of transport units (5.5), the daily call volume, and the size of the service area. In calendar year 2020 there were a total of 7,373 EMS responses among the combined service entities; these responses resulted in a total of 4,979 patient transports. Table 3-2 shows the distribution of EMS responses occurring in each of the subareas of CSA 17. On average, this would indicate that CSA 17 was generating approximately 15 transports each 24-hour period, or approximately 2.7 transports per transport unit if distributed equally. Given an estimated 73-minute call duration for each transport, CPSM estimates that on average, each of the CSA 17 ambulances are involved in patient transport activity approximately 3.1 hours each 24-hour period. When combined with the 2,394 EMS calls that do not result in a transport, and an average 25-minute call duration for each non-transport EMS call, CPSM would further estimate that this additional workload would equate to 0.5 hours each day per ambulance. Thus, we would estimate that each ambulance in CSA 17 is operational on EMS response and transport activity an estimated 3.6 hours each 24-hour period.

TABLE 3-2: CSA 17 Total EMS Calls by First Responding Agencies (2020)

Agency	Total EMS Calls	Average Daily Calls
Encinitas	4,371	12.0
Rancho Santa Fe	1,237	3.4
Solana Beach	887	2.4
Del Mar/Del Mar Heights	734	2.0
Total	7,944	21.8

DISPATCHING SERVICES

The dispatching of EMS resources is a key part of EMS service delivery. Dispatching services for responding agencies servicing CSA 17 are provided under contract by the North County Dispatch JPA, commonly referred to as North Comm. North Comm is a joint powers authority (JPA), a public entity established under Section 6502 of the California Government Code. North Comm provides fire and emergency medical dispatch services to 17 separate fire departments, AMR, and a number of other service entities in the North San Diego County area. North Comm has a separate operating Board of Directors and a Medical Director and receives fees from participating agencies to fund its operations. North Comm utilizes a staff of 21 full-time dispatchers and three shift supervisors along with additional part-time personnel, IT and GIS staff, and administrative and management personnel in providing these services.

The center provides Emergency Medical Dispatching but responding agencies in the CSA do not utilize the call-prioritization efforts and severity index provided by the center in order to better and more safely manage their response patterns. Subsequently, all response entities in CSA 17 (fire and ambulance) typically run “hot” (lights and sirens) to all requests for assistance.

In addition, North Comm has the ability to provide “**System Status Management**,” which is an automated dispatching process that allows real-time movements and relocations of available units to place them in optimum service location to maximize efficiency and improve response times. Fire and ambulance units in CSA 17 typically respond from fixed fire station locations and do not rove throughout the CSA when awaiting an assignment to a call. On most EMS calls, both a fire engine and an AMR ambulance are dispatched.

TRANSPORT SERVICES

911 emergency transport services are provided in CSA 17 by American Medical Response (AMR). AMR is a for-profit ambulance service that operates under a service contract with the County of San Diego. AMR was paid just over \$4 million for its services in calendar year FY 2019/20. In this arrangement, AMR provides personnel (including a full-time EMS Coordinator), vehicles, supplies, radio communications, mobile data computers, and regular reporting regarding its response activities to the County of San Diego. AMR units are housed and respond from municipal fire stations throughout the CSA. At the time of this analysis, AMR operated five 24-hour units and a sixth 12-hour ambulance. An additional 12-hour ambulance is also operated with combined staffing (1 AMR, 1 FD) and this is used primarily as a trainer car to train new personnel.

The current agreement is based on a flat rate charge in which payments are made monthly for one-year increments. The same monthly rate is paid regardless of the number of calls that are responded to or the payments received for these responses. The current agreement is slated to be in effect through December 31, 2021. The ambulance transport agreement is offered through a competitive procurement process. AMR is not responsible for any billing services associated with the transports it carries out. It provides a daily reporting to a third-party billing service (originally Wittman Enterprises, but recently transitioned to Digitech through a competitive procurement process), which is responsible for the billing services associated with EMS transports in CSA 17. All collections for transport services are received by the County of San Diego. AMR provides only 911 emergency transports; non-emergency, interfacility transports are provided in the CSA by other ambulance providers.

In 2020 AMR responded to a total 7,358 calls for service in CSA 17. These calls for service resulted in a total of 4,979 transports. The terms of the AMR service agreement stipulate that AMR units maintain a maximum response time for all calls in the CSA that is 10 minutes or less, 90 percent of the time. AMR consistently meets these response time criteria, except for those exclusions that are specified in the agreement (non-emergency responses, weather delays, mutual aid responses outside the CSA, road closures, incorrect dispatching, etc.). AMR responds hot (lights and sirens) on most calls. AMR will typically respond jointly with a fire department first response engine.

Billing Services and Collections

When the project began, the County of San Diego had entered into an agreement with Wittman Enterprises, LLC for the purpose of providing billing and collection services for all EMS 911 transports carried out in both CSA 17 and CSA 69. Wittman was in the fifth year of a five-year agreement that expired on June 30, 2020. Wittman was paid on a percentage basis for all net collections received for its services. In FY 2018/19 this rate of payment was established at 4.5 percent of net collections. In FY 2018/19, Wittman collected \$1,906,937 in net revenue for 911 transport services in CSA 17. For these services Wittman was paid an estimated \$87,856. A new billing and collection provider, Digitech began services in the first calendar quarter of 2020. It is CPSM's experience that there is normally a decrease in collections when a new provider is brought in because old collections continue and new begin. Normally this dip is resolved within several quarters as experience and collections increase.

The billing process carried out by Wittman (and with the new provider) was based on whether those transported are residents or non-residents. Residents are charged \$400 for each transport while non-residents are charged \$1,050 for each transport. In addition, all patients are billed extra for the mileage traveled during the transport. Non-residents also are assessed additional charges for the use of oxygen and whether the transport occurred during night-time hours. A treat-and-release charge is applied to non-residents who require EMS services but are not transported by an AMR unit. For CSA 17, Digitech receives its billing information from a data transfer by AMR units daily.

SECTION 4. OPERATIONAL COST AND REVENUE COMPARISON

For clarification purposes, the financial models and the operational delivery systems established for EMS in CSA 17 and CSA 69 are different. Though both systems have been established under the same dependent taxing mechanism authorized by law under the County Board of Supervisors, they differ markedly in their costs for delivering these services and the composition of service providers responsible for service delivery.

Though the two CSAs are approximately 30 miles driving distance apart and are similarly sized both geographically and in resident populations, the demographics and call activities in the two areas are markedly different. CSA 17 encompasses several affluent coastal communities and receives significant influxes of tourist population to these beach areas. CSA 69 is further inland and generates nearly twice as many EMS responses as CSA 17. Perhaps the more significant difference in the two service delivery systems is that CSA 17 utilizes a private ambulance provider (AMR) in providing EMS transport services, while CSA 69 provides fire department-based transport services through its two fire departments (Santee and Lakeside).

VIABILITY OF THE CSA SERVICE DELIVERY MODEL

EMS is a vital component of the healthcare system. As with most aspects of health care, costs have risen dramatically in recent years. In the wake of these cost escalations, insurance providers along with state (Medi-Cal) and federal payers (Medicare) have attempted to ensure that EMS transport services are of medical necessity and that other options for patient transfers are either not available or not viable. The scrutiny of these reviews are aimed at eliminating services that are not covered in an effort to reduce overall costs. The cost for an ambulance transport in the San Diego area is among the highest in the nation. According to a 2019 survey of transports rates throughout California, resident and non-resident ALS transport base rates average approximately \$1,550. BLS transports average just over \$1,326. In addition to these base charges there are add-on costs for mileage and supplies that average \$250 per transport. These add-on charges raise the typical transport rate for an ALS call to an estimated cost of \$1,800.

Most insurance providers typically cover emergency and non-emergency ambulance transports. There are several stipulations that qualify the necessity of these services, but when these stipulations are met, payment is allowed. Each insurance provider will pay varying amounts for the transport and there are various levels of EMS transports (ALS1, ALS2, BLS-emergency, BLS-non-emergency, ALS specialty, etc.) that can result in different charges and different levels of payment.

The general groupings of insurance payers in the U.S today are as follows:

- **Medicare** (national health insurance administered under Social Security).
- **Medi-Cal** (California Medical Assistance Program, California's Medicaid).
- **Private Insurance** (United Healthcare, WellPoint, Humana, Cigna, Blue Cross, etc.).
- **No Insurance/Private Pay.**

Among these payer classifications, there can be significant variation in the amount of payment that is allowable under the coverage and the copayment that is required to be paid by the patient. There may also be differences in the level of payment depending on whether the policy is in an HMO group or a PPO group. The majority of health insurance coverage in the U.S. today is provided under some type of employer provided insurance. Recently, the trend is toward a larger portion of medical healthcare coverage being provided through government providers (Medicare or Medi-Cal). Medicare and state Medicaid programs, including Medi-Cal, typically require that providers who accept their patients be paid based on what is referred to as **assignment**. Assignment means that if the provider of the service agrees to accept Medicare and Medicaid patients, they must accept the amount of payment that is paid by the provider and generally cannot recoup any additional costs for the service from the patient. Medicare and Medi-Cal payments for EMS transports are significantly lower than the typical charges for such services.

Depending on the demographics of the area, the mix of the payer groups can vary markedly. In communities with a larger concentration of senior population, there is a preponderance of coverage that is provided through Medicare and its associated supplemental private insurance coverages. Supplemental insurance coverage typically pays the cost of the service up to the allowable maximums authorized under Medicare. Medicare does not allow for **balance billing**; or the pursuit of payment by the service provider beyond what is authorized by Medicare. However, Medicare patients with supplemental coverage typically are a preferred payer class because of the reliability of these payments. In those service areas with lower socio-economic concentrations there is a higher percentage of the population that relies on government-provided coverage, typically Medi-Cal in California.

There are marked differences in the payer mix that utilize EMS transport in CSA 17 and CSA 69. In CSA 17, Medicare payments typically average about 40 percent of the payments and Medi-Cal about 4 percent. Conversely, in CSA 69 we see about 40 percent of payment comes from Medicare, but Medi-Cal users more than double and account for over 10 percent of the total payments. The mix of the payer groups affects total receipts for services. In San Diego County, the assigned rate for an EMS transport under Medi-Cal (ALS or BLS) is only \$106. The allowed charge for an ALS call in San Diego County under Medicare can be as high as \$697, notwithstanding the additional payments that are made through supplemental insurance coverage.

As insurance payments for EMS transports trend downward, efforts must be established that attempt to recoup the cost for providing these services. In systems that rely solely on the revenues generated through transport fees, the most viable option is to raise the cost per transport for those payer groups that have insurance. These higher charges are intended to offset the lower amounts paid by those patients who utilize Medicare and Medi-Cal and those patients without insurance who often do not pay for their services. However, there comes a point when price escalations become too high and service revenues are unsustainable. At that point, the services either become unavailable or a government entity must step in and provide assistance in order to maintain the service. This assistance can be provided in various ways. Typically, it takes the form of a stipend or subsidy to the provider that is generated from some type of tax levy to ensure the profitability of providing the services.

Government entities have utilized a whole host of funding mechanisms to fund EMS services. Some communities have established independent healthcare districts that generate revenues to fund a multitude of health service-related costs (public hospitals, trauma centers, ground and air ambulance services, health clinics, substance abuse centers, etc.).

Other communities have established government funded EMS providers either under the auspices of their fire department or by a standalone EMS service provider (County EMS, etc.). In this arrangement a combination of tax funding and transport fees are utilized to fund the service. A number of communities have chosen to utilize the EMS Public Utility Model. These utilities are specifically authorized to fund and manage EMS service delivery using a combination of public and fee-based revenues. In San Diego County, the establishment and utilization of the dependent County Service Area (CSA) was an iteration of a funding model designed to supplement the cost for providing EMS services and at the same time a regulatory mechanism to monitor the quality of patient care.

From the perspective of providing oversight of EMS services and generating a viable revenue stream to fund these services, **CPSM believes that CSA 17 is a viable and effective tool in effectuating the delivery of EMS services.** However, the proficiency with which the CSA has managed expenditures and its level of oversight regarding the quality of patient care, is, in our view, in need of improvement.

REVENUES CSA 17

EMS and ambulance services in CSA 17 have historically been financed through a combination of user fees (transport revenue), property taxes (tax increment rate), and a benefit assessment fee (benefit fee) for residents living in the CSA and visitors who utilize these services.

Property assessment rates are relatively fixed due to a combination of legislative regulations. The tax increment mileage rate is capped at an annual rate of increase of 2 percent and benefit fee annual increases are tied to the San Diego area Consumer Price Index (CPI).

TABLE 4-1: CSA 17 Historical Non-transport Revenue*

	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
Property Tax	\$1,071,935	\$1,127,153	\$1,197,186	\$1,257,938	\$1,323,145	\$1,390,637
Benefit Fee	\$1,495,887	\$1,515,909	\$1,572,224	\$1,603,873	\$1,578,598	\$1,630,281
Other	\$59,450	\$78,787	\$58,961	\$111,303	\$276,751	\$219,151
Non-Transport Revenue	\$2,627,272	\$2,721,849	\$2,828,371	\$2,973,114	\$3,178,494	\$3,240,069

Using these projections, we have developed the projected revenues that are anticipated through FY 2024-25 for non-transport revenues.

TABLE 4-2: CSA 17 Actual & [Projected] Non-transport Related Revenue

	FY 2019-20	[FY 2020-21]	[FY 2021-22]	[FY 2022-23]	[FY 2023-24]	[FY 2024-25]
Property Tax	\$1,453,535	\$1,624,948	\$1,711,720	\$1,803,126	\$1,899,413	\$2,000,842
Benefit Fee	\$1,689,966	\$1,694,522	\$1,720,605	\$1,747,089	\$1,773,981	\$1,801,288
Other	\$126,493	\$202,770	\$207,130	\$211,583	\$216,132	\$220,779
Non-Transport Revenue	\$3,269,994	\$3,522,240	\$3,639,455	\$3,761,798	\$3,889,526	\$4,022,908

Transport revenues are a product of the volume of transports that occur within the CSA, the rates charged for these transports, and the amount of collections that are received for these services. The rates charged for ambulance transports are established for the CSA through the direction of the County Board of Supervisors, based on feedback received from the CSA Advisory Board and administered by County EMS. These rates have historically provided for a resident transport rate and a non-resident rate. Resident transport rates have not increased since the early 1980s. In addition, there are charges for mileage, oxygen usage, and whether a nighttime transport increment was charged. User fees for residents are less than those for non-residents due to the tax and benefit fee assessment paid by residents. Changes in population growth and demographics result in ambulance response variations. However, there is little change from year to year in the numbers of transports that are carried out in the CSA (typically less than a 3 percent annual increase). CPSM has analyzed these historical patterns for CSA 17 and has developed transport volume predictions. It is important to note that for the purposes of this analysis, CPSM used only actual ambulance transports, not fees for patients assessed on scene and not transported.

TABLE 4-3: CSA 17 Historical Transport Revenue

	2015-16	2016-17	2017-18	2018-19	2019-20
Transports	4,698	4,909	5,154	5,086	5,011
Revenue	\$2,000,709	\$1,895,098	\$1,995,015	\$1,906,937	\$2,057,306

TABLE 4-4: CSA 17 Projected Transport Revenue

	2020-21	2021-22	2022-23	2023-24	2024-25
Transports	4,589	4,608	4,685	4,763	4,843
Revenue	\$2,298,915	\$2,310,462	\$2,349,094	\$2,388,371	\$2,428,305

**Note: COVID-19 Pandemic impacted transport rates in FY 2019-20 and beyond.*

CSA 17 Collection Rates

As with most healthcare providers, EMS services struggle with collection rates. Communities often are required to provide EMS service, but patients are not required to pay for those services at the time these services are received. This lag between service and payment results in great difficulty in ultimately collecting for these services. While some agencies may report collection rates in various ways, the most transparent way to report **collection rates** are by dividing the **total amount received** for services provided, by the **actual dollars billed** for the services. Some agencies may incorporate billed amounts that are expected to be received, net of contractual allowances; however, this may give a false interpretation of the most important measure, the dollars collected of the dollars billed.

It is not unusual for some agencies to only collect a fraction of the payment for the services provided. For emergency ambulance services, collection rates of 25 percent to 40 percent are generally expected. This is a product of the types of insurance that the patients have and whether or not they have insurance at all. For example, for a Medi-Cal patient, the maximum fee that can be collected for an emergency transport is just over \$106. For a Medicare patient, the maximum to be collected is approximately \$700. Given the resident transport rate of \$400 and the non-resident transport rate of \$1,050, one can see how the determination of the actual collections can be skewed by the differences in the payer groups.

For the fiscal year ended (FYE) June 30, 2020, CSA 17’s gross collection rate was 60.0 percent. This is derived as follows:

- Gross Invoiced: \$3,494,914
- Cash Received: \$2,057,306
- Percent Collected: 60.0

Payer Mix

Ambulance transport revenue is significantly impacted by the community payer mix, defined as the percentage of billed and collected revenue based on payer source. Generally, Medicare and Medi-Cal pay a set fee for ambulance transports and the patient is generally not required to pay any difference between the billed amount and the amount paid by Medicare and Medi-Cal. Commercial insurance tends to pay a higher portion of ambulance claims, as these payers typically pay claims based on a regional “Usual and Customary Rate,” or UCR. The UCR is generally derived from the payer’s analysis of the average ambulance claims for the market. A review of CSA 17’s payer mix is shown in Table 4-5.

TABLE 4-5: CSA 17 Payer Mix Based on Payments Received

Payer	FY18-19 Total YTD
Medicare	27.4%
Medicare HMO	15.4%
Medi-Cal	1.1%
Medi-Cal HMO	4.2%
Insurance	44.0%
Private Pay	8.0%
Other	0.0%

**For this analysis, CPSM has chosen to not include data from 2020 due to the unusual impact of the COVID-19 pandemic on response and transport volume.*

The proportion of payments from patients with commercial insurance is not unusual (typically it averages somewhere between 45 percent and 52 percent of the revenue) and as mentioned earlier, these private insurance payments tend to be higher than other payer types. This also means that any increase in the ambulance rates charged will likely yield additional net revenue from this payer category.

When we look at the combined revenues in CSA 17, we can determine that in FY 2019-20, tax funding (property tax and benefit fees) along with other non-user fee revenues (other), accounted for 61.4 percent of the total revenue. Ambulance transport revenues account for approximately 38.6 percent of the total revenue.

TABLE 4-6: CSA 17 Historical Revenue – All Sources

	2015-16	2016-17	2017-18	2018-19	2019-20
Ambulance Transport Fees	\$ 2,000,709	\$ 1,895,098	\$ 1,995,015	\$ 1,906,937	\$ 2,057,306
Property Tax	\$ 1,197,186	\$ 1,257,938	\$ 1,323,145	\$ 1,390,637	\$ 1,453,535
Benefit Fee	\$ 1,572,224	\$ 1,603,873	\$ 1,578,598	\$ 1,630,281	\$ 1,689,966
Other (Interest, GEMT)	\$ 58,961	\$ 111,303	\$ 276,751	\$ 219,151	\$ 126,493
Total Revenue	\$ 4,829,080	\$ 4,868,212	\$ 5,173,509	\$ 5,147,006	\$ 5,327,300

In projecting future revenues that include valuation changes, transport volume changes, along with projected transport collections, and assuming no increase in transports rates, we can expect a combined revenue increase of approximately 2.1 percent. For these projections, property tax was projected to increase an average of 5.3%. Based on these estimates, we have developed the following projections:

TABLE 4-7: CSA 17 Projected Revenue – All Sources

	2020-21	2021-22	2022-23	2023-24	2024-25
Ambulance Transport Fees	\$ 2,298,915	\$ 2,310,462	\$ 2,349,094	\$ 2,388,371	\$ 2,428,305
Property Tax	\$ 1,624,948	\$ 1,711,720	\$ 1,803,126	\$ 1,899,413	\$ 2,000,842
Benefit Fee	\$ 1,694,522	\$ 1,720,605	\$ 1,747,089	\$ 1,773,981	\$ 1,801,288
Other (Interest, GEMT)	\$ 202,770	\$ 207,130	\$ 211,583	\$ 216,132	\$ 220,779
Total Revenue	\$ 5,821,155	\$ 5,949,917	\$ 6,110,892	\$ 6,277,897	\$ 6,451,213

Net Revenue Per Transport

CPSM has analyzed historical and projected net revenue per transport for ambulance services, as well as tax increments, benefit fees, and other revenue sources. In the following table, the fiscal year 2019-20 column shows actual revenues reported for CSA 17. Revenues for fiscal years 2020-21 and beyond are CPSM’s projections.

TABLE 4-8: CSA 17 Net Revenue Per Transport

	2018-19	2019-20	[2020-21]	[2021-22]	[2022-23]	[2023-24]	[2024-25]
Transport Revenue/Transport	\$373.44	\$410.56	\$390.28	\$390.28	\$390.28	\$390.28	\$390.28
Other Revenue/Transport	\$637.06	\$652.56	\$657.84	\$666.09	\$674.66	\$683.57	\$692.83
Total Revenue/Transport	\$1,010.50	\$1,063.12	\$1,048.12	\$1,056.37	\$1,064.94	\$1,073.85	\$1,083.11

From a revenue perspective, in CSA 17 we are estimating the total revenue per transport (including transport fee collections, taxes and other revenue) to be just over \$970 in FY 2017-18. These per-transport revenues moderate slightly in future projections, but we anticipate that the average revenue to remain in the \$970 range for the next seven to eight years. Again, these projections include modest revenue increases, but assume the same transport fee structure for both resident and non-resident transport rates. By developing the average revenue per transport, we can provide a direct comparison to the cost per transport in refining this analysis.

EXPENDITURES CSA 17

In fiscal year 2019-20, the distribution of expenses in CSA 17 associated with EMS delivery was for contractual arrangements for the ambulance contractor and fire first response services. There was also a mix of payments for the various administrative overhead costs, including medical control, billing service, dispatch services, and other miscellaneous fees. There were also additional fees paid to the first responder organizations for capital equipment and training enhancements. The ambulance contract fees were the greatest expense, accounting for 74 percent of the overall costs. Fire department first response services, including the capital expenditures, accounted for 17.6 percent of the costs, with administrative costs, billing, and dispatch services account for 10.6 percent of the overall expenditures. The following figure shows the distribution of CSA 17 expenditures for FY 2019-20.

Table 4-9: CSA 17 Distribution of Expenditures, FY 2019-20

Expense	2019-20	% of Total
AMR	\$4,126,930	74.0%
City of Del Mar	\$138,722	2.5%
City of Encinitas	\$525,475	9.4%
Rancho Santa Fe Fire Protection District	\$135,696	2.4%
City of Solana Beach	\$183,414	3.3%
Billing Fees	\$76,244	1.4%
North County Dispatch	\$30,776	0.6%
Sacramento Fire	\$4,595	0.1%
Willdan	\$6,892	0.1%
County Admin Services	\$155,126	2.8%
DPC	\$-	0.0%
CSA Business Consultant	\$32,418	0.6%
GEMTQAF (\$32.30 fee per transport)	\$56,025	1.0%
Accruals for R1, Solana Beach, Wittman	\$105,479	1.9%
Total Expenses	\$5,577,792	100.0%

The ambulance contract is the largest expenditure for CSA 17, the combined rate of increase between FY 2016-17 and FY 2019-20 for this service is 12.9 percent, or approximately 3.2 percent annually.

Though the fire department first response agreements constitute a significantly lower portion of the overall expenditures in CSA 17, it is interesting to note the amount of increase occurring in these contract rates over the same four-year period. In FY 2017-18, the combined fire department first response contracts totaled \$159,912. In FY 2018-19 a new base service fee was determined for first responder contracts, including an established price adjustment over next 5 years. In FY 2019-20, these combined fire department contracts increased to \$417,824. This is an increase of over 161 percent. Table 4-10 shows the AMR historical contract expense and Table 4-11 is the projected ambulance contract expense through FY 2024-25. The current contract with AMR is in effect through December 31, 2021.

TABLE 4-10: Ambulance Contract Expense – FY 2016-17 through 2019-20

Expense	2016-17	2017-18	2018-19	2019-20
Ambulance Contract	\$3,660,645	\$3,859,703	\$3,988,936	\$4,126,930

TABLE 4-11: Ambulance Contract Expense – Projected through FY 2024-25

Expense	[2020-21]	[2021-22]	[2022-23]	[2023-24]	[2024-25]
Ambulance Contract	\$4,265,110	\$4,414,389	\$4,568,893	\$4,728,804	\$4,894,312

The terms of the AMR contract were negotiated and specified in the initial agreement and subsequent extensions. The fire department contracts, though negotiated for multiple years, were frequently adjusted on an annual basis. These adjustments were requested by the agencies, approved by the CSA 17 Advisory Committee, and recommended by County EMS to the County Board of Supervisors. Financial investments were made to enhance equipment, training, and public access defibrillators. Table 4-12 shows the fire agencies’ historical contract expenses and Table 4-13 shows the projected fire contract expenses through FY 2025-26.

TABLE 4-12: Fire First Response Fees, FY 2016-17 through FY 2020-21

	2016-17	2017-18	2018-19	2019-20	(2020-21)
City of Del Mar	\$17,112	\$19,262	\$22,266	\$47,250	\$50,068
City of Encinitas	\$79,538	\$79,581	\$96,613	\$205,378	\$221,633
Rancho Santa Fe	\$102,040	\$42,282	\$78,214	\$135,696	\$150,087
Solana Beach	\$24,043	\$18,787	\$30,311	\$64,381	\$70,458

*2020-21 are Budgeted Amounts.

TABLE 4-13: Projected Fire First Response Fees, FY 2020-21 through FY 2025-26

	[2021-22]	[2022-23]	[2023-24]	[2024-25]	[2025-26]
City of Del Mar	\$51,388	\$52,744	\$54,711	\$56,352	\$58,043
City of Encinitas	\$227,434	\$233,417	\$242,184	\$249,450	\$256,933
Rancho Santa Fe	\$153,977	\$157,981	\$164,004	\$168,924	\$173,992
Solana Beach	\$72,238	\$74,058	\$76,991	\$79,301	\$81,680

The billing contractor receives a percentage of the actual dollars collected as specified in the billing contract. Subsequently, billing fees vary based on the amount of dollars received. This is a common industry practice, and the rate is very consistent with other arrangements both regionally and nationally. Expenses related to ambulance billing are summarized in Tables 4-14 and 4-15.

TABLE 4-14: Billing Fees, FY 2016-17 through FY 2020-21

	2016-17	2017-18	2018-19	2019-20	[2020-21]
Billing Contract Fees	\$85,127	\$89,945	\$87,856	\$76,244	\$105,000

TABLE 4-15: Billing Fees Projected through FY 2025-26

	[2021-22]	[2022-23]	[2023-24]	[2024-25]	[2025-26]
Billing Contract Fees	\$108,150	\$111,395	\$114,736	\$118,178	\$121,724

The additional other expenses associated with service delivery in CSA 17 are illustrated in Table 4-16.

TABLE 4-16: CSA 17 Actual and [Budgeted] Other Expenses through FY 2020-21

Expense	2016-17	2017-18	2018-19	2019-20	[2020-21]
North County Dispatch	\$27,300	\$29,580	\$30,172	\$30,776	\$31,700
Sacramento Fire		\$5,011	\$-	\$4,595	\$-
Willdan	\$-	\$6,491	\$6,718	\$6,892	\$7,000
County Admin. Services	\$128,718	\$135,984	\$178,766	\$155,126	\$215,000
Mutual Aid			\$20,000	\$-	
DPC	\$32,033	\$32,433	\$32,933	\$32,347	\$44,337
GEMTQAF			\$155,921	\$105,479	\$148,235
CSA Business Consultant		0	\$47,500	\$56,025	\$62,852

Transport Unit Cost and Workload

In an effort to refine our analysis and provide perspective regarding the unit cost of service delivery, we have developed a cost per transport in CSA 17. This analysis will provide a direct link to the revenue generated per transport and will indicate, ultimately, a nexus between costs and revenues associated with service delivery in CSA 17.

The County’s ambulance contract for CSA 17 pays AMR \$4,126,930 for its transport services in FY 2019-20. With a projected ambulance transport volume of 5,011 in FY 2019-20, *this means the average ambulance cost per transport is \$823.57*. In addition to the ambulance costs are the cost associated with the fire department first response services, dispatch services, billing, and other administrative charges (including one person to oversee medical director-like service). This combined cost per transport was estimated to be \$124.66 in FY 2019-20. This would indicate that *the average cost per transport in FY 2019-20 is \$948.23*.

In 2019-20, with 5.5 ambulances and 8,706 Unit Hours per year per ambulance, there were 48,180 ambulance unit hours provided for emergency response. With property tax and benefit fees of \$3,134,501, the public subsidy per ambulance unit hour was \$65.06.

Based on FY 2019-20 ambulance contract fee and contracted fees for first response, the average hourly cost per unit hour is \$121.60, including first response fees.

A commonly used measure of ambulance workload and productivity is **Unit Hour Utilization (UHU)**. UHU is a calculation of the amount of time (in hours) a unit is occupied on emergency calls, as a percentage of the total number of hours a unit is staffed and available for response. A unit staffed full-time is available 8,760 hours per year. The greater the UHU, the more active the ambulance component is. The formula to calculate UHU is:

$$\text{UHU} = \frac{\text{(number of calls)} \times \text{(average call duration in hours)}}{8,760 \text{ Hours per Year}}$$

Balancing UHU with response time performance, clinical proficiency, and crew satisfaction is delicate. However, most urban/suburban area ambulance agencies strive to achieve a UHU of 0.330. This means that typically an ambulance would be on an ambulance call 33 percent of its on-duty time. For FY 2019-20 in CSA 17, AMR delivered 48,180 staffed unit hours per year for a transport volume of 5,011. Each call was estimated to have an average call duration of 60 minutes (1 hour). **The UHU calculation for AMR ambulances in CSA 17 is therefore 0.104** (5,011 / 48,180). By normal standards, this is a **very low** unit utilization rate.

CSA 17 TRANSPORT REVENUE

For FY 2019-20, ambulance transport revenue in CSA 17 was \$2,057,306 for 5,011 transports. This results in an **average transport fee revenue of \$410.56**. In addition, CSA 17 receives additional funding through property taxes, EMS benefit fees, and other additional revenue sources (governmental transfers, interest, etc.) for a total of \$3,269,994. This combined additional tax revenue **equates to \$652.66 per transport**.

In FY 2019-20, total CSA 17 total revenue is \$5,327,300. This means the **total revenue per transport is \$1,063.12**. Total expenses for CSA 17 for FY 2019-20 were \$5,577,792. When we evaluated the total costs associated with each transport (ambulance, first response services, billing, dispatch, and administrative charges) it was determined that in **FY 2019-20 the cost per transport was \$1,113.1**. This indicates that there is a net operating loss of \$250,492, or \$49.99 per transport.

2020 was a challenging year due to the COVID-19 pandemic. Many EMS systems, including CSA 17 saw a decrease in ambulance transports, which decreased transport revenue. For FY 2019-20, CSA 17 experienced a 1.5% decrease in transport volume, and we predict an 8.4% decrease in transport volume for FY 2020-21. Although transport volumes across many EMS systems are stabilizing, we do anticipate this a much slower growth in transport volume for CSA 17 for the next few years.

The slow transport volume growth, combined with rising expenses results in CSA 17 experiencing an operational loss for the foreseeable future, without financial mitigation strategies.

Table 4-17 is a summary of transport costs and revenues in CSA 17.

TABLE 4-17: CSA 17 Transport Revenue and Costs (FY 2017-21)

	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21
Ambulance Transports	5,154	5,086	5,011	4,589
Total Revenue	\$5,173,509	\$5,147,005	\$ 5,327,300	\$5,821,155
Total Expenses	\$4,280,134	\$4,718,611	\$ 5,577,792	\$5,371,480
Net from Operations	\$893,375	\$428,394	\$(250,492)	\$449,674

As we project future expenses and revenues, we predict that in future years the service revenues will exceed expenses, but expenses are rising faster than revenues. Table 4-18 shows revenues and expense predictions for CSA 17:

TABLE 4-18: CSA 17 Projected Transport Revenue and Costs (FY 2021-2025)

	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25
Ambulance Transports	4,608	4,685	4,763	4,843
Total Revenue	\$5,949,917	\$6,110,892	\$6,277,897	\$6,451,213
Total Expenses	\$5,550,201	\$5,734,582	\$5,925,859	\$6,123,749
Net from Operations	\$399,716	\$376,310	\$352,038	\$327,464

TABLE 4-19: CSA 17 Projected Reserve Amounts (FY 2021-2025)

	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25
Beginning Balance	\$5,336,913	\$5,636,629	\$5,912,939	\$6,264,978
Credit (Debit) Amount	\$399,716	\$376,310	\$352,038	\$327,464
New Balance	\$5,736,629	\$6,012,939	\$6,264,978	\$6,592,442
Capital Expenditure	\$100,000	\$100,000	\$-	\$-
Reserve After Capital	\$5,636,629	\$5,912,939	\$6,264,978	\$6,592,442
Required Reserve	\$2,775,100	\$2,867,291	\$2,962,930	\$3,061,875
Excess Reserve	\$2,861,528	\$3,045,649	\$3,302,048	\$3,530,567

SECTION 5. REVIEW OF CSA FINANCIAL OVERSIGHT & ACCOUNTING PROCEDURES

Review of Current Accounting Practices

The County of San Diego employs rigorous financial accounting procedures and analysis in its oversight of the CSA, and which cover virtually every aspect of both cost and revenue cycle analysis, along with projections of required reserve balances. The County uses sound practices to project property tax and benefit fees, as well as ambulance transport revenues. There is a significant use of a formula that the County refers to as Compound Annual Growth Rate (CAGR). CAGR is a complex formula for determining changes in projected revenue and expense. Though the CAGR formula is sound in its prediction of revenues over time, it will likely be ineffective in predicting increases in expenses, especially if the County continues to provide additional capital and operating expense increases that go beyond those specified increases in the individual service provider agreements.

CPSM believes that the County has not been diligent in establishing a formula for paying fire provider agencies for their services (first response and transport) within the CSA. The types and rate of increases in provider costs, specifically fire agency services, has been erratic and not associated with a specific performance requirement or volume of service index. CPSM believes that this results in an inconsistency that creates difficulty in predicting long-term financial forecasting. For example, the Wittman Enterprises billing costs and the AMR contract arrangements have incorporated specified price escalations tied to a Consumer Price Index (CPI) increment or some monitored service index (percentage of collections). This results in a more predictable and less sporadic cost model. Fire agency costs, on the other hand, have been erratic and not driven by longer-term contractual provisions.

CPSM believes that in order to stabilize future CSA expenditures, a series of rigid contractual cost containment provisions are needed, and the terms of these provisions must be strictly adhered to. We suggest that all future cost escalations for service providers be tied to a specified service provision or a financial cost indicator (i.e., the consumer price indicator, number of responses/transports, a percentage of revenue received, etc.).

1. County EMS should continue the current long-term service contracts (three to five years in length) with fire agency service providers and in subsequent agreements, tie any future price escalations to a specified service index or financial cost indicator. (Recommendation No. 1.)

The current service agreements with fire-based ambulance and first response agencies do include modest annual compensation increases (approximately 3 percent); however, we have observed several additional funding increases have been provided for equipment and training enhancements. Funding for capital improvements should be clearly stipulated in the first response service agreements. The ability to achieve a sustainable funding mechanism is dependent upon establishing realistic provider cost agreements and a management practice that adheres to the contractual stipulations that are agreed upon.

Accounting Oversight

The current level of oversight by the Advisory Committee and County EMS staff has not placed sufficient emphasis on the long-term financial sustainability of CSA funding mechanisms. The primary objective of the service providers in their relationship with the County appears to obtain the largest amount of financial support with minimal oversight and limited consideration for the long-term financial impacts.

CPSM believes that a higher level of scrutiny is needed in the financial oversight of EMS service delivery. The CSA utilizes an Operations Chiefs Subcommittee for the purpose of reviewing operational proposals and providing review and consent for any recommendations in these areas. CPSM believes that a similar subcommittee that has a financial focus should be established. This subcommittee should be charged with providing oversight regarding proposed expenditures and to review all proposals from a financial perspective. This will help to ensure that all financial decisions are cost effective and can be supported from a funding perspective in both the short-term and long-term.

Recommendation: The County of San Diego should institute a Financial Oversight Subcommittee for CSA 17 for the purpose of reviewing the short-term and long-term financial impacts of all service-related expenditures. (Recommendation No. 2.)

The Budget Subcommittee should be significantly engaged and have a financial perspective and be comprised of representatives of the providers, County EMS, and an independent third-party entity with accounting, healthcare, or public accounting expertise. The subcommittee would assist in the development and review of the financial reporting dashboards, provide preliminary budgetary review, and make recommendations to the CSA on all proposed expenditures.

Administration and Overhead Costs

The County's fiscal and managerial oversight of CSA funding is provided through County EMS. These administrative costs involve medical oversight, financial analysis, quality assurance, and continuing education. In FY 2019-20, the County contracted with an outside EMS business consultant to provide financial assistance with regard to CSA financial oversight. These services have been budgeted for both CSA in a total amount of \$100,000 annually. Considering the nearly \$13 million in combined expenditures by CSA 17 and CSA 69, CPSM believes that these consultant costs do not appear excessive.

It is, however, our belief that the level of oversight and the extent of financial control exercised by County EMS in its administrative duties is currently less than is needed to properly provide the level of oversight required. It is the prerogative of the County Board of Supervisors and the County Chief Administrative Office to determine if this allocation is generating the value desired by the system. As the CSA continues to evolve, the Board of Supervisors and its Chief Administrative Office should carefully evaluate the services being provided by County EMS and its effectiveness in the administration of the CSA.

SECTION 6. OBSERVATIONS & RECOMMENDATIONS

REPORTING PRACTICES

The County provides exceptionally detailed financial reports for the CSA. However, the complexity of these reports makes them difficult to understand and they do not provide sufficient emphasis as to the current and future financial status of the systems. We believe the use of a financial dashboard that identifies key performance indicators (KPIs) will assist in providing a more succinct understanding of the financial viability and trends for the CSA. Tables 6-1, 6-2, and 6-3 are examples of KPI dashboards that may be considered.

TABLE 6-1: Example Operational Revenue Analysis Dashboard

Year: Actual/[Projected]:	2017-18	2018-19	2019-20	[2020-21]	[2021-22]	[2022-23]	[2023-24]	[2024-25]	[2025-26]
Number of Transports	9,383	9,252	9,378	9,506	9,635	9,766	9,899	10,034	10,170
Total Transport Revenue	\$3,821,670	\$3,730,394	\$3,781,157	\$3,832,610	\$3,884,763	\$3,937,627	\$3,991,209	\$4,045,521	\$4,100,571
Revenue per Transport	\$407.30	\$403.20	\$403.20	\$403.20	\$403.20	\$403.20	\$403.20	\$403.20	\$403.20
Other Revenue	\$3,455,030	\$3,292,896	\$3,358,547	\$3,428,094	\$3,501,924	\$3,580,468	\$3,664,208	\$3,753,680	\$3,849,481
Other Revenue per Transport	\$368.22	\$355.91	\$358.13	\$360.64	\$363.46	\$366.63	\$370.16	\$374.11	\$378.51
Total Revenue	\$7,276,700	\$7,023,290	\$7,139,704	\$7,260,704	\$7,386,687	\$7,518,095	\$7,655,417	\$7,799,200	\$7,950,052
Total Revenue per Transport	\$775.52	\$759.11	\$761.33	\$763.84	\$766.66	\$769.83	\$773.36	\$777.31	\$781.71
Ambulance Unit Hours	35,040	35,040	35,040	35,040	35,040	35,040	35,040	35,040	35,040
Transport Revenue /Unit Hour	\$109.07	\$106.46	\$107.91	\$109.38	\$110.87	\$112.38	\$113.90	\$115.45	\$117.03

TABLE 6-2: Example Operational Expense Analysis Dashboard

Year: Actual/[Projected]:	2017-18	[2018-19]	[2019-20]	[2020-21]	[2021-22]	[2022-23]	[2023-24]	[2024-25]	[2025-26]
Transports	9,383	9,252	9,378	9,506	9,635	9,766	9,899	10,034	10,170
Total Expenses	\$6,722,564	\$7,294,103	\$7,547,824	\$7,853,225	\$8,147,873	\$8,489,469	\$8,850,749	\$9,229,745	\$9,627,629
Total Expense/Transport	\$716.46	\$788.38	\$804.85	\$826.18	\$845.67	\$869.29	\$894.12	\$919.89	\$946.66
Ambulance Expenses	\$6,361,298	\$6,865,003	\$7,109,168	\$7,401,247	\$7,680,655	\$8,004,762	\$8,345,912	\$8,701,674	\$9,072,676
Ambulance Expense/Transport	\$677.96	\$742.00	\$758.08	\$778.63	\$797.17	\$819.66	\$843.12	\$867.26	\$892.09
Overhead Expense/Transport	\$38.50	\$46.38	\$46.78	\$47.55	\$48.49	\$49.63	\$51.00	\$52.63	\$54.57
Ambulance Unit Hours (4 units x 8760 hours/year)	35,040	35,040	35,040	35,040	35,040	35,040	35,040	35,040	35,040
Unit Hour Utilization	0.268	0.264	0.268	0.271	0.275	0.279	0.283	0.286	0.290
Expense per Unit Hour	\$191.85	\$208.17	\$215.41	\$224.12	\$232.53	\$242.28	\$252.59	\$263.41	\$274.76

TABLE 6-3: Sample Operational Expense Analysis Dashboard

Year: Actual/[Projected]	2017-18	2018-19	2019-20	[2020-21]	[2021-22]	[2022-23]	[2023-24]	[2024-25]	[2025-26]
Revenue per Transport	\$407.30	\$403.20	\$403.20	\$403.20	\$403.20	\$403.20	\$403.20	\$403.20	\$403.20
Other Revenue/Transport	\$368.22	\$355.91	\$358.13	\$360.64	\$363.46	\$366.63	\$370.16	\$374.11	\$378.51
Total Revenue/Transport	\$775.52	\$759.11	\$761.33	\$763.84	\$766.66	\$769.83	\$773.36	\$777.31	\$781.71
Expense per Transport	\$677.96	\$742.00	\$758.08	\$778.63	\$797.17	\$819.66	\$843.12	\$867.26	\$892.09
Other Expense/Transport	\$38.50	\$46.38	\$46.78	\$47.55	\$48.49	\$49.63	\$51.00	\$52.63	\$54.57
Total Expense/Transport	\$716.46	\$788.38	\$804.85	\$826.18	\$845.67	\$869.29	\$894.12	\$919.89	\$946.66
Revenue over Expenses	\$59.06	(\$29.27)	(\$43.52)	(\$62.33)	(\$79.00)	(\$99.47)	(\$120.75)	(\$142.58)	(\$164.95)

The current forecasting process is overly complex and often deviates from the funding levels specified in the provider agreements. CPSM believes a simpler approach to forecasting is warranted and should utilize the known contractual cost increases to predict future expenses. Revenue projections should be based on historical trends in service volumes and the utilization of anticipated tax and benefit fee increments that are authorized legislatively. The ability to fund any service increments beyond those specified in the contractual agreements should be limited to one-time funding considerations that utilize reserve or contingency funding. In addition, prior to any fund increase, a detailed analysis should be made that looks specifically at the long-term impacts of these expenditures. This approach has been used by CPSM in this engagement as demonstrated in the workbooks and calculations provided in this report.

The recommended **Financial Oversight Subcommittee** should be required to review and recommend approval for any significant financial adjustment. To facilitate this financial analysis, we are proposing the use of “**dashboards**” with identified “**cost centers**” to monitor and report on projected revenues, expenses, and operational performance indicators.

Recommendation: The County of San Diego should implement a more simplified financial reporting process that incorporates the use of dashboards and cost centers in evaluating the expense and revenue projections for CSA 17. (Recommendation No. 3.)

COST CENTER APPROACH TO COST REPORTING

There are several primary revenue and cost drivers for CSA 17 that can be useful in developing a quick assessment regarding the financial solvency of operations. A cost center is an accounting tool typically utilized in manufacturing and production industries to isolate costs in an effort to maximize profits. CPSM believes that by utilizing cost centers to identify, and perhaps more importantly, to monitor, any trends in expenditures can improve the efficiency of EMS delivery within the CSA.

Typically, a cost center measures the specific costs associated with the delivery of a service. In CSA 17, various cost centers can be established for those elements involved in delivering these services. For example, cost centers can compare the cost-of-service delivery among the various first response fire agencies in CSA 17. One could then look at the cost per call between the cities of Encinitas, Del Mar, Solana Beach, and the Rancho Santa Fe Fire Protection District. Cost centers may also be established for the dispatch services or billing.

By isolating individual components of the cost of production, one can identify trends or make comparisons that ultimately elevate opportunities for improving efficiency. The cost center concept also has merit for looking at the various revenue streams associated with the cost of production. In the case of the CSA this would have applicability in looking at ambulance transport revenue, transport rates, and resident vs. non-resident rates and for isolating this revenue on a per call or per transport basis. Similarly, the other revenue streams utilized to fund CSA operations (Tax Increment, Benefit Fees, GEMT, other) can also be isolated and evaluated in providing financial reporting and trend analysis.

RESERVE ANALYSIS

CSA 17 maintains 180 days of operating expenses in cash reserves. CPSM believes that this is a sound policy since many factors could result in a slow-down or cessation of some payments for services billed by the CSA. In addition, emergency purchases or payments may be required that were not anticipated. Maintaining a six-month operating cash reserve is very consistent with policies we have observed in similarly operated urban EMS transport services in other U.S. communities. An adequate reserve will help assure continued operations in the event of an unexpected financial shortfall.

Recommendation: The County of San Diego should continue its practice of maintaining a six-month operating reserve balance in the CSA. (Recommendation No. 4.)

BILLING AND COLLECTION AUDITS

Current services provided by the CSA ambulance transport contractors are primarily emergency in nature. However, Medicare, Medicaid, and most third-party commercial insurers routinely conduct payment audits to assure they are paying for services they determine meet the medical necessity for ambulance transportation. When conducting audits, typically a small number of randomly chosen patient care reports, generally about 50 charts, will be reviewed. If the auditors determine that, for example, five of the claims (10 percent) did not meet medical necessity based on the documentation of the medical chart, they then apply that 10 percent figure to all payments made during the audit period. For example, if a commercial insurer paid a total of \$1 million for 1,000 ambulance claims during the audit period, it would consider that 10 percent of the total \$1 million payment was for medically unnecessary services, for a determined overpayment of \$100,000. The payer could then withhold future payments until it recovered the \$100,000 overpayment. This could have a significant impact on CSA revenues.

Recommendation: The County of San Diego should contract for random internal post-claim audits of ambulance billing and patient care records in the CSA. (Recommendation No. 5.)

The purpose of the audit would be to determine if the patient care records support the billing claim. Currently, this review process is being done by the individual transport providers and the County of San Diego is not involved in this review process. Ambulance billing underwent a sea change last year with changes to ICD-10 coding (International Statistical Classification of Diseases and Related Health Problems, 10th Revision). ICD-10 codes are alphanumeric codes used by doctors, health insurance companies, and public health agencies across the world to represent diagnoses. Every disease, disorder, injury, infection, and symptom has its own ICD-10 code. Consistent with the ***Post-Claim Audit*** recommended above, the County should include periodic reviews of the accuracy of the ICD-10 coding being provided to its billing agency. Correct coding can assure the proper level of care (ALS/BLS) and the accuracy of medical necessity determinations.

REVENUE ENHANCEMENTS

CPSM conducted a comprehensive review of the current and future revenues and expenses in CSA 17. To do this, we utilized an analysis of historical expenditures, projected call volume, transport fee revenues, property tax increments, benefit fees, and service contracts.

As noted in the **Operational Financial Analysis Dashboard**, CPSM projects that operational expenses will overtake revenues starting in FY 2021-22. CSA 17 pays more into the GEMT/QAF than it receives (nearly \$60,000). And CSA 17 rates are low when compared to other agencies throughout San Diego County. Though the CSA has maintained sizable reserve accounts that can cover overruns, they could be fully depleted and unavailable in a short timeframe.

In CSA 17, it appears there are three primary drivers of the *operational* imbalance considerations:

- The compounding financial impact or doubling of first responder fees in FY 2019-20.
- \$895,000 in additional capital infrastructure expense in FY 2019-20.
- A below-market rate for resident and non-resident ambulance transport fees.

CSA 17 has a broader tax base and its tax increment revenues are more robust in funding a less costly service.

If you recall, in previous sections, the payer share of overall payments for commercial insurance in CSA 17 was 46 percent. Most commercial insurers pay ambulance charges based on the regional Usual and Customary Rate (UCR). We believe that raising ambulance transport rates to be more reflective of the market area rates will have minimal effect on out-of-pocket expenses for insured patients. This is because most of the increased fee would be within the allowable UCR and will be paid by commercial insurers.

Medicare and Medicaid payment rates for ambulance service are fixed, and generally, ambulance providers cannot balance bill the patient the difference between the Medicare and Medicaid allowable fees and the ambulance bill. Therefore, there would be minimal impact on patients covered by Medicare and Medicaid. All told, patients covered by commercial insurance, Medicare, and Medicaid represent 92 percent of the payer mix in CSA 17. The remaining 4 to 8 percent of the patients are private pay or have no insurance and these patients would be most impacted by the rate change. However, in most systems, including San Diego, private pay categories have the lowest collection rates of all the payer groups.

A 2019 survey developed by Wittman Enterprises of transport rates throughout California showed resident and non-resident ALS transport base rates average of approximately \$1,550. BLS transports average just over \$1,326. Table 6-4 is a graphic representation of the survey findings.

TABLE 6-4: Ambulance Transport Fee Comparison

Jurisdiction	ALS1	Non-Res	ALS2	Non-Res	BLSE1	Non-Res	Mileage	Oxygen	EKG	Assessment at Scene
CSA 69	\$900	\$1,050	\$900	\$1,050	\$900	\$1,050	\$20	\$65	\$0	\$150
CSA 17	\$400	\$1,050	\$400	\$1,050	\$400	\$1,050	\$20	\$65	\$0	\$150
Los Angeles County (Alhambra)	\$2,282		\$2,282		\$1,523		\$20	\$96	N/A	\$250
Cathedral City	\$1,163		\$1,225		\$1,225		\$28	\$60	N/A	\$250
Oceanside (San Diego County)	\$1,220	\$1,740	\$1,370	\$1,910	\$1,020	\$1,530	\$40	\$50	\$20	\$150
Newport Beach (Orange County)	\$1,545		\$1,545		\$1,545		\$10	N/A	N/A	\$400
Sacramento	\$2,083		\$2,083		\$1,895		\$37	\$154	\$120	\$385
North County (San Diego)	\$1,266	\$1,456	\$1,287	\$1,519	\$1,055	\$1,224	\$23	\$71	\$35	\$643
Escondido (San Diego)	\$1,668		\$1,668		\$1,668		\$19	\$80	N/A	\$150
Santa Barbara	\$2,309		\$2,348		\$1,526		\$46	\$156	N/A	N/A
Cosumnes	\$1,574		\$1,574		\$1,574		\$26	\$72	\$36	\$159
Carlsbad	\$1,171		\$1,273		\$955		\$23	\$76	N/A	\$204
Poway	\$1,029	\$1,366	\$1,029	\$1,366	\$866	\$1,196	\$16	\$66	N/A	\$150
San Marcos	\$1,255		\$1,255		\$915		\$24	\$65	\$20	N/A
Ramona	\$1,523	\$1,712	\$1,635	\$1,824	\$1,479	\$1,668	\$19	\$71	\$50	\$200
Ave. w/o CSA 17 & 69	\$1,545.20	\$1,568.50	\$1,582.59	\$1,654.75	\$1,326.61	\$1,404.50	\$25.42	\$84.75	\$46.83	\$267.36
75th Percentile	\$1,158.90	\$1,176.38	\$1,186.94	\$1,241.06	\$994.96	\$1,053.38	\$19.06	\$63.56	\$35.13	\$200.52
95th Percentile	\$1,467.94	\$1,490.08	\$1,503.46	\$1,572.01	\$1,260.28	\$1,334.28	\$24.15	\$80.51	\$44.49	\$254.00

As illustrated in Table 6-4, the average rate for Advanced Life Support (ALS1) transport in the region is \$1,545.20. CSA 17's resident ambulance rate is currently 26 percent of the area's average rate. We would recommend a resident transport rate increase in CSA 17 to at least the 75th percentile of the regional prevailing rate (\$1,158.90) and 95 percent of the prevailing non-resident rate (\$1,490.08).

Recommendation: The County of San Diego should consider increasing resident and non-resident transport rates in CSA 17 to reflect the prevailing transport rates in the area. (Recommendation No. 6.)

When this rate increase is applied to the current financial projections, plus allowing for a decrease in the average collection percentage (lower collection rate accompanies a higher ambulance rate due to the fixed amounts paid by Medicare and Medicaid), we would estimate the projected shortfall for CSA 17 will occur much further in the future. These impacts are shown in Table 6-5.

TABLE 6-5: CSA 17: Impacts of Recommended Increases in Transport Fee

Year: Actual/[Projected]	2017-18	2018-19	2019-20	[2020-21]	[2021-22]	[2022-23]	[2023-24]	[2024-25]
Revenue per Transport	\$510.25	\$510.25	\$510.25	\$510.25	\$510.25	\$510.25	\$510.25	\$510.25
Other Revenue per Transport	\$602.31	\$630.98	\$625.74	\$620.55	\$615.41	\$610.31	\$605.25	\$600.24
Total Revenue per Transport	\$1,112.56	\$1,141.23	\$1,135.99	\$1,130.80	\$1,125.66	\$1,120.56	\$1,115.50	\$1,110.49
Expense per Transport	\$748.88	\$786.65	\$794.80	\$800.90	\$858.66	\$878.74	\$899.28	\$920.31
First Response Expense Transport	\$31.03	\$43.00	\$86.59	\$89.26	\$80.84	\$89.41	\$89.76	\$90.11
Other Expense/Transport	\$51.03	\$79.13	\$81.21	\$81.05	\$80.84	\$80.65	\$82.81	\$83.33
Total Expense/Transport	\$830.94	\$908.78	\$962.61	\$971.21	\$1,020.33	\$1,048.80	\$1,071.85	\$1,093.75
Revenue over Expenses	\$281.63	\$232.44	\$173.38	\$159.59	\$105.33	\$71.76	\$43.65	\$16.74

By increasing the transport fee rates, CSA 17 remains solvent given no additional increase in provider compensation beyond what is currently budgeted.

EMS PERFORMANCE MEASURES AND MONITORED SERVICE OUTCOMES

EMS service delivery needs to be planned and managed so that these efforts achieve specific, agreed-upon results. This requires establishing a set of goals for the activities of any given program. Determining how well an organization or program is doing requires that these goals be measurable and that they are measured against desired results and national indices. This is the goal of **performance measurement**.

Simply defined, performance measurement is the ongoing monitoring and reporting of progress toward pre-established goals. It captures data about programs, activities, and processes, and displays data in standardized ways that help communicate to service providers, customers, and other stakeholders how well the agency is performing in key areas. Performance measurement provides an organization with tools to assess performance and identify areas in need of improvement. In short, **what gets measured gets improved**.

The County of San Diego HHS is in the process of developing performance measures for the CSA. We would encourage the County to include robust reporting of performance metrics that demonstrate value to the CSA stakeholders.

As referenced earlier in this report, EMS leaders, public policy makers, and even the citizenry being served have generally regarded that a “faster” EMS service equates to a “better” EMS system. However, a growing body of research is indicating that faster response times, even for the most critical of our EMS situations—cardiac arrest—has minimal, if any, impact on patient outcomes.

Additionally, as the healthcare landscape continues to change dramatically, it will be increasingly difficult to prove the true value of EMS to stakeholders based solely on how fast an apparatus gets to the patient.

This means that an important approach to measuring system quality is needed, one that is clinically based, and patient focused; in essence, providers need to **measure what matters in terms of clinical quality and patient experience of care**.

In today’s value-based healthcare environment, operational and financial reporting are important, but equally important are essential clinical performance and patient experience metrics. The County of San Diego HHS and the CSA should collaborate to generate and report clinical performance measures that include:

- Airway Management Outcomes.
- CPR Process Measures (chest compression fraction (CCF), capnography use, mechanical CPR use, ROSC, and survival to discharge).
- Compliance with Medical Director-approved clinical bundles for STEMI, Stroke, Trauma and Sepsis cases.
- Patient Experience.

CLINICAL PERSPECTIVE

EMS is healthcare, and until recently, EMS Quality Assurance/Quality Improvement (QA/QI) measures have focused more on procedural success (IV start rate success, endotracheal success rates, etc.) as opposed to successfully complying with **evidence-based clinical bundles** of care that make a difference in the patient's outcome. Though it is important to know and monitor specific procedural performance, CPSM believes it is more important that agencies look at the entire treatment regimen (evidence-based clinical bundles) in developing measures of overall system performance.

Recommendation: County EMS, working with the service provider agencies in CSA 17, should develop a clinical performance dashboard to monitor compliance with clinical bundles. (Recommendation No. 7.)

These reports should track the frequency in which the appropriate clinical bundle is completed. These outcomes should be reported on a regular basis (no less than quarterly), distributed publicly, and used as a basis for continuous quality improvement.

TABLE 6-6: Examples of Clinical Bundle Performances Measures

Cardiac Arrest	Goal	May-20	Jun-20	Jul-20	Average
% of cases with CCF \geq 90%					
% of cases with compression rate 100-120 cpm 90% of the time					
% of cases with compression depth \geq 2 inches 90% of the time					
% of cases with Lucas placement with < 5sec pause in chest compression					
% of cases with Rhythm check / Peri-shock pause < 10 sec					
% of cases with time to tCPR < 120 sec from first key stroke					
% of cases with bystander CPR					
% of cases with bystander AED use					
% arrive at E/D with ROSC					
% discharged alive					
% neuro intact at discharge (Good or Moderate Cognition)					
9-1-1 Access to first EMS provider hands on chest time					
# of people trained in CCR					

Ventilation Management	Goal	May-20	Jun-20	Jul-20	Average
% of cases with etCO2 use for non-invasive ventilation management (CPAP, BVM) when equipped					
% of cases with etCO2 use for invasive ventilation management (KA, ETT, Cric)					
% of successful ventilation management as evidenced by etCO2 waveform throughout the case					
% of successful King Airway placement					
% of successful endotracheal tube placement					

STEMI	Goal	May-20	Jun-20	Jul-20	Average
% of suspected STEMI patients correctly identified by EMS					
% of suspected STEMI patients not identified by EMS					
% of suspected STEMI patients w/ASA admin (<i>in the absence of contraindications</i>)					
% of suspected STEMI patients w/NTG admin (<i>in the absence of contraindications</i>)					
% of suspected STEMI patients with 12L acquisition within 4 minutes of patient contact					
% of suspected STEMI patients with 12L transmitted within 5 minutes of transport initiation					
% of suspected STEMI patients with PCI facility notified of suspected STEMI within 10 minutes of EMS patient contact					
% of patients with Suspected STEMI Transported to PCI Center					
% of suspected STEMI patients with EMS activation to Cath Lab intervention time < 90 minutes					

Table 6-7 is an example of first responder measurement tools currently being used in Santa Cruz County, California.

TABLE 6-7: Santa Cruz County First Responder & Transport Report Cards

Santa Cruz County First Responder Report Card			
Criterion	Goal	Weighted Value	Score
Cardiac Arrest			
End-tidal CO2 monitored	90.0%	4.0%	
Complete documentation (see System QI P&P)	90.0%	4.0%	
Respiratory Distress			
Mental Status assessed/documented	90.0%	4.0%	
bronchodilator administration for wheezing within 10 minutes	85.0%	4.0%	
Airway Management			
End-tidal CO2 performed on any successful ET intubation	90.0%	4.0%	
Other confirmation techniques (e.g., visualize chords, chest rise, auscultation)	90.0%	4.0%	
Complete documentation (see System QI P&P)	90.0%	4.0%	
STEMI			
ASA administration within 5 minutes	90.0%	4.0%	
SpO2 recorded	95.0%	4.0%	
12 LEAD EKG acquired within 5 minutes	80.0%	4.0%	
Complete documentation (see System QI P&P)	90.0%	4.0%	
Stroke			
Time last seen normal	90.0%	4.0%	
Use of a prehospital BEFAST stroke scale	90.0%	4.0%	
Complete documentation (see System QI P&P)	90.0%	4.0%	
Trauma			
PAM scale recorded	90.0%	4.0%	
Complete documentation (see System QI P&P)	90.0%	4.0%	
Safety			
Protocol compliance rate per chart review (high acuity, AMA/RAS, & random)	90.0%	10.0%	
Patient Satisfaction (use standardized questions to allow inter-agency comparison)			
Degree to which the firefighters took your problem seriously	94.0%	4.0%	
How well the firefighters explained things in a way you could understand	95.4%	4.0%	
Skill of the firefighters	94.1%	4.0%	
Extent to which the firefighters cared for you as a person	94.1%	4.0%	
Professionalism of the firefighters	94.1%	4.0%	
ePCR Submission Compliance			
Transfer of Care (TOC) critical ePCR elements completed within 10 minutes of patient departure from scene	90.0%	3.0%	
Full ePCR completed within 24 hours	100.0%	3.0%	
Total Standards		100.0%	

Green: Meet/Exceed Goal

Orange: 0-20% Below Goal

Red: >20% Below Goal

Criteria

- 1) Measurable
- 2) Must be improvable
- 3) Reflect value to the patient

Santa Cruz County Transport Report Card			
Criterion	Goal	Weighted Value	Score
Cardiac Arrest			
End-tidal CO2 monitored	90.0%	3.0%	
Complete documentation (see System QI P&P)	90.0%	3.0%	
Respiratory Distress			
Mental Status assessed/documented	90.0%	3.0%	
bronchodilator administration for wheezing	85.0%	3.0%	
Airway Management			
End-tidal CO2 performed on any successful ET intubation	90.0%	3.0%	
Other confirmation techniques (e.g., visualize chords, chest rise, auscultation)	90.0%	3.0%	
Complete documentation (see System QI P&P)	90.0%	3.0%	
STEMI			
ASA administration	90.0%	3.0%	
SpO2 recorded	95.0%	3.0%	
12 LEAD EKG acquired within 5 minutes	80.0%	3.0%	
Scene time less than 15 minutes	80.0%	3.0%	
Transport to STEMI center rate (with notification)	95.0%	3.0%	
Complete documentation (see System QI P&P)	90.0%	3.0%	
Stroke			
Time last seen normal	90.0%	3.0%	
Use of a prehospital BEFAST stroke scale	90.0%	3.0%	
Scene time less than 15 minutes	80.0%	3.0%	
Complete documentation (see System QI P&P)	90.0%	3.0%	
Trauma			
PAM scale recorded	90.0%	3.0%	
Scene time less than 15 minutes	50.0%	3.0%	
Trauma center destination	90.0%	3.0%	
Complete documentation (see System QI P&P)	90.0%	3.0%	
Safety			
Employee injuries per 10,000 hours worked	1.00	2.0%	
Employee turnover rate	25.0%	8.0%	
Protocol compliance rate per chart review (high acuity, AMA/RAS, & random)	90.0%	10.0%	
Patient Satisfaction (use standardized questions to allow inter-agency comparison)			
Communication by medics (patient and family)	97.2%	3.0%	
Care shown by the ambulance crew	94.4%	2.0%	
Skill and professionalism of our ambulance crew	93.8%	2.0%	
Cleanliness of ambulance	94.1%	2.0%	
Ride of the ambulance	92.3%	2.0%	
ePCR Submission Compliance			
At time of patient drop off (over 90 days)	90.0%	2.0%	
High acuity (ROSC, STEMI, Stroke, Trauma) cases at time of drop off	95.0%	2.0%	
Completed within 24 hours	100.0%	2.0%	
Total Standards		100.0%	

Green: Meet/Exceed Goal	Criteria 1) Measurable 2) Must be improvable 3) Reflect value to the patient
Orange: 0-20% Below Goal	
Red: >20% Below Goal	

PATIENT PERSPECTIVE

Patients rarely know if the clinical care provided to them was consistent with sound medical protocol and guidelines, but they do know if the EMS providers were nice to them. Patients are often mindful of the following in their treatment regimen:

- Did the providers address them by name?
- Did they put a blanket on them?
- Did they explain everything that was happening?
- Did they seem concerned about them and their anxiety?

Patient experience scores are valuable measures of the performance of the EMS system providers. They are also one of the measures that other healthcare providers are evaluated on, and even paid more or less based on these scores.

Many EMS systems are implementing comprehensive **patient experience surveys**, using external survey agencies, as a performance metric. One such survey provider, EMS Survey Team, currently conducts standardized, external patient experience surveys which enable providers to benchmark themselves against other agencies and to themselves over time. It also provides a mechanism to identify and recognize high-performing EMTs and Paramedics, as well as providers who might benefit from additional customer service training.

The EMS Survey Team process includes patient experience questions for the field medics (EMTs or Paramedics), dispatch personnel, and billing office personnel. While the County of San Diego may be appropriately interested in the patient experience scores for their field EMS personnel, the County may wish to collaborate with its EMS service providers to analyze the patient experience across the spectrum of the EMS response.

Here are some examples of patient experience questions:

Medic Analysis:

- Extent to which the EMS provider arrived in a timely manner.
- Care shown by the EMS providers who arrived.
- Degree to which the medics took your problem seriously.
- Degree to which the medics listened to you and/or your family.
- Medical skill of the medics.
- Extent to which the medics kept you informed about your treatment.
- Extent to which medics included you in the treatment decisions.
- Degree to which the medics relieved your pain or discomfort.
- Extent to which medics cared for you as a person.

Dispatch Analysis:

- Helpfulness of the person you called for EMS.
- Concern shown by the person you called for EMS.
- Extent to which you were told what to do until EMS arrived.

Recommendation: The County of San Diego EMS, working with its EMS service providers, should develop a patient experience reporting process and dashboard to monitor patients' perceptions of the services being provided. (Recommendation No. 8.)

Once again, CPSM believes that these reports should be reported on a regular basis (no less than quarterly), distributed publicly, and used as a basis for continuous quality improvement.

CLINICAL SERVICES BENCHMARKING

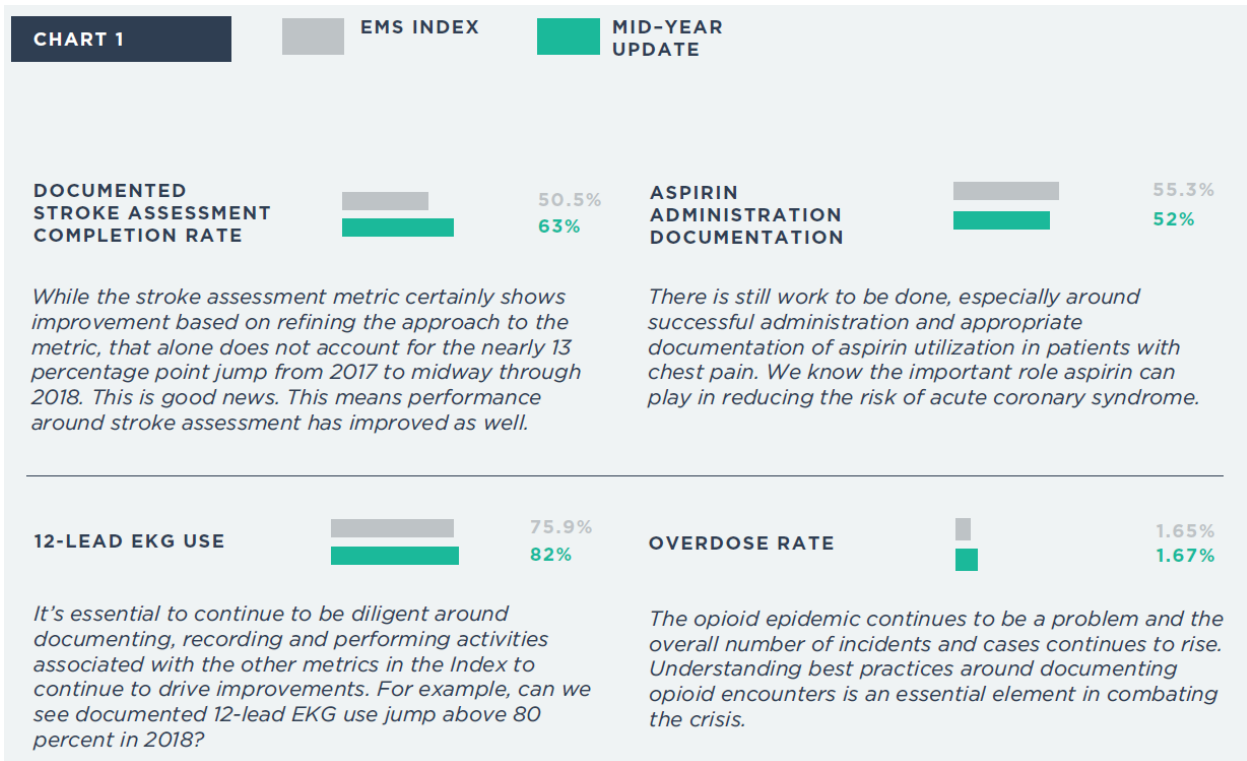
ESO Solutions is an electronic patient care report (ePCR) platform that is available on a subscription basis for EMS providers. ESO is an industry leader not only for patient care reporting software, but also as a clinical data analytics provider. This year, ESO released its **ESO EMS Index**, which is an analysis of key performance indicators (KPIs) for EMS quality metrics. The dataset is real-world data, compiled and aggregated from more than 1,000 agencies across the United States that use ESO's products and services. These data are based on 5.02 million patient encounters between January 1, 2017, and December 31, 2017, representing a full calendar year. The Index tracks performance of EMS agencies nationwide across five metrics:

- Stroke assessment and documentation.
- Overdose events.
- End-tidal carbon dioxide (ETCO₂) monitoring.
- 12-lead electrocardiogram (EKG) use.
- Aspirin administration for chest pain.

This report is beginning to serve as a benchmark comparator for EMS agencies across the country for several important measures of clinical quality. CPSM believes the County of San Diego EMS should incorporate the use of ESO Solutions and its clinical activities reports in comparing service delivery for EMS in CSA 17. These reports should be reported on a regular basis (no less than quarterly), distributed to contracted service providers and the public, and used as a basis for continuous quality improvement.

Recommendation: The County of San Diego EMS should monitor the clinical performance outcomes reported for patient care in CSA 17 and compare these indicators with those benchmarks established in the ESO Solutions EMS Index. (Recommendation No. 9.)

FIGURE 6-1: ESO EMS Index Example



RESPONSE ACTIVITIES

Deployment practices CSA 17 drive the financial costs. There are a number of deployment options that CPSM believes would improve efficiencies if implemented.

CSA 17

CSA 17 appears to have an abundance of resources when one considers the volume of EMS workload and the distribution of these response activities. This area is served by a series of fire agencies that provide ALS first response services and a for-profit ambulance provider that provides ALS care and transport. Combined, there are 15 primary first response fire units (excluding Command Staff) and 5.5 ambulances operated by AMR that serve CSA 17 on a daily basis. These units combined respond to approximately 8,000 annual EMS calls throughout the CSA. As mentioned earlier, two units (a fire first responder and an AMR ambulance) are dispatched to most EMS calls. All units typically respond from fixed locations (fire stations) and all units will generally respond with lights and sirens (Hot) to all calls. AMR ambulances must respond to 911 EMS calls within a 10-minute total response time, 90 percent of the time. Fire-based ALS first responders must maintain an eight minute or less total response time criteria (at the 90th percentile).

Though the North Comm dispatch center is capable of providing Medical Priority Dispatching (MPDS), it is not currently using the MPDS process to its fullest capability with regard to HOT vs. COLD response modes, and ALS or BLS resource assignment options in its dispatching of fire and ambulance resources.

When CPSM inquired as to why MPDS was not being utilized, it was indicated that the County's Medical Director had not fully sanctioned the use of call screening and call prioritization, though a number of discussions have been held on this issue.

For a dispatch center to utilize MPDS, it must have supervision and oversight of its operations by a licensed Medical Director. CPSM was surprised to learn that at the time of this study, North Comm had an open RFP on the street for its own Medical Director. We were told that in part, the reason for contracting with an independent Medical Director was to obtain authorization to implement MPDS in its dispatching practices among other service providers.

MPDS has two primary purposes. The first is to screen the call sufficiently so that the nature and severity of the call can be identified, and pre-arrival assistance can be provided in a structured and clinically valid process. The second purpose is to enable dispatchers to adjust the number and type of units that are dispatched to the incident and to recommend a modified mode of response (from Hot to Cold) when appropriate.

As stated earlier, much of the EMS call activity in CSA 17 is non-emergency in nature. CPSM estimates that upwards of 60 percent of the calls involve minor or non-emergency situations in which an altered response may be appropriate. By reducing the number of responding units to a given call, the overall response resource capacity is increased. In addition, by reducing the numbers of units that are responding Hot throughout the area, this in effect enhances the safety of both responders and the citizens being served.

A recent report compiled by the National Highway Traffic Safety Administration (NHTSA), entitled: "*Lights and Sirens Use by Emergency Medical Services (EMS): Above All Do No Harm,*"² revealed that HOT responses are inherently dangerous, do not result in improved patient outcomes, and should be limited to only time-life critical events.³ The study goes on to recommend that typically HOT responses account for less than 50 percent of all EMS responses.

Our observations and national statistics indicate that when medical priority dispatching systems are fully functional, the number of Priority 1 calls that necessitate a "HOT" response are dramatically reduced. We have also observed in some urban EMS delivery systems in which responding fire officers and paramedics are given the latitude to alter their mode of response on the basis of the dispatch call-screening process and dispatcher notes, the frequency of HOT responses is reduced dramatically.⁴

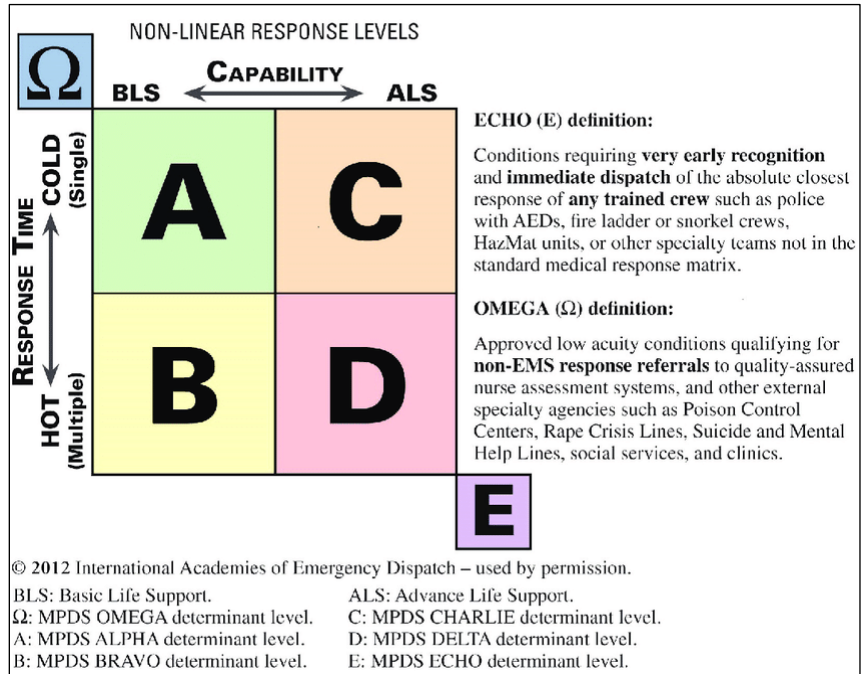
Figure 6-2 is a graphic developed by the International Academies of Emergency Dispatch that provides guidance regarding the mode of response and types of resources deployed on the basis of the call-screening and call-prioritization process.

2. https://www.ems.gov/pdf/Lights_and_Sirens_Use_by_EMS_May_2017.pdf

3. Ibid.

4. See Sugar Land Fire-Rescue, a suburb of Houston TX.

FIGURE 6-2: MPDS Response Matrix



Baseline Response Example		
All actual response assignments are decided by local Medical Control and EMS Administration		
Level	Response	Mode
ECHO	Closest Apparatus—Any (includes Truck Companies, HAZMAT, or on-air staff)	HOT
DELTA	Closest BLS Engine Paramedic Ambulance	HOT HOT
CHARLIE	Paramedic Ambulance	COLD
BRAVO	Closest BLS Engine BLS Ambulance (alone HOT if closest)	HOT COLD
ALPHA	BLS Ambulance	COLD
OMEGA	Referral or Alternate Care	

*Note: This is not to be considered the Academy's official recommendation for Baseline Responses.

The utilization of MPDS in guiding response patterns for units in CSA 17 is dependent upon the support and facilitation by a Medical Director or some Medical Control officer. It is essential that medical control work closely with the affected dispatch centers in designing, implementing, and monitoring the call-screening and call-prioritization process. The Medical Director or their representative must play a key role in this effort. In addition, the leadership of the local fire departments, along with ambulance management staff, must work cooperatively in developing a response matrix that seamlessly alters the response patterns for the various call types. CPSM is confident that through dispatch call screening and the implementation of altered response patterns, EMS responses in CSA 17 will be more efficient and will enhance the safety for both response personnel and the citizens being served.

Recommendation: County EMS should work with response agencies in CSA 17, the dispatch centers, and the Medical Director in implementing an effective call-screening and call-prioritization process that is capable of supporting emergency medical dispatching for incoming EMS calls. (Recommendation No. 10.)

Response times are typically the primary measurement used in evaluating service levels for EMS. Many deployment models attempt to achieve a four-minute initial travel time for EMS calls and the initiation of BLS treatments. These systems similarly attempt to achieve an eight-minute travel time for the delivery of ALS treatments. Though these times have validity, the actual impact of a speedy response time is limited to very few incidents. For example, in a full cardiac arrest, analysis shows that successful outcomes are rarely achieved if basic life support (CPR) is not initiated within four minutes of the onset of the arrest. Though many systems build their response criteria around cardiac arrest treatment objectives, the reality in prehospital care is that cardiac arrests occur very infrequently; on average these calls are only 1 percent to 1.5 percent of all EMS incidents.⁵ There are other emergency situations that are truly life-threatening, and the time of response can clearly impact the outcome. These involve drownings, electrocutions, and severe trauma (often caused by gunshot wounds, stabbings, and severe motor vehicle accidents, etc.). Again, the frequency of these types of calls are limited and rarely account for more than 10 percent of the total EMS call activity.

In a 2011 study of EMS response times in urban settings, little evidence was found that the 8-minute response criteria for other than cardiac arrest patients actually resulted in improved patient outcomes.⁶ The point being that the practice of responding *Hot* on all EMS responses, especially when effective dispatch screening efforts are available, makes little sense. The EMS response criteria established for both fire department first response units and AMR ambulances should recognize this reality and exclude from the response time standards any calls that do not require an emergency response.

Recommendation: County EMS should work with response agencies in CSA 17 to implement response guidelines that preclude agencies from responding with lights and sirens when the MPDS inquiry indicates that a "Hot" response is not warranted. (Recommendation No. 11.)

5. Myers, Slovis, Eckstein, Goodloe et al. (2007). "Evidence-based Performance Measures for Emergency Medical Services System: A Model for Expanded EMS Benchmarking." *Prehospital Emergency Care*.

6. Ian E. Blanchard, Christopher J. Doig et al (2011) "Emergency Medical Services Response Time and Mortality in an Urban Setting," *Prehospital Emergency Care*, Volume 16, 2012 - Issue 1

Providing interfacility, non-emergency transports in CSA 17 is currently not under the purview of AMR as a component of its 911 service agreement with the County of San Diego. Interfacility transports are carried out in an open market environment by several providers who are licensed to operate and provide these services. The interfacility transport business operates with limited supervision and is not under the purview of County EMS. Interfacility transports are a lucrative aspect of the transport business and typically are provided by the agency charged with doing 911 emergency transports. Though it is uncertain as to the actual number of interfacility transports that are taking place in CSA 17, CPSM believes that this number can be in the range of 600 to 800 transports each year. This represents a significant revenue stream, and we believe these transports can be carried out in CSA 17 with existing AMR resources.

Recommendation: County EMS should include in future ambulance service agreements in CSA 17 an exclusivity provision with the 911 transport provider for all interfacility, nonemergency transports that originate in the CSA. (Recommendation No. 12.)

Under the current deployment practice in CSA 17, AMR units operate from fix-based locations. In addition, most AMR units are operated on a 24-hour basis except for a single unit (Medic 232), which operates for a 12-hour period. Typically, ambulance operations utilize what is termed as a **System Status Management** deployment practice. System status management involves the strategic prepositioning of resources to reduce response times and maximize resources. The basic concept is to utilize geographic information system (GIS) technology to identify optimum locations for the posting of ambulances and that considers the fastest traffic routing and the prediction of future calls based on historical data involving time of day, day of week, and seasonal impacts. This fluid or **dynamic deployment process** is used to constantly reposition available resources to those locations that will allow the fastest response to those areas that historically generate the most calls. There are several computer modeling systems that facilitate system status deployment. North Comm currently has access to the Deccan International "LiveMUM" system that can be utilized to incorporate system status management practices in its deployment of AMR resources.

Recommendation: County EMS should work with AMR and the North Comm dispatch center in the utilization of system status management deployment practices for AMR units. (Recommendation No. 13.)

In addition to the system status management practice for deployment, there are several statistical models that can predict the times of the day during which service demand will be at its highest. The use of a **dynamic staffing model** is a management concept that adjusts the number of resources available at any given time and adjusts these amounts based on daily spikes in service demand. EMS workloads are very predictable. It can be anticipated that service demand typically is at its highest during the six-hour period between 3:00 p.m. to 9:00 p.m. Conversely, the lowest demand typically occurs during the early morning hours, generally between midnight and 6:00 a.m. In a dynamic staffing model, the number of available resources are highest during the peak demand periods and lowest during non-peak periods.

Currently AMR uses a **static staffing model**. In this arrangement, the number of ambulances deployed remains the same throughout the 24-hour period. Except for Medic 232, which operates on a 12-hour basis, all other ambulances are deployed for 24-hour periods. CPSM believes that this type of deployment is inefficient and can be improved.

Recommendation: County EMS should include in future ambulance service agreements in CSA 17 the requirement that the selected ambulance provider receive enhanced revenues if it can demonstrate cost savings in its deployment practices. (Recommendation No. 14.)

The current fixed price service agreement does not facilitate efficiency. If an incentive for cost savings were incorporated in the provider agreement, CPSM believes that significant cost savings in CSA 17 can be realized.

END