Improving Emergency Medical Services in San Diego County

Report to the San Diego County Board of Supervisors

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OVERVIEW

The purpose of this study is to identify issues related to access to and quality of emergency medical services in communities within San Diego County's backcountry and other rural areas, and to recommend system-wide improvements to ensure equitable prehospital care to all residents and visitors to San Diego County.

The County of San Diego Health and Human Services Agency (HHSA) is responsible for planning and regulating San Diego County's Emergency Medical Services (EMS) system. This includes reviewing the need for emergency ambulance services in the unincorporated areas of the County. In line with this responsibility, HHSA regularly tracks and reviews areas of service, and associated boundaries; hospital and dispatch agency locations; ambulance agencies and other EMS service providers; and many other key components of the San Diego County's EMS delivery system.

While most San Diego County residents receive ambulance services from their city, fire district or other local jurisdictions, many residents of the county's unincorporated area are served by ambulance service providers contracted by HHSA to provide ambulance service in specific operating areas.

Four of these operating areas cover large portions of the more rural, eastern areas of the County: (1) Valley Center Service Area; (2) Julian Service Area; (3) Grossmont Healthcare District Zone 2 Rural and Otay Mesa Service Area; and (4) Ocotillo Wells, Anza Borrego State Park, and Surrounding Desert Communities Service Area. These areas have smaller numbers of residents yet experience large numbers of seasonal and weekend visitors for recreational activities, creating significant fluctuations in population. The areas are geographically large and home to desert and mountainous terrain; winding roads; occasional weather constraints including extreme heat, fog, snow, and ice; as well as areas that are not well mapped. As a result, challenges are frequently encountered in providing ambulance services in this part of San Diego County, such as ensuring services arrive in a timely fashion, and that paramedic resources are consistently available.

In addition to these demands and challenges, there are six areas of the county (known as the De Luz, San Pasqual, Ramona, Sycamore Canyon, El Capitan Reservoir, and Southern Desert areas) where there is no provider specifically assigned to provide ambulance services. These areas are referred to in this analysis as "undesignated."

Together, these four operating areas and six undesignated areas represent over 50% of the land mass of San Diego County. This geographic area (hereafter referred to as "the Study Area") is the primary focus of this report.

This report summarizes findings of an analysis of the EMS delivery system in the Study Area, as well as the broader regional service delivery system, where applicable. It also outlines a proposed implementation plan for improving the access to and quality of emergency medical services, specifically focusing on paramedic ground ambulance service (hereafter referred to as "ambulance service") in the Study Area, in line with the County of San Diego's *Live Well San Diego* vision of healthy, safe, and thriving communities.

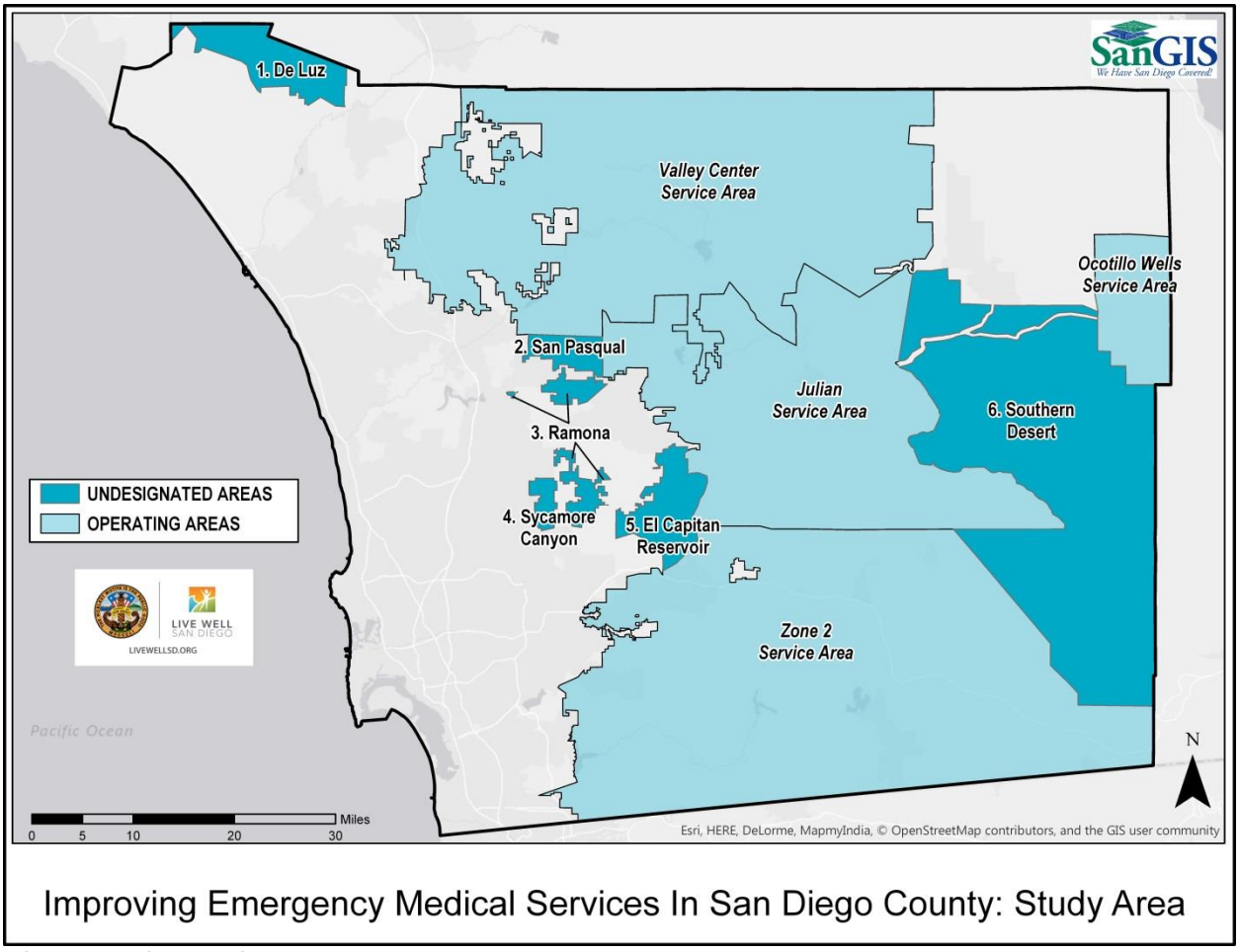


Figure 1. The Study Area

BACKGROUND: THE CURRENT EMS DELIVERY SYSTEM MODEL

California legislation enacted in 1980 defines local responsibilities for administration of emergency medical services; the legislation was codified in Health and Safety Code, Division 2.5, Chapter 4. According to State law, the County may designate a local EMS agency, or LEMSA, which would be responsible to "plan, implement, and evaluate an emergency medical services system" for the County[1]. Following this, the Board of Supervisors approved a Board Policy K-12 designating HHSA as the local EMS agency, responsible for developing an EMS program, including, but not limited to, operational policies, procedures, and protocols to ensure an effective and efficient EMS system[2].

Operating Areas

State law also empowers the local EMS agency to "create exclusive operating areas in the development of a local plan."[3] An exclusive operating area (EOA) is defined in the statute as "an EMS area or subarea defined by the emergency medical services plan for which a local EMS

[1] Division 2.5, Chapter 4, Sections 1797.200-4, of the California Health and Safety Code
[2] Board of Supervisors Policies K-9 *Emergency Medical Services-Ambulance Services* and K-12 *Emergency Medical System Management*
[3] Division 2.5, Chapter 4, Section 1797.224, of the California Health and Safety Code

agency, upon the recommendation of a county, restricts operations to one or more emergency ambulance services or providers of [paramedic service]."[4]

Presently, the local EMS system is comprised of 26 operating areas for ambulance service including 20 EOAs and six non-exclusive operating areas (a geographic area open to all qualified ambulance providers approved by a local EMS agency) (see Appendix A for additional detail).

HHSA-Administered Operating Areas

Within the Study Area, there are three EOAs and one non-exclusive operating area HHSA administers for provision of ambulance services. The EOAs are Valley Center Service Area, Julian Service Area, and Grossmont Healthcare District Zone 2 Rural and Otay Mesa Service Area (hereafter referred to as Zone 2 Service Area). The Ocotillo Wells, Anza Borrego State Park and Surrounding Desert Communities Service Area (hereafter referred to as Ocotillo Wells Service Area) is a non-exclusive operating area.

Valley Center Service Area (located in Supervisorial District Five) – The Valley Center Service Area is currently contracted to the Valley Center Fire Protection District which, in turn, subcontracts to Mercy Medical Transportation, Inc. to provide three ambulances (plus two ambulances operated cooperatively with the Pala and Rincon tribal governments) in this northeastern area of San Diego County. The initial term for this contract is July 1, 2015 through June 30, 2019, with three additional two-year option periods through June 30, 2025[5].

Julian Service Area (located in Supervisorial District Two) – The Julian Service Area is currently contracted to the Julian-Cuyamaca Fire Protection District (JCFPD) which operates the service with firefighter-paramedics. JCFPD provides one ambulance in this central-eastern area of San Diego County. The initial term for this contract was April 1, 2014 through June 30, 2017, with three additional one-year option periods through June 30, 2020.The contract is currently in the first option period through June 30, 2018.

Zone 2 Service Area (located in Supervisorial District Two) – Zone 2 Service Area is currently contracted to Mercy Medical Transportation, Inc. Mercy provides up to seven full time ambulances in this southern area of San Diego County. This area also serves four detention facilities located in Otay Mesa. The initial term for this contract is April 1, 2015 through June 30, 2018, with four additional one-year option periods through June 30, 2022.

Ocotillo Wells Service Area (located in Supervisorial Districts Two and Five) – The Ocotillo Wells Service Area is currently contracted to the Borrego Springs Fire Protection District (BSFPD). Through this contract, BSFPD provides ambulance service in the Ocotillo Wells area and the Anza-Borrego State Park. The initial term for this contract was September 16, 2012 through June 30, 2013. The contract has been extended through June 30, 2018. There are no remaining option periods in the contract.

[4] Division 2.5, Chapter 2, Section 1797.85 of the California Health and Safety Code

[5] Valley Center Fire Protection District previously administered the Valley Center Service Area. Due to a recent determination made by the State of California EMS Authority, HHSA will assume administrative responsibility for procurements for this EOA going forward.

Undesignated Areas

As noted above, six areas in the Study Area have no provider specifically assigned to provide ambulance service. These undesignated areas are generally sparsely populated but require the occasional emergency medical response, which is provided by ambulance service providers in neighboring areas. This agreement among emergency responders to lend assistance across jurisdictional boundaries is known as "mutual aid." However, in the case of the county's undesignated areas, aid occurs only one way without reciprocation. The undesignated areas are depicted in Figure 1.

De Luz (located in Supervisorial District Five) – De Luz is located in the Santa Rosa plateau northwest of Fallbrook and due west of Temecula.

San Pasqual (located in Supervisorial Districts Two, Three, and Five) – This includes areas of San Pasqual east of the San Diego Zoo Safari Park and north of Ramona. This area also includes the County of San Diego's San Pasqual Academy site.

Ramona (located in Supervisorial District Two) – This includes Barona Mesa (south of Ramona), areas north of Ramona, and areas just outside of the Ramona Municipal Water District jurisdictional boundary.

Sycamore Canyon (located in Supervisorial District Two) – The Sycamore Canyon area is divided by Highway 67 into two parts, north of Lakeside and southeast of Poway. This is a sparsely populated area which contains San Vicente Reservoir and Goodan Ranch/Sycamore Canyon Preserve.

El Capitan Reservoir (located in Supervisorial District Two) – This is a largely uninhabited area within Cleveland National Forest north of Alpine, and the Capitan Grande Reservation. This area also includes Three Sisters Falls and Cedar Creek Falls.

Southern Desert (located in Supervisorial Districts Two and Five) – This area includes the communities of Shelter Valley, Butterfield Ranch, and Canebrake Canyon, as well as the Agua Caliente and Vallecito County Parks.

EOAs Outside of the Study Area

Many local fire agencies have provided ambulance service in particular areas since before January 1, 1981 and are considered "grandfathered" under State statute. As the LEMSA, HHSA has regulatory responsibility to monitor compliance with local policies and performance in these areas. However, there is no HHSA subsidy or financial arrangement for ambulance service involved in these EOAs, and they are not directly administered by HHSA (see Appendix A for further detail). As such, these areas are not included in the Study Area.

The Study Area also geographically contains tribal areas, which arrange for their own ambulance services. While not required, some of the tribes in these areas have opted to enter into an agreement with HHSA to provide their own ambulance services, while others opt for emergency medical response from the local EOA holder.

ANALYSIS OF THE CURRENT SERVICE DELIVERY MODEL: KEY FINDINGS

To assess the effectiveness and efficiency of the current EMS delivery model in the Study Area and identify opportunities for improvement, data from the local EMS system; epidemiologic surveillance data; academic research; state and national industry information; and best practices from other County departments and other LEMSAs were reviewed with the following points of focus:

- Ensuring the prompt arrival of care;
- Ensuring that no part of San Diego County lacks an assigned ambulance provider;
- Supporting further threading of EMS delivery with fire service delivery;
- Supporting more robust performance management and operational efficiency;
- Engendering more meaningful EMS mutual aid reciprocation where not currently feasible; and
- Examining methods by which services are provided.

This analysis revealed several key findings:

Population density and distribution is changing

In the past 15 years, the Study Area experienced large population growth and changes to population centers within the Study Area (see Figure 2). From 2001 to 2016, the overall population of San Diego County increased by approximately 15%, while the population of the Study Area increased nearly twice as much (27%) as the County over the same 15-year period[6].

Numbers of 9-1-1 responses for emergency medical assistance are increasing

When compared to other parts of San Diego County, overall response volumes in the Study Area are relatively low, accounting for approximately 5% of the total responses. Annual 9-1-1 responses for emergency medical assistance in the Study Area have increased from 7,003 in 2013 to a projected 11,549 responses in 2017 (see Figure 3)[7].

Most of the calls for emergency medical response are related to trauma and neurological issues

During a 9-1-1 emergency medical response, a paramedic assigns a prehospital "provider impression" to the patient. While not a diagnosis, this represents what the paramedic generally believes to be the primary medical issue at hand.

[6] Population based on subregional boundaries. Data source: Population data from the San Diego Association of Governments (SANDAG), 2001 – 2016.

[7] Dispatch data was not available for the entire Study Area at the time of this analysis; total responses were determined by number of contacts with a Base Hospital Mobile Intensive Care Nurse during EMS responses for Valley Center, Julian, and Zone 2. Ocotillo Wells Service Area responses are self-reported by the contractor.

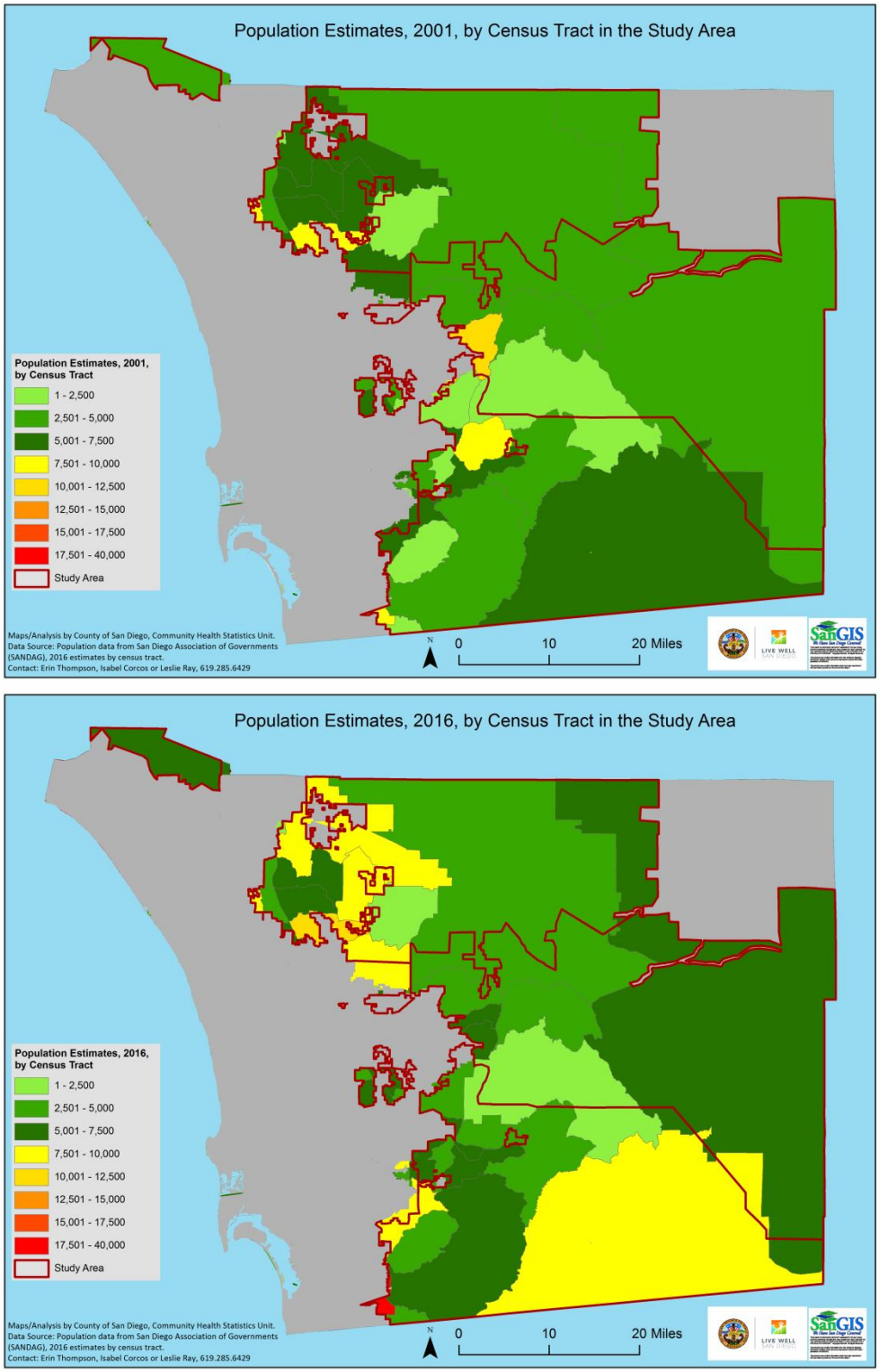
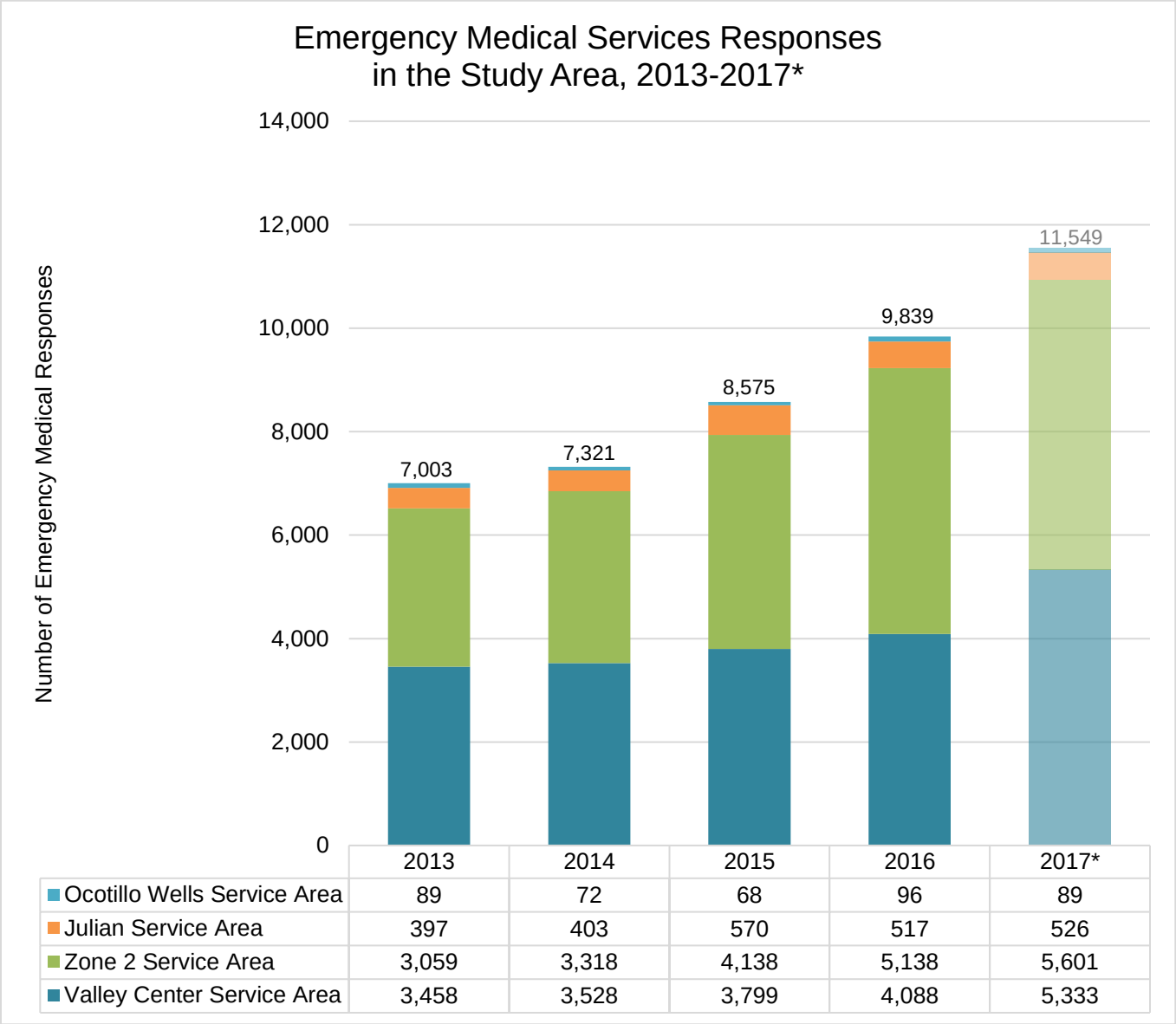


Figure 2. Population Estimates in the Study Area, Based on Census Tract



	2013	2014	2015	2016	2017*
Ocotillo Wells Service Area	89	72	68	96	89
Julian Service Area	397	403	570	517	526
Zone 2 Service Area	3,059	3,318	4,138	5,138	5,601
Valley Center Service Area	3,458	3,528	3,799	4,088	5,333

Figure 3. Total Emergency Medical Services Responses in the Study Area.
**2013-2016 response volume represents actuals; 2017 data is projected based on year-to-date and historic actuals.*

In 2016, more than half of all provider impressions in the Study Area pointed to trauma/injury (28.6%) or neurological issues (25%), followed by chest pain/cardiopulmonary resuscitation (CPR) and gastrointestinal issues (both 11.2%); respiratory issues (7.6%) and substance abuse/poisoning (5.1%).

This distribution is reflected in patterns of disease and death in the Study Area (see Appendix B). For example, emergency department discharge data show high rates of coronary heart disease and stroke in parts of the Study Area, when compared to the rest of San Diego County. Data from recent reports compiled from the San Diego County Medical Examiner's Office also

indicate higher rates of mortality from drug and medication, motor vehicle, and fall-related incidents in the Study Area, when compared with other parts of San Diego County.

More timely medical intervention by EMS personnel can lead to better patient outcomes
For heart attack and stroke, as well as other emergent incidents, timely identification of certain conditions within "critical minutes" can decrease the risk of permanent disability or death. For example, timely transport to a specialized treatment center to administer clot-busting drugs and other interventions dramatically decreases death and disability from stroke.

Early identification of heart attacks by 12-lead Electrocardiograms (EKGs) performed by EMS personnel help keep the initial medical contact to intervention time under 90 minutes as recommended by the American Heart Association to improve patient outcomes[8]. Other time-sensitive interventions in a prehospital setting that can improve patient outcomes include tourniquets for life-threatening hemorrhages; epinephrine for severe allergic reactions; and naloxone for opioid overdose[9].

Ambulance response time standards vary by operating area
HHSA, with the advisement of the Emergency Medical Care Committee[10], sets standards for advanced life support ambulance service provider response times: 10 minutes, 90% of the time for urban areas and 30 minutes, 90% of the time for rural areas.[11] There are exemptions to this standard for unforeseen circumstances like weather, traffic, and other uncontrollable conditions. Much of the Study Area has traditionally been subject to the rural response time requirement, as shown in Figure 4.

Services are frequently provided via mutual aid; in these instances, the provider is not bound to specific response time standards
Measuring response times using a 90% performance standard is common across the EMS delivery system. However, when ambulance providers are providing mutual aid, it is considered an exemption and not included in the calculation of response time performance metrics; the provider must simply provide a "best effort" response. Because a mutual aid response comes from another jurisdiction, it typically takes longer for an ambulance to arrive on scene. Additionally, the jurisdiction that provides the mutual aid has temporarily depleted resources within its own response zone, potentially creating a ripple effect of diminished emergency medical services.

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[8] Source: American Heart Association (http://www.heart.org/idc/groups/ahaecc-public/@wcm/@swa/documents/image/ucm_468135.pdf; http://www.heart.org/HEARTORG/Professional/MissionLifelineHomePage/EMS/Recommendations-for-Criteria-for-STEMI-Systems-of-Care_UCM_312070_Article.jsp#.Wab3Lj6GNEY; http://circ.ahajournals.org/content/102/suppl_1/I-60)

[9] Source: Journal of Emergency Medical Services (http://www.jems.com/articles/2010/05/tourniquet-first.html); World Allergy Organization Journal (https://waojournal.biomedcentral.com/articles/10.1186/1939-4551-1-S2-S18); World Health Organization (http://www.who.int/substance_abuse/information-sheet/en/); American Society for Addiction Medicine (https://www.asam.org/docs/default-source/public-policy-statements/use-of-naloxone-for-the-prevention-of-opioid-overdose-deaths-final.pdf?sfvrsn=4)

[10] Advisory Committee to the Board of Supervisors

[11] County of San Diego Emergency Medical Services Policy P-801, http://www.sandiegocounty.gov/content/dam/sdc/hhsa/programs/phs/EMS/Policies_Protocols/EMS-Protocol_P-801_2011.pdf

Based on available Computer-Aided Dispatch (CAD) data from July 1, 2015 to June 30, 2017[12], 14.9% of all ambulance responses in the Study Area were in the form of mutual aid. This is much higher than other County-administered service areas like County Service Area 17 and County Service Area 69, which experienced a lower need for mutual aid at 2.7% and 7.1% respectively for the same two-year period.

Service Area	Response Zone Designation (If applicable)	Response Time Standard (must be met 90% of time)	Response Time Standard Compliance[13]
Valley Center Service Area	Rural	**30** Minutes	98.8%
Julian Service Area	Rural	**30** Minutes	91%
Zone 2 Service Area	Rural (with exception for ambulance stationed at detention facilities)	**30** Minutes (10 Minutes for ambulance stationed at detention facilities)	96.4%
Ocotillo Wells Service Area	N/A, response time standard established by contract specific to service area	**50** Minutes	100%[14]
Undesignated Areas	N/A	No specific time metric; "**Best Effort**" applies	N/A

Figure 4. Response Time Standards and Compliance in the Study Area

Across the Study Area, mutual aid responses took 70% longer than ambulances responding in their own zone. When looking at data broken down by individual operating areas within the Study Area (Valley Center, Julian, Zone 2, and undesignated areas), in each case, a similar pattern of increased response times associated with mutual aid can be seen.

The data demonstrates that residents and visitors in the Study Area are receiving a higher proportion of mutual aid suggesting a more integrated and efficient ambulance response arrangement in the Study Area is needed. Better oversight and improved coordination reduces reliance on mutual aid and improves access to care.

Technology provides opportunities to monitor the EMS system and improve performance
Since the challenge of providing ambulance services in rural areas is not unique to San Diego County, HHSA researched how neighboring California LEMSAs address similar issues with service provision. Research revealed variability in the methods LEMSAs use to determine response time standards and manage performance. Factors that other LEMSAs use to set

[12] HHSA accessed data from four out of the six County CAD providers, including Monte Vista Interagency Communications, Heartland, American Medical Response (AMR), and the City of San Diego. CAD data relevant to these analyses includes information on incident location and response times, which were used to determine the percent to total mutual aid responses and the resulting effect on response times.
[13] Percentage calculated based on self-reported compliance data from the ambulance provider (Number of compliant responses/total responses) for April-June 2017.
[14] Percentage based on low volume of responses by contractor in the timeframe sampled.

response time standards include city boundaries, ambulance response locations, population density, and census tracts[15].

At the State level, core measures are used to benchmark the performance of EMS systems and drive quality. The core measures are based upon information taken from prehospital care reports and derived from scientific evidence about processes and treatments that are known to get the best results for a condition or illness. San Diego County participates in this performance measurement process with other California LEMSAs. Core measures are valuable in comparing regional performance to other LEMSAs. HHSA augments core measure data with a local data system.

With the full implementation of the County of San Diego's new comprehensive prehospital data system (also known as CoSD LEMSIS), HHSA will have access to more robust prehospital data related to patient outcome and incident location. With outcome data, the effects of various factors, such as procedures, medications, response times, and individual agencies and paramedics can be directly assessed within the Study Area as well as the broader region. This will allow for detailed quality improvement measures based on direct data assessment as opposed to general best practice guidelines. Additionally, with response location data, these quality improvement measures can be even more precisely implemented. Given the wide variety of geographies and communities in San Diego County, this will be especially important; determining and implementing quality improvement processes in the County's backcountry may look very different than in more population-dense and accessible areas.

There have also been significant changes to technology used in the field for 9-1-1 response, including technology used for dispatching fire and ambulance resources. With the widespread implementation of Computer-Aided Dispatch and Automatic Vehicle Location on ambulances stationed throughout the County, it becomes possible for dispatch agencies to deploy the closest, available resource within an operating area based on the exact distance from the scene, thereby supporting a higher performing EMS system[16].

Changes to fire service delivery have created new opportunities for coordination

In alignment with standard procedure for 9-1-1 calls in San Diego County, both fire agencies and ambulance agencies respond to the scene of a medical emergency in the Study Area. For many years, paramedic-level care (an advanced level of care) was only provided by ground ambulance providers in the Study Area, whereas the care provided by fire agencies responding to an emergency was largely volunteer-based and/or Emergency Medical Technician-level. Air ambulance transport was used for acutely ill patients, which positively impacted travel time to a hospital. However, in most cases, a ground ambulance is still necessary to transport the patient from the scene of an emergency to a helicopter accessible landing zone.

In the Study Area, fire stations outnumber ambulances four to one[17]. As more fire agencies have consolidated under the San Diego County Fire Authority, fire response vehicles throughout the county are increasingly staffed with paramedics. Fire resources frequently arrive prior to an ambulance.

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[15] Based on information received on methods used by Solano County, Riverside County, and Inland County Emergency Medical Agency

[16] "Principles of EMS Systems" by American College of Emergency Physicians, page 128.

[17] San Diego County Fire Authority: http://www.sandiegocounty.gov/content/sdc/sdcfa.html

EMS and fire services share a role in emergency medical response in the Study Area, but currently utilize different frameworks for defining response time standards. For fire services, travel time standards are based upon County General Plan Regional Category or Land Use Designation[18], which takes into account current population estimates, but also factors in planned development for future needs. Utilizing a similar framework for ambulance response time standards could support further service integration and coordination.

Boundaries for Exclusive Operating Areas require revision to ensure paramedic coverage countywide

Current EOA boundaries were analyzed to determine if adjustments could be made to support improved service delivery. Through this process, several potential boundary adjustments were identified that:

- Move currently undesignated areas into the boundaries of exclusive operating areas
- Make EMS boundaries coterminous with fire service delivery boundaries when feasible and appropriate
- Clarify the boundary between existing EOAs as appropriate

HHSA subsidizes EMS service delivery to varying degrees

Typically, the costs of operating ambulance services in an area are recouped by the ambulance service provider through patient billing. However, as previously mentioned, the Study Area has a relatively low number of responses; this makes it challenging for providers to cover the full operational cost of providing a 24 hour per day, seven days per week, fully staffed ambulance. Therefore, HHSA subsidizes these services via contracts with the ambulance providers to ensure continuous availability of services, as delineated in Figure 5.

In Valley Center Service Area, Julian Service Area, and the Ocotillo Wells Service Area, the contract dollars are used to offset operational costs for ambulance services such as ambulance and equipment maintenance, dispatch and radio subscription fees. The contracts are funded by a combination of State EMS funds (also known as Maddy Funds) and Health Realignment funds.

The contract for Zone 2 Service Area is structured differently. Zone 2 includes the Otay Mesa area, where four detention facilities are located. In addition to providing a subsidy, HHSA contracts for the full cost of providing an ambulance stationed in this area for responses to the detention facilities. In return, HHSA also has agreements with the facilities for reimbursement of contract costs based on the proportion of responses to each facility. The total revenue from these agreements was $553,417 in Fiscal Year 2016-17. The remaining $166,583 of the contract is supplemented with Health Realignment funding.

In addition to operational cost drivers like staffing, equipment, and supplies, unique drivers of costs for ambulance provision in the Study Area include “first responder fee payments.” Ambulance providers typically enter into agreements with the first responder fire agencies within the service area to address space rental in fire stations, reimbursement or replenishment of equipment and supplies as well as other items. It is not unusual for these agreements to also include a financial component known as first responder fee payments. Currently, HHSA is not a

[18] The San Diego County General Plan for Safety: http://www.sandiegocounty.gov/pds/gpupdate/docs/BOS_Aug2011/C.1-6_Safety.pdf

party to agreements for first responder fee payments; however, this is a key variable for consideration in the costs of ambulance service provision.

Service Area	Ambulance Provider	Annual Contract Amount
Valley Center Service Area	Valley Center Fire Protection District (which subcontracts service provision to Mercy Medical Transportation, Inc.)	$96,132
Julian Service Area	Julian-Cuyamaca Fire Protection District	$130,008
Zone 2 Service Area	Mercy Medical Transportation, Inc.	$120,000 (Subsidy)
		$600,000 (Reimbursement for ambulance stationed at detention facilities)
Ocotillo Wells Service Area	Borrego Springs Fire Protection District	$72,000
TOTAL		$1,018,140

Figure 5. Current Subsidies Paid to Ambulance Service Providers in the Study Area

Dispatch fees are another key driver of service costs. Much of the Study Area is currently dispatched by the County dispatch center for fire services, Monte Vista Interagency Command Center (MVIC). Currently, the dispatch fees are paid by the ambulance service provider and vary between approximately $30-45 per response. Based on the projected number of responses in the Study Area for 2017 (11,549), dispatch costs for ambulance service providers would range between approximately $346,470 to $519,705.

PROPOSED SERVICE DELIVERY MODEL

Based upon these findings, HHSA has developed a proposed alternate service delivery model to support better access to and quality of EMS services in the Study Area.

This proposed service delivery model would unify and integrate the four existing operating areas and six presently undesignated areas in the Study Area into a “Unified Service Area.” Under this model, the existing EOAs would remain in place, but future procurements for ambulance services would allow providers to propose services for all or part of the Unified Service Area. This would provide the opportunity for more innovative approaches to ambulance response due to potential economies of scale, and support coordination of requests for emergency medical services in the Unified Service Area within the operating area so that the closest, most appropriate resource can be sent to the scene. Elements of the proposed Unified Service Area concept include the following:

- **Ensure paramedic-level response is consistently available by bringing together currently undesignated areas into a broader "Unified Service Area"**

  Although the undesignated areas do receive service coverage from nearby ambulance providers, the service provided is not presently held to response time performance standards, as it is in the form of mutual aid. Bringing the identified undesignated areas within the Study Area into the Unified Service Area by absorbing them into existing operating areas (which would remain as distinct EOAs) would ensure paramedic-level service coverage is consistently available and monitored for performance. Additionally, the proposed model would provide the opportunity for a single provider to potentially have service responsibility for multiple parts of, or even the entire, Unified Service Area. This could better enable providers to position ambulances within the Unified Service Area for optimal responsiveness.

  Figure 6 details proposed boundary adjustments to existing operating areas to fully implement the Unified Service Area service delivery model, align services, and clarify jurisdictional boundaries. Figure 7 depicts the proposed Unified Service Area. These changes and any additional changes would be incorporated into San Diego County's EMS Plan, and submitted to the State of California EMS Authority for review and approval.

Name of Area	Proposed Change
Valley Center Service Area	Integrate into Unified Service Area and rename "Inland North"
Julian Service Area	Integrate into Unified Service Area and rename "Inland Central"
Grossmont Hospital District Zone 1 -and- Zone 2 Service Area	Adjust Boundary between Zone 1 and Zone 2 so all of San Miguel Fire Protection District resides within Zone 1 except the area that was formerly Crest Fire Protection District remains in Zone 2 and the Bostonia portion of San Miguel FPD should remain in CSA-69. Rename Zone 1 to "Grossmont Hospital District." Incorporate Zone 2 into Unified Service area and rename "Inland South"
Ocotillo Wells Service Area	Integrate into Inland Central Service Area
De Luz	Incorporate into Inland North Service Area
Ramona Undesignated Areas	Incorporate into Inland Central Service Area
Southern Desert	Incorporate into Inland Central Service Area
El Capitan	Incorporate into Inland South Service Area
Sycamore Canyon	Incorporate into Inland South Service Area
San Pasqual	Incorporate into Inland North Service Area

Figure 6. Proposed Boundary Adjustments

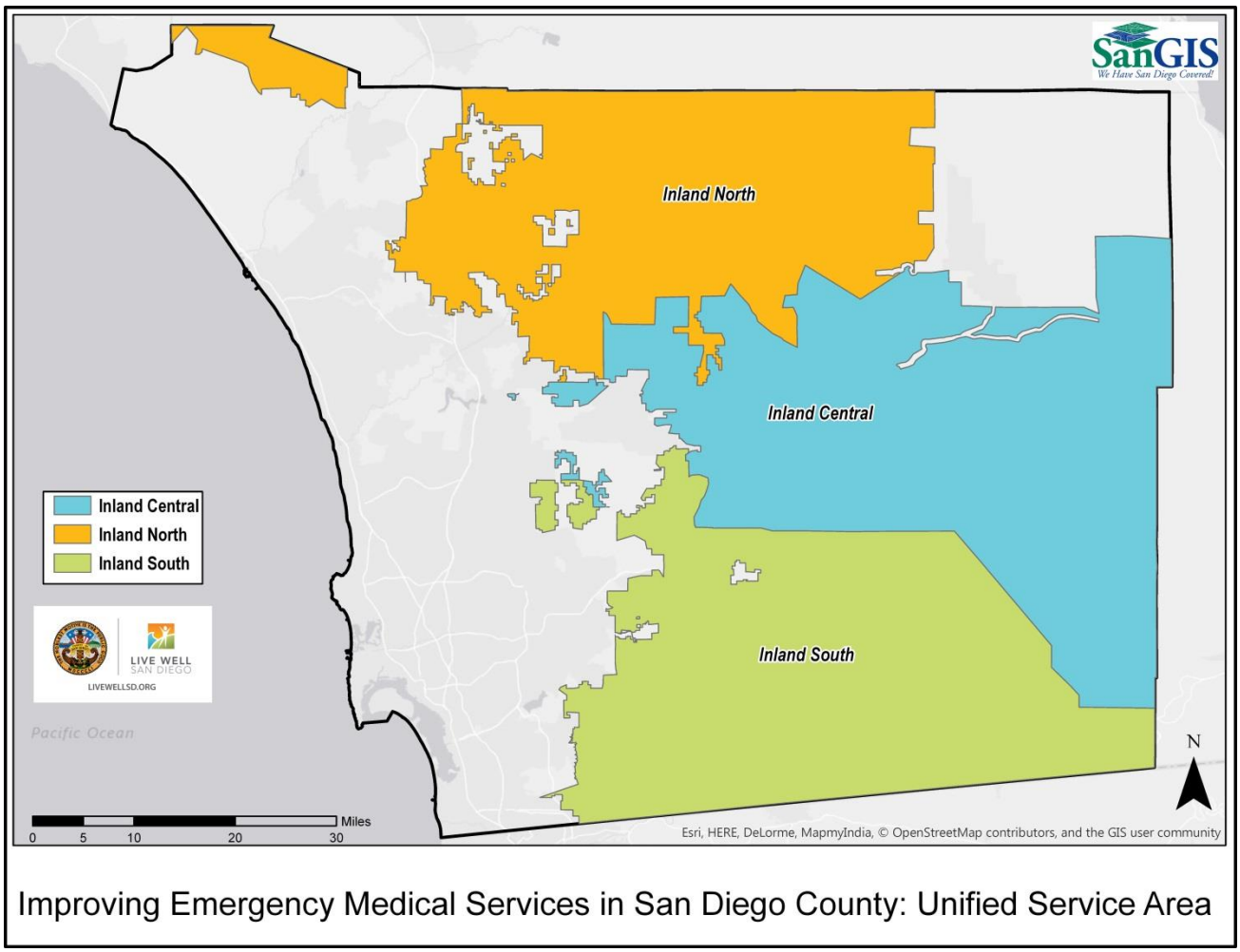


Figure 7. Proposed Unified Service Area

- **Update response time standards to reflect population patterns and integration of EMS and fire services**

  As the provision of ambulance services in this part of San Diego County is so closely related to the provision of fire services, under the proposed model, EMS response time standards would align with County Fire Authority's methodology for travel time standards. As such, rather than a single response time standard applied within a given operating area regardless of geography or population patterns, under the new model, EMS response zone designations within the Unified Service Area would be created so that, like with fire services, are striated into "urban," "rural," "outlying" or "desert." Response zone designations would follow patterns of population and not necessarily be coterminous with EOA boundaries.

  Figures 8 and 9 depict the recommended response time framework for the Unified Service Area. This framework is a proposal; HHSA EMS policy would be updated to reflect final revised response time standards. The updated policy would be presented to the Emergency Medical Care Committee prehospital subcommittee for initial review and then to the Emergency Medical Care Committee for final approval.

Response Zone Designation	Existing Ambulance Response Time Standard	Existing Response time for Ambulance if Fire Agency Paramedic	Proposed Ambulance Response Time Standard if no Fire Agency Paramedic	Proposed Response time for Ambulance if Fire Agency Paramedic
Urban	**10** minutes	12 minutes, with the arrival of a fire agency paramedic within 8 minutes	**No change**	**No change**
Rural	**30** minutes	N/A	**16** minutes	**20** minutes, with the arrival of a Fire Agency Paramedic within **15** minutes
Outlying	Areas would have previously fallen under "**best effort**" designation or "rural" designation with **30** minutes as standard	N/A	**25** minutes	**30** minutes, with the arrival of a Fire Agency Paramedic within **23** minutes.
Desert	Areas would have previously fallen under "**best effort**" designation or **50** minutes for Ocotillo Wells Service Area	N/A	**45** minutes	**60** minutes, with the arrival of a Fire Agency Paramedic within **45** minutes.

Figure 8. Existing and Proposed Response Time Standards within the Unified Service Area

- **Leverage new technology to establish updated, evidence-based performance management standards for EMS providers**

  At present, the primary service performance metric used by HHSA in the proposed Unified Service Area is response times. As baseline data is gathered via the County's new prehospital data collection system, CoSD LEMSIS, this data can be used to establish new performance metrics for the Unified Service Area to measure the quality and timeliness of care.

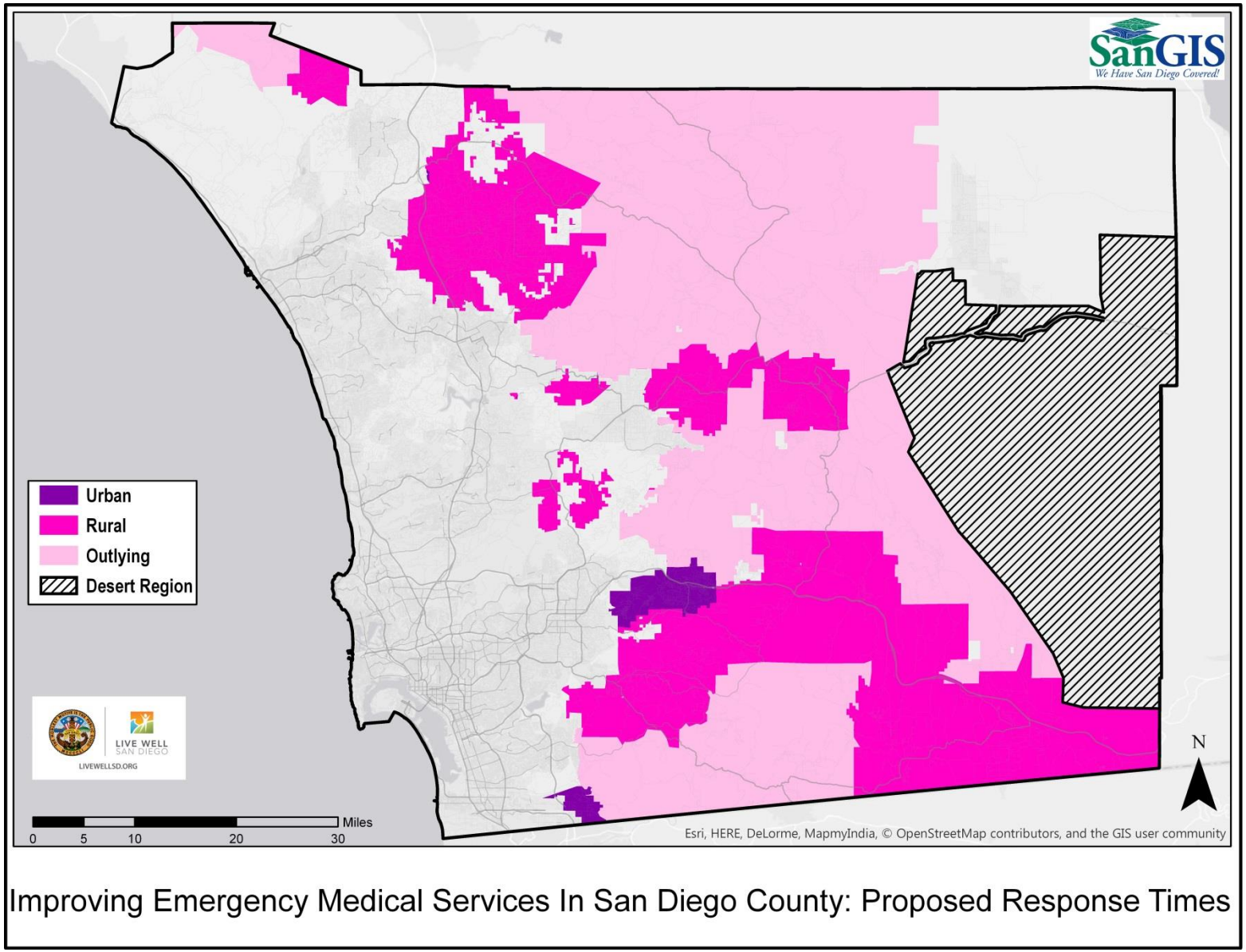


Figure 9. Proposed Updated Response Time Standards

- **Streamline processes for HHSA subsidization of ambulance service**

  Cost drivers previously identified for ambulance services include dispatch and other fees. In many cases, payment of these fees results in HHSA making a payment to the ambulance contractor and the ambulance contractor, in turn, paying the funds back to another County of San Diego department. There is an opportunity to explore a more efficient process for subsidies where HHSA funds are transferred directly to the other County of San Diego department.

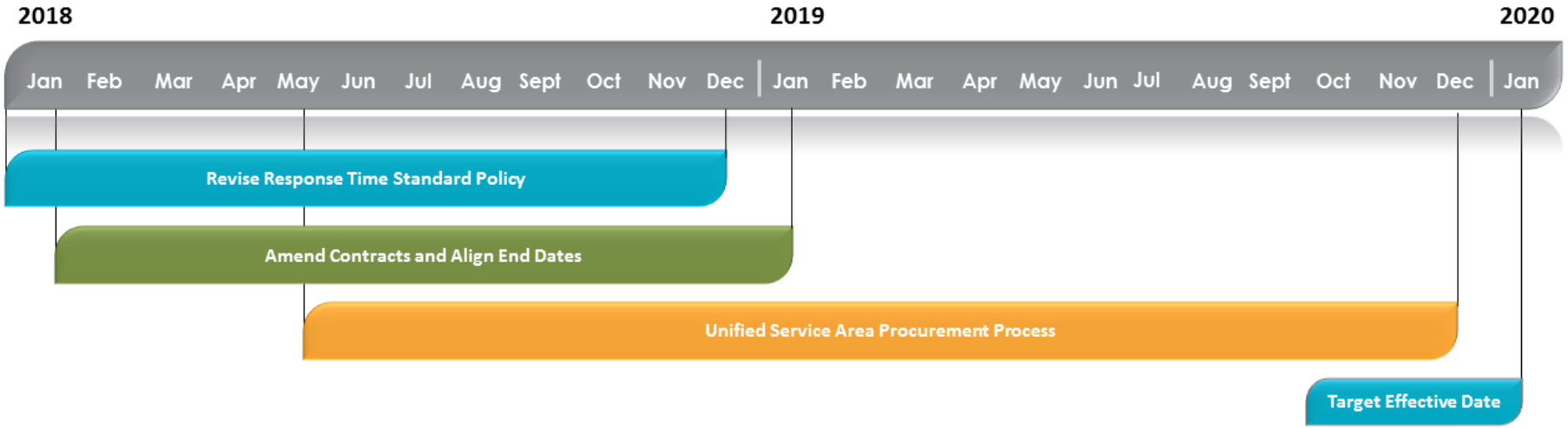
  Additionally, further analysis and standardization of the other methods by which HHSA subsidizes service, like supplementary fee payments to fire agencies, could be explored to identify similar circumstances where processes can be streamlined to ensure HHSA resources are supporting the areas of greatest need.

- **Align existing contract dates and develop a procurement for the Unified Service Area**

  Currently, HHSA contracts for ambulance service in the proposed Unified Service Area are on a staggered schedule and procurements are conducted on alternating years. The Unified Service Area would offer the opportunity for a provider(s) to have service responsibility for multiple parts of, or even the entire area. In order to incentivize providers to submit proposals on multiple EOAs or the entire Unified Service Area and serve it in an integrated manner in cooperation with fire agencies, HHSA will need to align contract dates and begin a new procurement for the Unified Service Area with a target effective date of January 1, 2020.

A proposed implementation plan for operationalizing the proposed alternate service delivery model is outlined in Figure 10.

Implementation of the proposed Unified Service Area concept would provide a practical approach to improving access to and quality of emergency medical care within the Study Area and ensure consistency of prehospital care by assigning responsibility to provider(s) in the identified Undesignated Areas. This model would help build a better EMS delivery system as well as pursue policy changes that support the alignment and integration of fire and EMS services, in line with the County of San Diego's *Live Well San Diego* vision of healthy, safe, and thriving communities.



1. **Revise Response Time Standards**. HHSA EMS policy would be updated to reflect revised response time standards. The updated policy would be presented to the Emergency Medical Care Committee prehospital subcommittee for initial review and then to the Emergency Medical Care Committee for final approval.
2. **Amend Contracts and Align End Dates**. To build the groundwork for the Unified Service Area procurement, the end dates of existing contracts within the future Unified Service Area would be aligned as follows:
   - Valley Center Service Area – Opt to not exercise any option periods for contract 551693 with Valley Center Fire Protection District and allow contract to end December 31, 2019.
   - Julian Service Area – Opt to not exercise the third option period for contract 547916 with Julian-Cuyamaca Fire Protection District and allow contract to end December 31, 2019.
   - Zone 2 Service Area – Exercise only one of the three option periods for contract 550512 with Mercy Medical Transport, Inc. and allow contract to end on December 31, 2019 and amend contract to clarify Zone 1/Zone 2 Boundary.
   - Ocotillo Wells Service Area – Seek single source authority to extend current service contract 542611 with Borrego Springs Fire Protection District for an additional 18 months through December 31, 2019 and an additional six-month option period as needed.
3. **Conduct procurement process for the Unified Service Area**. This would include development of the Request for Proposals, conducting industry days and pre-proposal conferences, the source selection committee process, and contract award and negotiation, as well as other procurement milestones as needed. Stakeholder engagement and input will be a critical element in development of the procurement.

   Target effective date for the new service delivery model is January 1, 2020. This includes time to transition services to new contractor(s), if required.

Figure 10. Proposed Implementation Plan

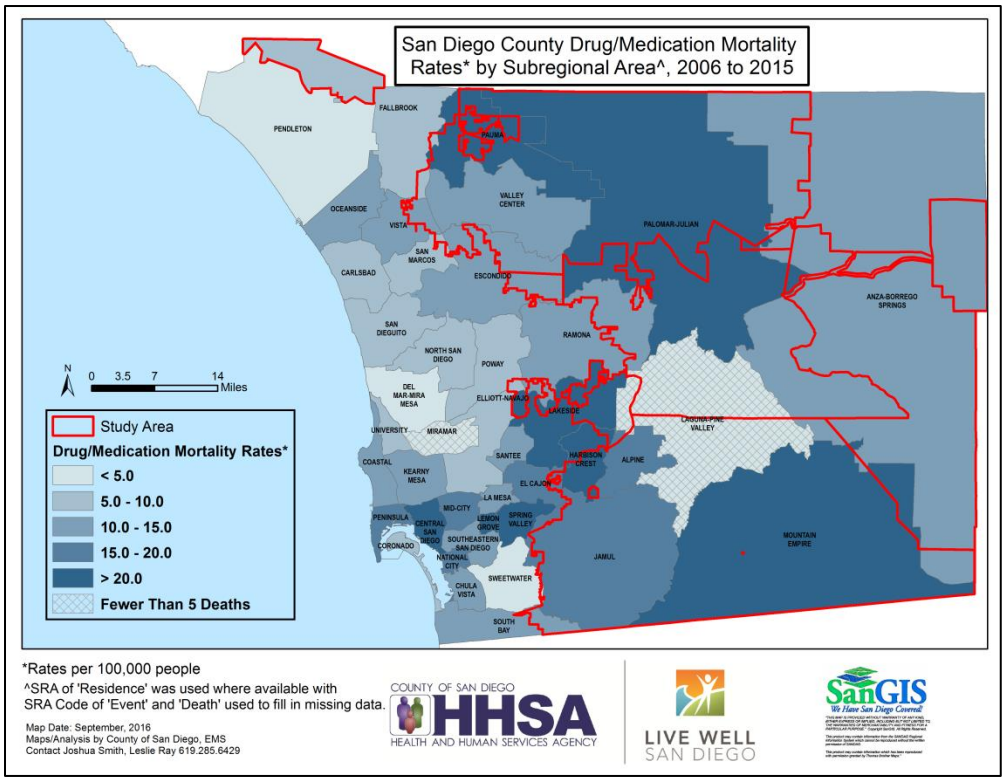
APPENDIX A – CURRENT OPERATING AREAS AND UNDESIGNATED AREAS

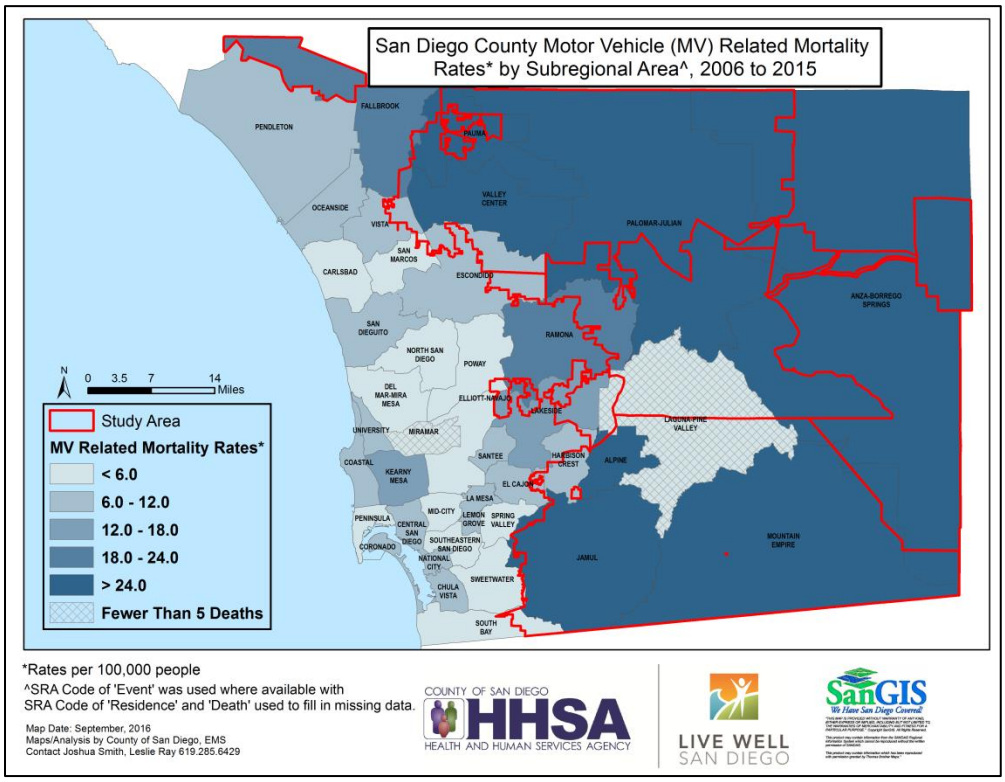
Category	Name of Zone	Zone Description	Current Provider	Board of Supervisors Approval Date
Administered by EOA Holder	Borrego Springs Service Area	Area of Borrego Springs Fire Protection District	Borrego Springs Fire Protection District	N/A
Administered by EOA Holder	Carlsbad	City of Carlsbad	Carlsbad Fire Department	08/30/1977
Administered by EOA Holder	Chula Vista	Bonita-Sunnyside Fire Protection District, Chula Vista, & Imperial Beach	American Medical Response	03/08/1977
Administered by EOA Holder	City of Coronado	City of Coronado City limits	Coronado Fire Department	N/A
Administered by EOA Holder	El Cajon	El Cajon City	El Cajon Fire Department	03/11/1980
Administered by EOA Holder	Escondido	Escondido City	Escondido Fire Department	08/30/1977
Administered by EOA Holder	Grossmont Hospital District -Zone #1	Boundaries of Grossmont Hospital District	American Medical Response	05/15/1979
Administered by EOA Holder	North County Fire Protection District	North County Fire Protection District	North County Fire Protection District	07/03/1990
Administered by EOA Holder	Oceanside	City of Oceanside	Oceanside Fire Department	03/29/1977
Administered by EOA Holder	Poway	Poway City	Poway Fire Department	12/04/1976
Administered by EOA Holder	Ramona	Ramona Municipal Water District	CAL FIRE	10/11/1988
Administered by EOA Holder	San Diego	City of San Diego	Rural/Metro	05/21/1991
Administered by EOA Holder	Vista	City of Vista (Vista city limits and the Vista Fire Protection District)	Vista Fire Department	08/30/1977

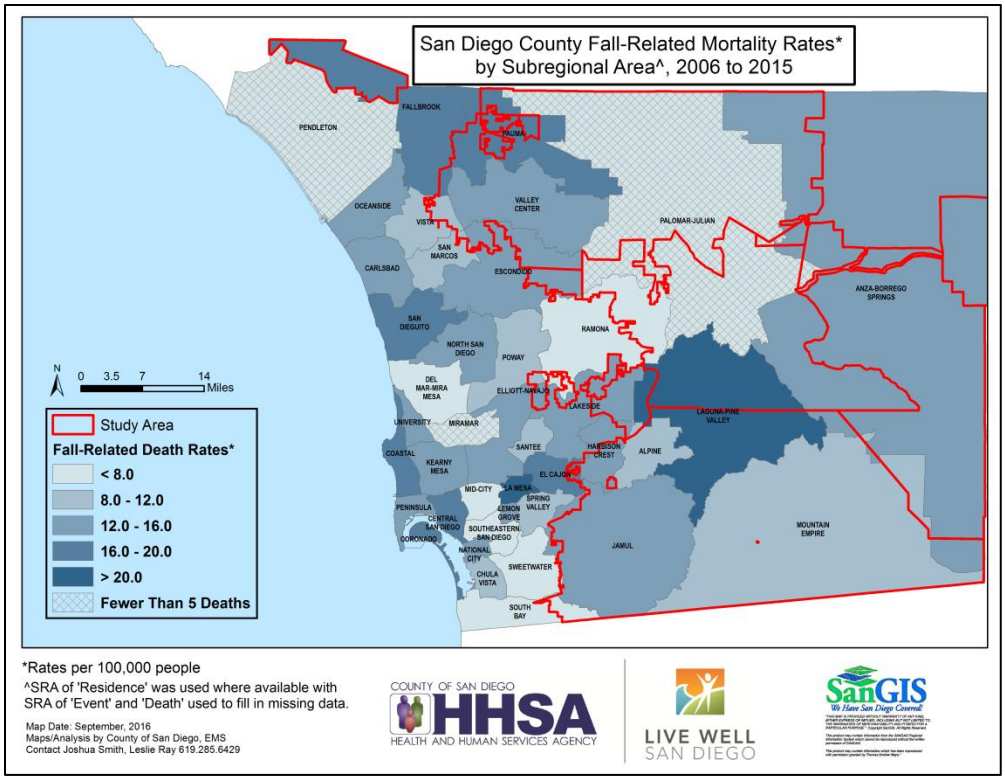
Category	Name of Zone	Zone Description	Current Provider	Board of Supervisors Approval Date
County Administered EOA, No Subsidy	National City	National City	American Medical Response	10/04/1983
County Administered EOA, No Subsidy	San Marcos	City of San Marcos	San Marcos Fire Department	12/01/1987
County Administered EOA, Subsidized Operating Area	Julian-Cuyamaca Fire Protection District	Area of Julian-Cuyamaca Fire Protection District	Julian-Cuyamaca Fire Protection District	11/10/2000
County Administered EOA, Subsidized Operating Area	Valley Center Service Area	Area of Valley Center Fire Protection District	Valley Center Fire Protection District	11/11/2000
County Administered EOA, Subsidized Operating Area	Grossmont Healthcare District Zone 2 Rural and Otay Mesa Service Area	Unincorporated areas east and south County areas	Mercy Medical Transportation, Inc.	05/15/1979
County Administered, Subsidized Non-Exclusive Operating Area	Ocotillo Wells Service Area	Unincorporated areas of San Diego County - Ocotillo Wells, Anza-Borrego State Park and surrounding desert communities	Borrego Springs Fire Protection District	06/12/1995
County Service Area	San Dieguito Ambulance District (CSA 17)	Cities of Encinitas, Solana Beach, Del Mar, Rancho Santa Fe, Del Mar Heights, Del Mar Terrace, Elfin Forest	American Medical Response	08/15/1969 07/25/1975
County Service Area	Heartland Ambulance District (CSA 69)	City of Santee and Fire Protection Districts of Lakeside & Bostonia	Santee Fire Department/Lakeside Fire Department	12/18/1974
Tribal	Sycuan	Sycuan Indian Reservation.	Sycuan Fire Department	N/A
Tribal	Barona	Barona Indian Reservation	Barona Fire Department	N/A

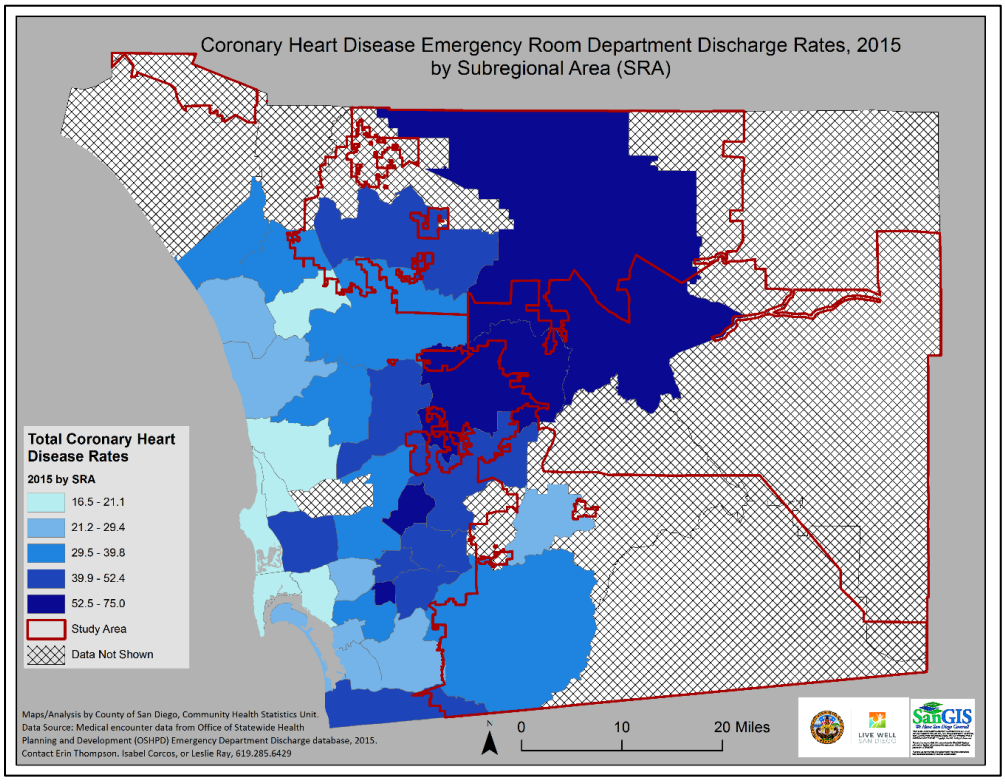
Category	Name of Zone	Zone Description	Current Provider	Board of Supervisors Approval Date
Tribal	Pala	Pala Indian Reservation	Pala Fire Department	N/A
Tribal	Rincon	Rincon Indian Reservation	Rincon Fire Department	N/A
Tribal	Viejas	Viejas Indian Reservation	Viejas Fire Department	N/A
Undesignated	De Luz	De Luz	Mutual Aid	N/A
Undesignated	Harmony Grove	Harmony Grove	Mutual Aid	N/A
Undesignated	San Pasqual	San Pasqual	Mutual Aid	N/A
Undesignated	Ramona	Barona Mesa (south of Ramona), areas north of Ramona, and areas just outside of the Ramona Municipal Water District jurisdictional boundary.	Mutual Aid	N/A
Undesignated	Sycamore Canyon	San Vicente Reservoir and Goodan Ranch/Sycamore Canyon Preserve	Mutual Aid	N/A
Undesignated	El Capitan	El Capitan Reservoir Area	Mutual Aid	N/A
Undesignated	Southern Desert	South of Ocotillo Wells	Mutual Aid	N/A

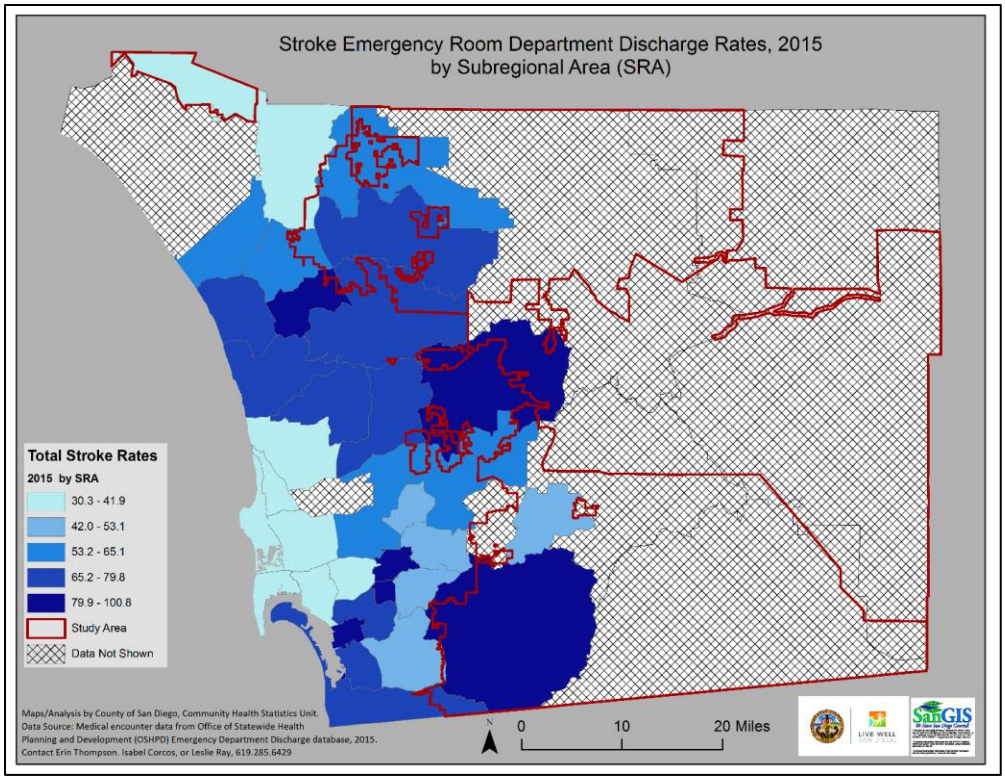
APPENDIX B – RATES OF CHRONIC DISEASE AND MORTALITY IN THE STUDY AREA






San Diego County Fall-Related Mortality Rates*
by Subregional Area^, 2006 to 2015
PENDLETON
FALLBROOK
PAUMA
OCEANSIDE
VISTA
VALLEY CENTER
PALOMAR-JULIAN
SAN MARCOS
CARLSBAD
ESCONDIDO
ANZA-BORREGO SPRINGS
SAN DIEGUITO
RAMONA
NORTH SAN DIEGO
POWAY
DEL MAR-MIRA MESA
ELLIOTT-NAVAJO
LAKESIDE
LAGUNA-PINE VALLEY
UNIVERSITY
MIRAMAR
COASTAL
SANTEE
HARBISON CREST
ALPINE
KEARNY MESA
EL CAJON
MID-CITY
LA MESA
SPRING VALLEY
PENINSULA
LEMON GROVE
CENTRAL SAN DIEGO
SOUTHEASTERN SAN DIEGO
CORONADO
MOUNTAIN EMPIRE
NATIONAL CITY
JAMUL
SWEETWATER
CHULA VISTA
SOUTH BAY
N
0 3.5 7 14
Miles
Study Area
Fall-Related Death Rates*
< 8.0
8.0 - 12.0
12.0 - 16.0
16.0 - 20.0
> 20.0
Fewer Than 5 Deaths
*Rates per 100,000 people
^SRA of 'Residence' was used where available with SRA of 'Event' and 'Death' used to fill in missing data.
Map Date: September, 2016
Maps/Analysis by County of San Diego, EMS
Contact Joshua Smith, Leslie Ray 619.285.6429
COUNTY OF SAN DIEGO
HHSA
HEALTH AND HUMAN SERVICES AGENCY
LIVE WELL SAN DIEGO
SanGIS


Coronary Heart Disease Emergency Room Department Discharge Rates, 2015
by Subregional Area (SRA)
Total Coronary Heart Disease Rates
2015 by SRA
16.5 - 21.1
21.2 - 29.4
29.5 - 39.8
39.9 - 52.4
52.5 - 75.0
Study Area
Data Not Shown
Maps/Analysis by County of San Diego, Community Health Statistics Unit.
Data Source: Medical encounter data from Office of Statewide Health Planning and Development (OSHPD) Emergency Department Discharge database, 2015.
Contact Erin Thompson, Isabel Corcos, or Leslie Ray, 619.285.6429
0 10 20 Miles
LIVE WELL SAN DIEGO
SanGIS


Stroke Emergency Room Department Discharge Rates, 2015
by Subregional Area (SRA)
Total Stroke Rates
2015 by SRA
30.3 - 41.9
42.0 - 53.1
53.2 - 65.1
65.2 - 79.8
79.9 - 100.8
Study Area
Data Not Shown
Maps/Analysis by County of San Diego, Community Health Statistics Unit.
Data Source: Medical encounter data from Office of Statewide Health
Planning and Development (OSHPD) Emergency Department Discharge database, 2015.
Contact Erin Thompson. Isabel Corcos, or Leslie Ray, 619.285.6429
N
0
10
20 Miles
LIVE WELL
SanGIS

APPENDIX C – LIST OF COMMUNITY FORUMS

Date	Location	Number of Attendees
August 21, 2017 1:00 p.m. to 3:00 p.m.	Alpine County Library 1752 Alpine Blvd. Alpine, CA 91901	20
August 22, 2017 10:00 a.m. to 1:00 p.m.	Julian Branch Library 1850 CA-78 Julian, CA 92036	13
August 23, 2017 10:00 a.m. to 1:00 p.m.	Valley Center Library 29200 Cole Grade Rd., Valley Center, CA 92082	6
August 24, 2017 12:00 p.m. to 2:00 p.m.	Deer Springs FPD Station 1 8709 Circle R Drive, Escondido, CA 92026	15
August 25, 2017 10:00 a.m. to 12:00 p.m.	Campo Village Library 31356 CA-94 Campo, CA 91906	15
August 25, 2017 2:00 p.m. to 3:30 p.m.	Crest Branch Library 105 Juanita Ln. El Cajon, CA 92021	7
September 12, 2017 5:30 p.m. to 7:00 p.m.	County Operations Center 5520 Overland Avenue San Diego, CA 92123	2
September 14, 2017 9:00 a.m.to 10:30 a.m.	Emergency Medical Care Committee Emergency Medical Services 6255 Mission Gorge Road San Diego, CA 92120	45
October 19, 2017 1:00 p.m. to 2:30 p.m.	Emergency Medical Services 6255 Mission Gorge Road San Diego, CA 92120	0
October 19, 2017 7:00 p.m. to 8:00 p.m.	Descanso Community Planning Group 24536 Viejas Grade Road Descanso, CA 91916	7
October 26, 2017 1:00 p.m. to 2:30 p.m.	Emergency Medical Services 6255 Mission Gorge Road	2

Date	Location	Number of Attendees
	San Diego, CA 92120	
November 2, 2017 1:00 p.m. to 2:30 p.m.	Emergency Medical Services 6255 Mission Gorge Road San Diego, CA 92120	11
November 7, 2017 4:00 p.m. to 5:00 p.m.	CSA 17 Advisory Committee 635 South Hwy 101 Solana Beach, CA 92075	20
November 9, 2017 1:00 p.m. to 2:30 p.m.	Emergency Medical Services 6255 Mission Gorge Road San Diego, CA 92120	3
November 9, 2017 4:00 p.m. to 5:00 p.m.	CSA 69 Advisory Committee 12216 Lakeside Avenue Lakeside, CA 92040	18
November 20, 2017 9:00 a.m. to 10:30 a.m.	Emergency Medical Care Committee 6255 Mission Gorge Road San Diego, CA 92120	33
December 1, 2017 11:00 a.m. to 1:00 p.m.	Health Services Advisory Board 1600 Pacific Highway San Diego CA 92101	TBD