EMS System Analysis

Orange County, NC

Presented By

Public Consulting Group LLC

Public Safety Consulting Services Team

CONSULTANT'S FINAL REPORT

August 2022

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PREFACE

"A Prepared, Coordinated, and Integrated Emergency Services System"

SECTION 1 – PROJECT INTRODUCTION, CONTEXT, AND ACKNOWLEDGEMENTS

1.1 – Project Introduction

Orange County issued a Request for Proposal (RFP) to Provide an EMS System Analysis in September of 2021 and ultimately selected Public Consulting Group LLC (PCG) as its contracted consulting firm, formally beginning the Study in February of 2022.

1.1.1 – Scope of Services/Objectives

The primary Scope of Services for this Study is based on a two-phased analysis surrounding a Comprehensive EMS System Assessment (Phase 1) and a Deployment and EMS Location Study (Phase 2). Highlighted within this Study are five Objectives:

- Preserve a high-quality ALS emergency medical response and transport system throughout Orange County
- Maintain a countywide EMS system – providing for consistency of service throughout all areas and jurisdictions of the County, allowing for differences in population density, but without regard to race, creed, gender, or economic status
- Maintain, support, and value the current EMS workforce
- Produce an EMS system that is sustainable for the planning horizon and beyond
- Look at EMS delivery including 9-1-1 procedures, clinical care, response times throughout the County, ALS availability by time of day, day of week and geography, operational deploying including staffing, and EMS training.

Within each of these two Phases are various primary components for evaluation:

Phase 1: Comprehensive EMS System Assessment

- Routing and screening of 9-1-1 and other medical calls
- Use of dispatch protocols for prioritized and tiered responses
- Clinically-based response time performance standards
- Integration and use of first responders
- Data and performance reporting requirements
- Review of management practices, including budget and fiscal management
- Review of hospital diversion data and their impact on the EMS system and communities
- EMS staffing and shift patterns, schedules and hours, and staffing limitations relative to fatigue, crew and patient safety, and skill development and retention
- Utilization of Community Paramedics
- Drivers of system change during the 2025 – 2035 planning horizon

- The physical resources needed to support EMS activities including facilities, vehicle fleet, and equipment specific to EMS delivery

Phase 2: Deployment and EMS Location Study

- Assess current response and planned station locations
- Assess and identify opportunities for future public/private partnerships, including non-emergency transport agencies and co-located deployment with fire and other partners

1.1.2 – Tasks/Deliverables

Primary deliverables respective to this project include holding regular project meetings, providing a final report, including a prior draft report for approval, and a presentation of this report to identified stakeholder groups after the report's submission. Items to be included in the final report include:

- Findings from the EMS System Assessment
- Current and future drivers of system change
- Current and planned deployment locations or stations
- Response statistics
- Recommendations for operational, staffing, and deployment changes needed to address the planning horizon of 10 years
- Recommendations for future station deployment locations, ranked in order of priority over the next 10 years
- Providing appropriate comparisons with similar-sized communities and other regional partners
- Adherence to applicable North Carolina EMS regulations

1.2 – Project Context

1.2.1 – Review of 2011 Comprehensive EMS System Plan

A review of Orange County's 2011 *Comprehensive Assessment of Emergency Medical Services and 911/Communications Center Operations Study* (Draft Report dated August 30th, 2012) provided some initial context into the history of Orange County EMS (OCEMS) and insight into some of the challenges faced at that time. Around the timeframe of this (prior) study, the County's population consisted of approximately 135,776 residents, with the highest concentration of residents living in the Carrboro/Chapel Hill area. OCEMS staffed the County with a total of 66 full-time employees, including three administrative staff, primarily working a combination of 12- and 24-hour shift schedules, with the intent of transitioning all field staff to 12-hour shifts toward the later part of 2012. The field employees (EMTs and Paramedics, plus four additional Supervisors) staffed four ambulances that were scheduled on a 24-hour shift rotation, in addition to four ambulances that were scheduled on a 12-hour shift rotation. This equated to a total of six full-time (24/7) ambulances, plus one supervisor unit. Total dispatched calls for the year 2011 equaled 10,719 incidents. Ambulance units were additionally placed in a "move-up" status to cover multiple response zones due to high call volumes and decreased unit availability, a total of 2,360 times throughout the year. ***Table 1.1*** shows an overview of the 2011 OCEMS agency.

Item	Description
County Population	**135,776 Residents**
OCEMS Call Volume	**10,719 Incidents**
OCEMS 24-Hour Ambulances	**4 Total** *(Medic 1, 2, 3, 4)*
OCEMS 12-Hour Ambulances	**4 Total** *(Medic 5 – 06:00-18:00)* *(Medic 6 – 09:00-21:00)* *(Medic 7 – 12:00-24:00)* *(Medic 8 – 06:00-18:00)*
Total Full-Time Staff	**66 Employees** *(3 Administrative – Operations Manager/Captain, Training Officer, Staff Operations Officer)* *(4 Shift Supervisors)* *(36 Paramedics)* *(23 EMTs)*

Table 1.1 – OCEMS Agency Overview (2011)

Throughout this study, three primary issues of concern are identified with subsequent issues outlined within each of these primary concerns. The three primary significant concerns are as follows:

- Availability of ALS ambulances
- Response Times
- EMS Facilities

Outlined below are some of the highlighted points and excerpts surrounding these issues from this study that are relevant to today's 2022 Study:

- Move-ups as a result of having no additional units available are a common occurrence, transpiring 2,360 times in 2011
- Large service area coverage gaps within the County exist
- In 2011, the existing EMS stations were insufficient in terms of living amenities, particularly privacy within sleeping quarters, adequate workspace areas, or climate-controlled or even element-protected ambulance parking areas
- There were identified shared space issues between OCEMS and its partnering co-locating fire departments, especially surrounding workforce culture and call volume and workload demands
- OCEMS should staff additional supplemental BLS ambulances to help supplement call volume loads during identified peak timeframes (09:00-21:00)
- Identified nine zones for unit stationing throughout the day with the need for adequate buildings to be provided to accommodate such staffing needs

Interpreting the collective data presented in the 2011 study, it appears as though OCEMS was understaffed, had an insufficient fleet for continued operations, and had insufficient facilities to support 24-hour staffing operations. Many of these same findings come as a result of what today's Study has uncovered and speaks volumes in reflection upon what has (and hasn't) been mitigated during the past decade.

1.2.2 – Review of 2014 EMS Strategic Plan

Orange County's Emergency Services (OCES) department (the Department) constructed a Strategic Plan in 2014 with the goal of "designing a short-term and long-term guide to assist OCES leadership in directing programmatic efforts within each Division." Its Vision Statement describes OCES's desired future state for emergency service capabilities, while each Division's Mission Statement describes how the vision will be achieved. For the Department, the Vision is identified as being "a prepared, coordinated, and integrated emergency services system." The EMS Division has outlined a Mission Statement concluding that "the OCES EMS Division will deploy highly educated, well-trained emergency medical personnel to deliver efficient, effective, and excellent care that encompasses the wide range of community health needs."

Each of the Division's strategic goals are identified below. It also identifies three strategic goals for the EMS Division to incorporate:

- Strategic Goal 1 – Build capabilities to support efficient, effective, and excellent care.
- Strategic Goal 2 – Develop programs to address the wide range of community healthcare needs.
- Strategic Goal 3 – Deploy highly educated, well-trained personnel.

Considering the feedback provided in this report and the approximately three-year gap between both prior studies, the strategic vision of the EMS Division appears to strive to become a community-integrated, efficient, highly educated, and well-trained EMS agency. Further items addressing these vision interests will be discussed forthcoming in this Study.

1.3 – Report Introduction

1.3.1 – Methodology

This Report was developed through the combination of direct data analysis, stakeholder feedback, independent research, and professional industry insight respective to the Orange County EMS system, Orange County EMS (OCEMS) specifically, and the EMS industry in general. Considering that the significant majority of Orange County's EMS system is comprised of the operations of Orange County EMS (the Agency), the significant majority of this Report is focused on this one agency and its subsequent interaction with the partnering response agencies around it. Additionally, Orange County EMS is the one agency that the County has direct oversight and influence over, as all others are independent of County operations and are only regulated through existing Franchise Agreements.

Data within this Report is primarily based on filtered computer-aided dispatch (CAD) data provided to our firm for this Study and covers a seven-year fiscal period including FY 2015 through FY 2021. An additional dataset was provided that covered additional elements, and its captured timeframe encompasses four years of calendar data including CY 2018 through CY 2021. This second dataset is derived from OCEMS's electronic patient care reporting (ePCR) software and may include different filters or included/excluded elements as a result. Whenever and wherever possible, variances in data presentations are communicated throughout the context of this Report. These variances, although minimal in occurrence, do present a potential limitation within this Study. Appropriate citations are provided for relevant and utilized data components or resources outside of the verbal accounts, delivered data, or subject matter expert insight noted within this Report.

Throughout the course of this Study, external factors also contributed to the need for Orange County EMS and the County's Emergency Services Department to make rapid course adjustments and responses to local wage increases for EMS providers. As a result, some of the data that would have otherwise been presented in this report respective to EMT and Paramedic wages has already been presented to the County Board and subsequent pay increases have already taken effect. This action is seen as a positive move by our firm and one that we would have likely recommended had the County not taken this immediate, time-sensitive step. Subsequent budget requests have also been made by the Department as the County's new fiscal year cycle has begun during the midst of this Study. Nevertheless, the remainder of this Study and Report primarily focuses on understanding the current system in an effort to provide appropriate immediate, short-term, and particularly long-term recommendations toward building a sustainable future.

1.3.2 – Structure of the Consultant's Final Report

Coinciding with the RFP, this Report is divided into five primary segments: the Preface, Phase 1: Comprehensive EMS System Assessment, Phase 2: Deployment and EMS Location Study, Closing, and Appendix. Within each of these segments are various applicable sections that categorize components of the Scope of Services, Objectives, and Tasks and Deliverables throughout them. Respective findings and recommendations are provided throughout this report in each section, along with a summary of recommendations being noted aside the Executive Summary.

1.3.3 – Key Terms and Definitions

Agency – In appropriate context and when capitalized, refers to Orange County EMS (this may also be referenced as the Division)

ALS – Advanced Life Support; commonly referring to an ambulance crew consisting of an EMT and a paramedic, a first response vehicle staffed solely by a paramedic, or patient care provided by a paramedic

Ambulance Service – Referencing an EMS agency that functions as a 9-1-1 ambulance transport service provider

BLS – Basic Life Support; commonly referring to an ambulance crew consisting of two EMTs (which may include Advanced EMTs), or patient care provided by an EMT

County – In appropriate context and when capitalized, refers to Orange County as either the governing body or the municipal entity

Department – In appropriate context and when capitalized, refers to Orange County's Department of Emergency Services – which oversees the Division of EMS

Division – In appropriate context and when capitalized, refers to Orange County EMS (this may also be referenced as the Agency)

EMS – Emergency Medical Service; commonly referencing an ambulance transport agency with 9-1-1 dispatched emergency response responsibilities, but may include other agencies like first responder (only) services

EMT – Emergency Medical Technician

FD – Fire Department (or Fire District)

OCES – Orange County [Department of] Emergency Services

OCEMS – Orange County [Division of] Emergency Medical Services (EMS)

PSAP – Public Safety Answering Point; referencing either the primary or secondary source for receiving 9-1-1 calls and dispatching public safety resources (e.g., police, fire, ambulance)

Report – Referencing this document

Study – Referencing this project, its Scope of Work/Services, and the consulting firm's research, findings, and recommendations; may also reference this document (in the appropriate context and as applicable)

Unit – Referencing (used synonymously with) a staffed ambulance or an ambulance vehicle

1.4 – Acknowledgements and Appreciation

1.4.1 – Orange County Project Team

A key component to the current success of OCEMS, the County EMS system as a whole, and the implementation of this Study is due to the involvement of the Orange County Project Team. This team met monthly to provide relevant project and system updates, develop the Study's employee and community surveys, and review and approve this Report. Individual interviews were conducted with various Team members as content related to each of their areas of expertise and Agency involvement was relevant.

Particular appreciation is expressed to **Emergency Services Director Kirby Saunders** and **EMS Division Chief Kim Woodward** for their regular and direct project involvement.

Additional appreciation is expressed toward the following Project Team members (in alphabetical order):

Dr. Joey Grover, OCEMS Medical Director

Mr. Scott Lodge, OCEMS Paramedic

Mr. Al Matthews, OCES Logistics Manager

Division Chief Lisa May, OCES Division of Finance/Administration

Division Chief Kevin Medlin, OCES Division of 9-1-1 Communications

Mr. Kyle Ronn, EMS Quality Assurance Coordinator

Mr. Andrew Werner, EMS Supervisor

1.4.2 – Additional Acknowledgements

Multiple additional stakeholder interviews were conducted with various local fire department, EMS, and internal County representatives to glean greater insight into OCEMS and the EMS system as a whole. Their perspectives provided insight into direct working relationships with OCEMS, internal operational and administrative practices, and local emergency system operations. Their willingness to participate in providing stakeholder feedback is greatly appreciated.

Listed below are these individuals (in alphabetical order):

Ms. Jeryl Anderson, OCES Recruitment and Outreach Coordinator

Ms. Brenda Bartholomew, Orange County Human Resources Director

Fire Chief Charles Bowden, New Hope Fire Department

Fire Chief Jeff Cabe, Orange Rural Fire Department

Ms. Donna Davenport, Orange County Human Resources Manager

Fire Chief Vencelin Harris, Chapel Hill Fire Department

Ms. Chasidy Kearns, OCEMS Training Coordinator

Chief Paramedic Mark Lockhart, Durham County EMS

Fire Chief Bob Louis, Mebane Fire Department

Chief Matthew Mauzy, South Orange Rescue Squad

Fire Chief Phillip Nassen, White Cross Fire Department

Fire Chief David Schmidt, Carrboro Fire Department

Mr. Landon Weaver, OCEMS Community Paramedic Coordinator

1.4.3 – PCG Project Team

Chief Tim Nowak brings 20 years of emergency service industry knowledge and experience to this project as its primary report author and **Lead Subject Matter Expert** within the EMS industry. Tim holds a Bachelor of Science degree in Fire Science, an Undergraduate Certificate in Human Resource Management, an Associate of Applied Science degree as a Fire Protection Technician, and a Technical Diploma as an EMT-Paramedic. He is a Nationally Registered Paramedic (NRP) with additional instructor credentials in basic, advanced cardiovascular, and pediatric advanced life support. He holds additional credentials as a Critical Care Emergency Medical Transport Paramedic (CCEMTP), Supervising Paramedic Officer (SPO), Managing Paramedic Officer (MPO), and Certified Ambulance Documentation Specialist (CADS). His background includes clinical care, training delivery and development, quality assurance and data management, and protocol development for EMS agencies ranging in rural, suburban, and urban demographics throughout four states. As an experienced chief officer, he brings executive-level experience overseeing the areas of EMS operations, special operations and emergency preparedness, logistics, accreditation, policy development, community risk reduction, and community paramedicine.

Chief Ken Riddle brings over 40 years of emergency service industry knowledge and experience to this project as its **Project Advisor** and as a **Subject Matter Expert** within the EMS industry. Ken holds multiple fire service credentials, has prior clinical and administrative experience in EMS system delivery, and is also credentialed as an Executive Fire Officer (EFO). His background includes extensive executive chief officer experience within the fire service overseeing all levels of operations within a large, metropolitan fire/EMS system. In addition to this experience, Ken has been providing fire and EMS consulting services for over 30 years.

Chief Jason Fuller brings over 15 years of emergency service industry knowledge and experience to this project as a contributing author and **Subject Matter Expert** within the EMS industry. Jason holds a Master of Public Administration degree and a Bachelor of Arts degree in Psychology. He also holds a Technical Certificate as a Paramedic and is both a Nationally Registered Paramedic (NRP) and a North Carolina licensed Paramedic. Jason also brings extensive North Carolina fire and EMS experience to this project as a resident and industry professional within the state. His chief officer experience spans across fire and EMS operations, training, and specialty response.

Ms. Alina Coffman brings over 15 years of project management experience to this project as its **Project Manager** and as a point of contact for this project's execution. Alina holds a Master of Public Affairs degree and is a certified Project Management Professional (PMP). Her background includes experience in EMS agency cost collection and project management oversight for multiple fire and EMS operational studies.

Public Consulting Group (PCG) *is a national fire and EMS consulting firm with experience in providing feasibility studies, data analysis, strategic and master planning, operational assessments, cost reporting analysis, ambulance supplemental payment program design, and professional recommendations for public safety agencies.*

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SECTION 2 – EXECUTIVE SUMMARY, KEY FINDINGS, AND KEY RECOMMENDATIONS

2.1 – Executive Summary

The EMS system within Orange County – primarily comprised of its own county-operated EMS agency, Orange County EMS – appears somewhat paradoxical and inconsistent in nature. On one hand, the system operates within a static, station-based setting, but also attempts to dynamically deploy units in order to maintain adequate call volume coverage. It primarily staffs its crews on a 24-hour basis, but also tries to account for peak daytime call volumes and unit movement. It exists within a primarily career responder model that emphasizes the need for more consistent training, high provider standards, and verified provider competency, yet it also allows the opposite to exist based on past practices and perceived political and cultural pressures. As a result, the current EMS system – and primary EMS agency – within Orange County seems somewhat confused and needing further direction to course-correct its inconsistencies. This Report is intended to provide that direction.

At the root of identifying the issues surrounding this systemwide inconsistency is the need to define how the system should be designed and supported to be operated. This responsibility rests not only on the shoulders of its EMS administrators, but also on the shoulders of its elected officials and residents. What type of organizational structure, response system, and level of geographic coverage are its taxpayers expecting and, as a result, willing to financially support? The findings of this Report will help to outline two primary recommendation models for the County and its residents to choose from.

From an objective standpoint, Orange County EMS and the County's EMS system presents an example of how data-driven decisions alone can be detrimental toward building an EMS system. Building a system that relies solely on traditional workload metrics and call volumes would leave significant coverage gaps throughout the County and result in a need for regular unit shifting and an artificially overworked workforce. Data-supported decisions, however, take into account the context surrounding the data and its impact within the County, specifically, based on the various drivers of system change and unique characteristics that differentiate Orange County EMS and the County's EMS system from others nearby or even nationally.

Recommended solutions on the horizon, nevertheless, revolve around system designs that benefit the public – the County's residents, travelers, and individual patients – along with Agency employees and their professional and personal well-being.

2.2 – Summary of Recommendations

- **Summary Recommendation 1** – Emphasis should be placed on recognizing the Division of Emergency Medical Services (OCEMS) as its own entity that is a part of the greater Department of Emergency Services (OCES), not one-in-the-same as the Department. This should primarily come in the form of Division branding and daily operations separation. The sharing of various administrative services and general budget oversight by the Department is still seen as an efficiency benefit within the County and should remain a continued practice, but not necessarily with all operational functions. Future Division focus should also be placed on emphasizing administrative and operational organizational chart expansion in an effort to promote employee career path development, retention, responsibility delegation, and adequate administrative/operational staffing, in general.

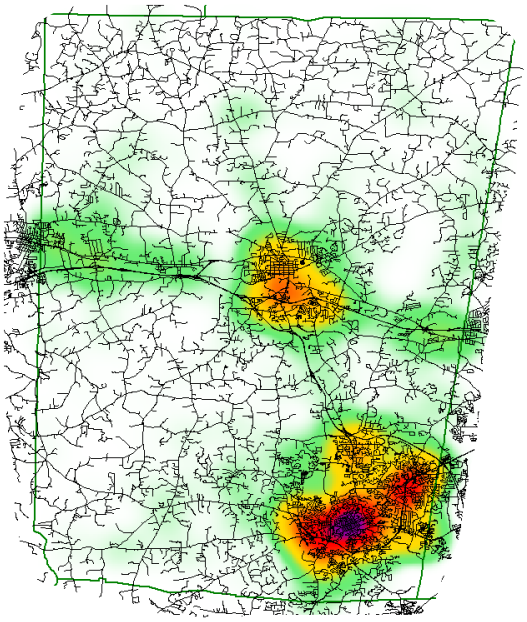
- **Summary Recommendation 2** – Countywide EMS system oversight should be shifted under the sole authority of the Emergency Services Department while EMS agency operations related to Orange County EMS should remain under the respective EMS Division. Franchise Agreements, system quality performance, system medical direction, and system-level administrative concerns should be separated from individual EMS agency operations, thus requiring all agencies operating within the County – including those that are Franchised, fire department medical first responder, and even Orange County EMS – to operate under the same systemwide standards, equally. OCEMS-specific training, quality assurance, operations, administration, and data management should remain separate from the countywide EMS system's functions, unless they apply universally to all EMS agencies within the countywide EMS system and OCEMS chooses to offer such services outside of its own agency.

- **Summary Recommendation 3** – OCEMS Supervisors should transition to 12-hour AM/PM shifts, rather than continue to work 24-hour shifts, as soon as possible. Consideration should also be placed on a complete Agency transition toward a 12-hour shift (combination AM/PM) staffing model with the elimination of 24-hour shifts all together.

- **Summary Recommendation 4** – OCEMS daily personnel staffing and unit coverage should be increased to account for greater daytime/"peak" call volumes while also increasing overnight coverage needs to maintain adequate geographic and response coverage throughout the entire County. Within this, OCEMS also needs defined policies addressing the procedures surrounding system "surge," acceptable and required minimum unit coverage, and outlining unit downgrade and/or brownout parameters. Utilization of South Orange Rescue Squad for regular operational staffing should be discontinued and increased emphasis should be placed on appropriate OCEMS up-staffing and resource support.

- **Summary Recommendation 5** – Future Agency focus should be on expanding operational staffing levels to better account for geographic coverage and response coverage needs, ideally designed around a battalion- or zone-based hub model with various satellite stations utilized for static unit deployment. Future station development should focus on the construction of County-owned EMS stations that are either standalone in nature or co-located with other County resources, not co-located with local fire department agencies. Current co-location agreements may continue as operated, but consideration should be placed toward recognizing OCEMS presence at each station as a part of any leasing agreements.

PHASE 1: COMPREHENSIVE EMS SYSTEM ASSESSMENT



SECTION 3 – THE COUNTY AND ITS COMMUNITIES

3.1 – Orange County and Community Overview

3.1.1 – Orange County Overview

"*Nestled in the hills of the North Carolina Piedmont, Orange County is located between the Research Triangle Park and Triad cities of Greensboro, Winston-Salem, and High Point. With more than 140,000 residents, Orange County includes historic Hillsborough, the county seat, Chapel Hill, home of the University of North Carolina, and Carrboro and Mebane, former railroad and mill towns.*" [1]

ORANGE COUNTY
NORTH CAROLINA

Figure 3.1 – Orange County Logo

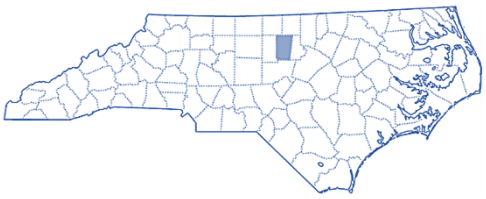


Figure 3.2 – Image of North Carolina County Borders with Orange County Highlighted

This description could not be more eloquently scripted to describe the wooded landscape of Orange County, North Carolina (***Figure 3.1*** shows the County's logo). At first glance, the County's panorama appears rural, but a deeper dive will bring you into pockets of residential subdivisions and communities that have a suburban-to-urban vibe. This unique appearance plays into the County's growing attraction for not only permanent residents, but also seasonal residents, college students, and workers alike. ***Figure 3.2*** shows Orange County's location within North Carolina. [2]

The County's local attraction is reflected in its population growth patterns over the past few decades, which have shown steady decade-to-decade increases, along with a continued significant growth projection well into the future. The County's 2021 population is approximately 148,884 residents, which is a slight 0.5% increase from 2020, but a larger 11.3% increase since 2010. ***Table 3.1*** shows a 2021 population comparison of Orange County related to its neighboring counties of Alamance, Caswell, Chatham, Durham, and Person. [3]

County	2021 Population	Population Comparison %
ORANGE	**148,884**	**19%**
Alamance	173,877	22%
Caswell	22,714	3%
Chatham	77,889	10%
Durham	326,126	41%
Person	39,127	5%
TOTAL	**788,617**	**-----**

Table 3.1 – Population Comparison of Orange County and Surrounding Counties (2021)

Locally, Orange County comprises approximately one-fifth (19%) of the total population amongst its combined surroundings. Durham County, its neighbor to the east, comprises nearly two-fifths (41%) of the local population while Alamance County to its west comprises slightly over one-fifth (22%) of the local population. Long-term population projections for the County as a whole trend it significantly upward over the next forty years into 2060, anticipating a population increase to over 250,000 residents around that time. ***Figure 3.3*** shows the actual U.S. Census (1980-2020) and projected population numbers (2030-2060) and trends throughout this nine-decade time period. [4]

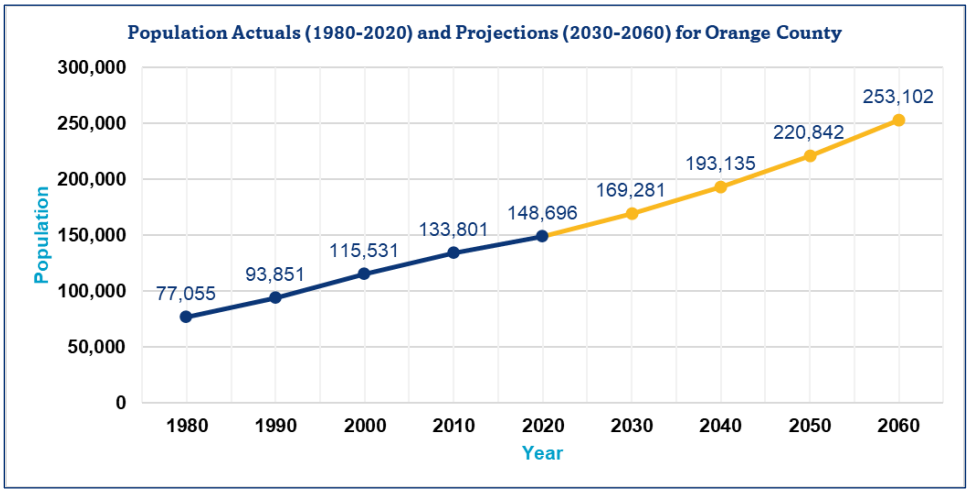


Figure 3.3 – Population Actuals (1980-2020) and Projections (2030-2060) for Orange County

Annual decade-to-decade growth percentages from 1980-2020 average population increases of 17.9% each decade, while future projections anticipate a slightly lower growth rate of 14.2% from one decade to another from 2020-2060. Overall, the population increase projected looking at 2020 actuals and 2060 projections shows a total population increase of 70.2%. Additional County and State comparison information related to their geography and population demographics can be found in ***Table 3.2***. [3]

Geography	Orange Co.	State
Land Area (sq. mi.)	397.6	48,623
Population per Sq. Mi.	374	214.7
Population Demographics	**Orange Co.**	**State**
Population	148,696	10,439,388
Persons per Household	2.5	2.5
Age under 18 years old	18.8%	21.8%
Age 18-65 years old	65.5%	61.2%
Age over 65 years old	15.7%	17.0%
Male	47.7%	48.9%
Female	52.3%	51.1%
White, not Hispanic	67.9%	59.9%
Black or African American	11.9%	22.3%
Amer. Indian or AK Native	0.6%	1.6%
Asian	7.9%	3.4%
Native Hawaiian or Pac. Isl.	0.1%	0.1%
Two or More Races	2.8%	2.5%
Hispanic or Latino	8.8%	10.2%

Table 3.2 – Orange County Comparison to North Carolina Geographic and Population Demographic Information (2020)

Part of the County's claim to popularity is its relationship within the Research Triangle, which includes the region within and immediately surrounding Duke University (Durham), North Carolina State University (Raleigh), and the University of North Carolina-Chapel Hill (Chapel Hill). These major research universities are located within close proximity to one another and include reputable medical schools that add to the clinical progressiveness that the area is nationally recognized for. Within the greater Research Triangle area, there are over two million residents, over 7,000 companies, as well as 12 colleges/universities and eight community colleges that attract 174,000 students each year (***Figure 3.4*** shows an overview map of this area). [5] This famed impact plays a larger role not only in the area's permanent and transient population, but also on its local infrastructure, cost of living, access to health care, political ecosystem, workforce, taxing economy, and public safety and emergency services systems.

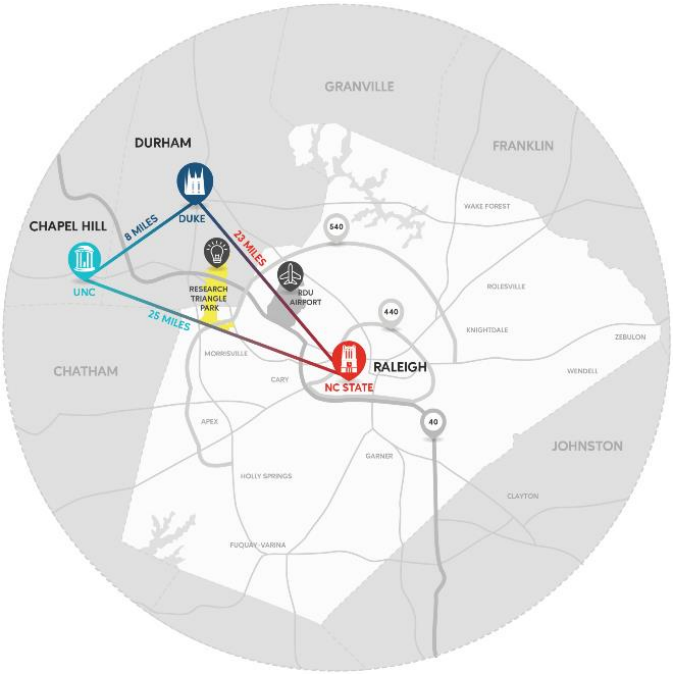


Figure 3.4 – Research Triangle Image

3.1.2 – Community Overviews

Within Orange County, there are seven townships that contain a total of three towns and a split city with neighboring Alamance County. ***Table 3.3*** lists Orange County's townships and any respective towns or municipalities within their borders, while ***Figure 3.5*** displays a corresponding township map and ***Figure 3.6*** shows an overview map with municipal borders and major roadways, including Interstates-85 and -40, which serve as major infrastructure connecting points between the major population centers within the greater Research Triangle region. [6]

Township	Municipalities
Bingham	-----
Cedar Grove	-----
Chapel Hill	Town of Carrboro Town of Chapel Hill
Cheeks	City of Mebane *(Split with Alamance Co.)*
Eno	-----
Hillsborough	Town of Hillsborough
Little River	-----

Table 3.3 – Listing of Orange County Townships and Municipalities

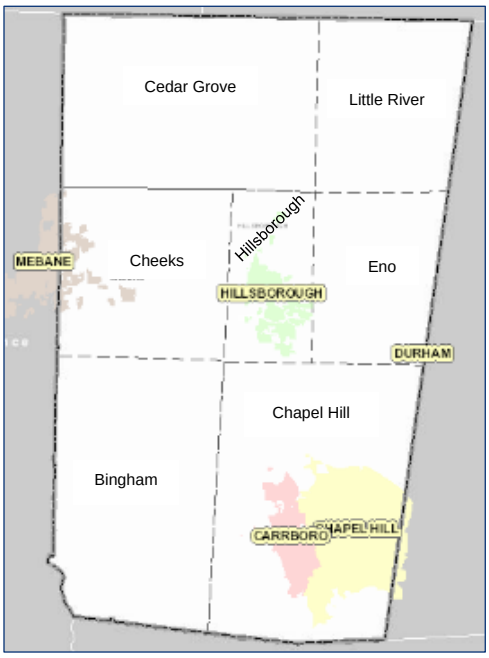


Figure 3.5 – Orange County Township Map

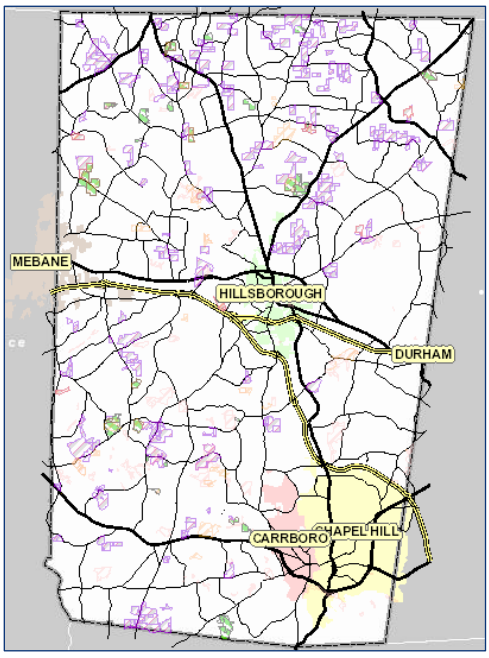


Figure 3.6 – Orange County Overview Map with Municipal Borders and Major Roadways

Considering the County's growth history and future projections from earlier presented data, it can be presumed that the majority of the County's population is centered around its two visible community areas of Hillsborough and Carrboro/Chapel Hill. Further 20-year historical population reviews and projections (***Table 3.4***) corroborate this presumption and work to show how Orange County remains and is projected to remain a primarily rural-to-suburban county with pockets of suburban-to-urban municipalities. [4]

Township *Municipality*	Historical 2000	 2010	"Current" 2020	Projections 2030	 2040
Bingham	6181	6527	6972	7404	7863
Cedar Grove	4930	5222	5251	5419	5592
Chapel Hill	76,578	87,971	96,006	107,527	120,430
Town of Carrboro	*16,782*	*19,582*	*21,295*	*23,978*	*26,999*
Town of Chapel Hill	*44,102*	*54,397*	*59,054*	*68,503*	*79,463*
Cheeks	7064	9313	11,050	13,835	17,321
City of Mebane	*675*	*1793*	*3171*	*7014*	*15,516*
Eno	6092	7501	8437	9939	11,708
Hillsborough	11,639	13,809	17,373	21,230	25,943
Town of Hillsborough	*5446*	*6087*	*9660*	*13,060*	*17,658*
Little River	3047	3458	3607	3928	4278
Township Totals	**115,531**	**133,801**	**148,696**	**169,281**	**193,135**
10-Yr. Growth Rate	***(+25.1%)***	***+15.8%***	***+11.1%***	***+13.8%***	***+14.1%***

Table 3.4 – Historical and Projected Orange County Township/Municipality Populations (2000-2040)

What this township/municipal population data shows us is that: (1) Orange County has seen historic population increases each decade, (2) each township has seen historic population increases each decade, (3) each municipality has seen historic population increases each decade, and (4) each respective municipal entity will likely continue to see population increases each decade. Respective to the two primary population centers within the County, Carrboro/Chapel Hill and Hillsborough, ***Table 3.5*** shows their respective population comparisons to the total of the County and how their population centers impact overall population concentration.

Population Center	Historical 2000	 2010	"Current" 2020	Projections 2030	 2040
Carrboro/Chapel Hill	60,884	73,979	80,349	92,481	106,462
% Pop. Center	*52.7%*	*55.3%*	*54.0%*	*54.6%*	*55.1%*
Hillsborough	5446	6087	9660	13,060	17,658
% Pop. Center	*4.7%*	*4.5%*	*6.5%*	*7.7%*	*9.1%*
Pop. Center Totals	**66,330**	**80,066**	**90,009**	**105,541**	**124,120**
County Totals	**115,531**	**133,801**	**148,696**	**169,281**	**193,135**
% Total Pop. Center	***57.4%***	***59.8%***	***60.5%***	***62.3%***	***62.3%***

Table 3.5 – Historical and Projected Orange County Population Center Populations (2000-2040)

Population trending throughout the County appears to follow a consistent pattern of steadily increasing population concentration within the two population centers of Carrboro/Chapel Hill and Hillsborough, where greater than half of the County's residents reside within these three municipalities. Additionally, playing into consideration in terms of overall concentration, is the unaccounted-for student population and daytime working population, as both are also concentrated toward these two population centers and lead to a daytime population shift that likely far exceeds the current 60% concentration.

Of additional note and consideration is the population growth and overall concentration impact that is anticipated to be seen in the County's portion of the City of Mebane in the upcoming decades. Accounting for this third potential population center, the total concentration of residents into one of these three areas would approach closer to the 70% concentration mark. Increased current development along the Interstate-85/-40 corridor near Efland (census area) is already acting as a testament to the linear connections being made between these three regions within the County.

Another approach toward identifying population centers and regional population trends is basing them off of zip codes within the region, which are also border-based. While zip code borders may cross various municipal boundaries such as townships, towns, cities, and/or counties, their overall snapshot of a region provides another consistent measure of population concentration over varying geographical locations. ***Figure 3.7*** shows a map of zip codes overlaying Orange County, and ***Table 3.6*** outlines each zip code's population (using 2010 population data). [7]

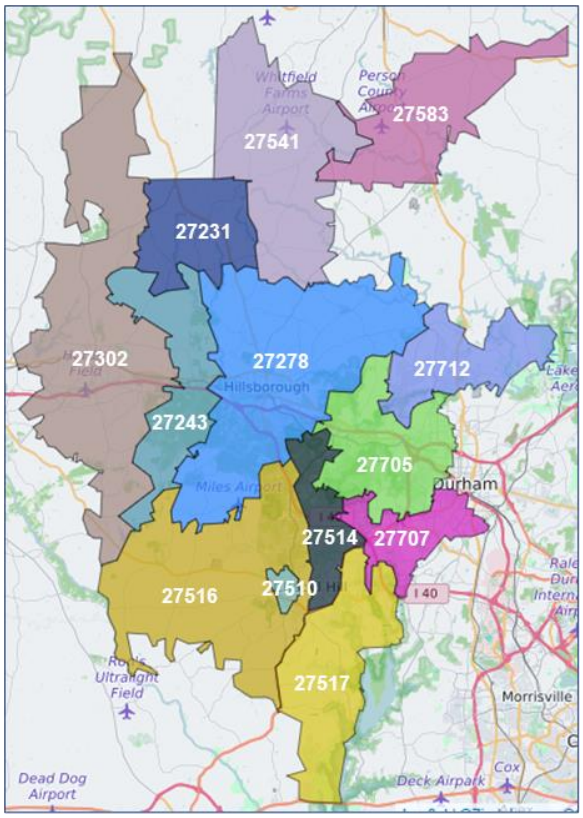


Figure 3.7 – Map with Zip Code Overlay of Orange County Region

Zip Code	Zip Code Name	Population
27231	Cedar Grove	2148
27243	Efland	4337
27278	Hillsborough	24,286
27302	Mebane	26,412
27510	Carrboro	14,644
27514	Chapel Hill	32,110
27516	Chapel Hill	23,346
27541	Hurdle Mills	3770
27583	Timberlake	6921
27705	Durham	46,282
27707	Durham	45,023
27712	Durham	20,035
TOTAL		249,314

Table 3.6 – Zip Code Populations of Orange County Region (2010)

Regionally, Orange County comprises just over 50% of the overlayed zip code population based on this 2010 data (2010 population: 133,801). While this is not a perfect depiction of Orange County's population, it does show that there is regional popularity around the area and those same population concentrations appear to be near identified population centers, rather than in rural areas, such as Carrboro/Chapel Hill, Durham, Hillsborough, and Mebane.

3.1.3 – Population Shifts within Orange County

Because of Orange County's location within the Research Triangle area, daytime population shifts within the County regularly with County residents commuting to nearby Durham (Durham County) and Raleigh (Wake County) for various types of work opportunities. With Chapel Hill – particularly its university and healthcare system – playing a large employment role within the County, many County residents and neighboring county residents commute within the County for employment. 2015 data suggests that the County experiences an approximately 5% increase in net-commuter population each year. Based on this 2015 data, the daytime population within the County was estimated at approximately 148,880 people. Considering the County's aforementioned 2021 U.S. Census population estimate of 148,884 residents, a continuation of this net-commuter population increase would equate to a daytime population of approximately 156,328 people. Overall, the County's residents do not appear to be shifting as much within the County to work. Rather, there is a pattern noted of Orange County residents leaving the County to work in neighboring communities, as the number of residents living and working within Orange County declined by nearly 10%.

Within the County, the focus of this net population increase is generated within Chapel Hill, where its daytime population is estimated at greater than 40% of the Town's permanent residential population. Population shifts like this indicate that many of the in-County commuting residents likely travel to Chapel Hill for employment, or they travel outside of the County. To bring the County back to a net population increase of 5%, many residents from neighboring counties are traveling into Orange County – Chapel Hill, specifically – for daytime work. As a result, overall daytime weekday populations within the County are centered more on an increase in Chapel Hill and a likely coinciding decrease within Carrboro, Hillsborough, and Mebane. This population increase does not factor-in the net student population generated by the University. [8]

The University of North Carolina at Chapel Hill boasts a student housing population of greater than 8,500 individuals per year. This equates to an on-campus population consisting of approximately 27% of their annual enrollees. The University also employs over 4,000 faculty members and over 9,000 additional staff members, which helps to validate the significant daily commuter increase into Chapel Hill each day. [9]

3.2 – Review of the 2030 Orange County Comprehensive Plan

Dated back to 2008, the *2030 Comprehensive Plan* for Orange County projected that the County's population would grow to between 160,000-215,000 residents by 2030 [p.5-8]. More recent projections (from the prior ***Figure 3.3***) show this number to be toward the 160,000 mark, which is still approximately 40,000 residents greater than what existed for this 2008 document. Comparative to the prior ***Table 3.2***, the County's 2005 population density value equaled approximately 305 residents per square mile [p. 5-21]. Further elaborated in this document and still reflective of the County's population density today is that the population is not evenly distributed throughout the County. Reflective both in the 2008 document and in 2020, greater than half of the County's total population is concentrated in the Towns of Carrboro, Chapel Hill, and Hillsborough, leaving the remainder of the County in a primarily rural-to-suburban setting with pockets of subdivisions scattered throughout.

Accurately reflected within this document, and uniquely impacting future drivers of system change respective to both call volume impacts and the need for increased access to care, is the County's elder population. In 2000, the older adult population (classified as over the age of 65 years old) represented approximately 8.6% of the total population but was projected to increase to 16.8% of the population by 2030 [p. 5-27]. These population values were expected to increase both in terms of absolute numbers and in terms of the overall percentage of the population. As outlined in ***Table 3.2***, the elder population was represented as 15.7% of the County's total population (based on 2020 population values), keeping this projection on track throughout the next decade. Overall, the document references that these "new populations will require expanded services and new development to meet their needs" … and our firm concurs. [10]

3.3 – Consultant's Findings and Recommendations

3.3.1 – Consultant's Findings

- Population volumes are trending upwards, with future projections concentrating their growth in the existing population centers of Carrboro/Chapel Hill and Hillsborough, with the area around Mebane also growing into a third potential population center within the County.
- Daytime weekday commuter traffic generally shifts in-County population away from each community and toward Chapel Hill. Additional student populations also shift overall transient population numbers within the County toward Chapel Hill.

3.3.2 – Consultant's Recommendations

- Consistent with the identified population centers, future operations should be primarily focused around providing adequate unit coverage and station locations with access to the main thoroughfares between these centers, without losing focus on the need for coverage in the surrounding rural areas of the County.
- Consistent with the daytime population shifting and student population found within the County, additional operational focus should be made toward directing daytime unit staffing within Chapel Hill, without losing sight of still needing to provide adequate system coverage throughout the remainder of the County.

SECTION 4 – PUBLIC HEALTH, EMERGENCY SERVICES, AND HOSPITAL SYSTEM OVERVIEW

4.1 – Public Health Overview

4.1.1 – Public Health Services

The Orange County Health Department (OCHD) serves the County's residents through four primary functions or internal divisions: dental health, personal health, environmental health, and health promotion and education. They offer residents programs and services related to medical and dental clinic access, diabetes education, new family in-home visits, smoking cessation, opioid addiction resource navigation, vaccination access, maternal health blood pressure awareness, nutrition services, regulated facility inspections, and integrated behavioral health services. Their staff consists of a licensed clinical social worker, a registered dietician, nurses, and other clinical and support staff. [11]

Much of this department's focus is emphasized in addressing access to care, educating on healthy behaviors, and toward promoting health equity. Some of these focal points are supported through their Family Success Alliance (FSA), which is a public health program that strives to address health disparities among at-risk, vulnerable children and adults within the County. This program utilizes family navigators to serve as community health workers, helping individuals, families, and communities to enhance their health, access to services/care, and to improve their overall conditions for health. According to the *2021 State of the County Health Report*, the FSA serves 64 families within the County, with an additional 136 families also being served throughout the program's graduated FSA Connections program. This Connections program is managed by a navigator position which is available to connect individuals to resources to support their overall health and well-being. [12]

The County's Department on Aging serves as a resource for older adults and caregivers to help better meet their social, mental, financial, and day-to-day practical needs. They operate two senior centers that promote active lifestyles in order to maximize the health, well-being, community engagement, and independence of older adult functions. Their *2022-2027 Master Aging Plan* identifies eight primary goals, including the need for transportation, social participation, housing, and respect and social inclusion. Many of these focal points are derived from the County's 2019 Community Health Assessment which will be addressed in a forthcoming section. Respective to the older population (65-years-old and older) within the County, this document outlines that the highest causes of death for this demographic are cancer, heart disease, cerebrovascular disease, Alzheimer's disease, and chronic lower respiratory diseases (displayed in a highest-to-lowest pattern). It is further highlighted that each of these causes of death should be considered high priority in the discussion toward how to best serve the community's older population and the population as a whole. This document does outline some strategies where EMS can help to meet various objectives that are assigned to the Plan's goals, outlined below. [13]

- Educate transit-dependent older adults about emergency and disaster preparedness and planning [Strategy 2.2.3]
- Continue and expand efforts to make Orange County a dementia-capable community [Strategy 5.1.3]
- Expand community-based health and support programs that support older adults' health and safety [Strategy 7.2.1] (Indicator 7.2.1b further elaborates that this can be accomplished by the EMS/Department of Aging *Stay Up and Active* program being expanded, allowing more people to access follow-up services after a fall is reported, and expanding capacity to provide fall risk assessments)

- Emergency preparedness education reflects and incorporates the needs of older adults [Strategy 7.2.3]
- Reduce provider-side barriers to access and use of completed Advanced Care Planning forms when needed, and support provider education [Strategy 7.6.2] (Indicator 7.6.2c further elaborates through the development of an EMS task force on mobile MOST/DNR (Medical Order for Scope of Treatment/Do-Not-Resuscitate) forms that recommends ways to authorize end-of-life care wishes when patients are away from their home)

Referencing the *Stay Up and Active* program, this program is collaborative between the County's Department on Aging and OCEMS, although, the flyer for this program titles the EMS agency as the "Emergency Management Service." The program also gains support from the UNC Geriatric Education Center, the UNC Division of Occupational Science and Occupational Therapy, and the UNC Center for Health Promotion and Disease Prevention. This program seeks to connect older adults to the services and resources they need to safely reside while addressing their previous falls or their increased risk of falls. Approximately 1,000 older adults call 9-1-1 each year requesting EMS assistance. Those who request EMS as a result of a fall can receive a follow-up visit by EMS for evaluation and continued services through the Department of Aging. These services may include home safety education, home modifications, counseling, referral for their primary care provider, in-home services, or other resource referrals. [14]

4.1.2 – Community Health Assessment Review

Orange County's *2019 Community Health Assessment* (CHA) outlines three main priorities that will be addressed through 2023 as a part of this document's overall plan: (1) access to care, (2) health behaviors, and (3) health equity. Regarding health equity, this Assessment identifies that one of the top five priority gaps is addressing social determinants of health.

This document further elaborates each of these priorities and references multiple public input findings outlined below:

- 28% of respondents felt that access to care was an issue, with concerns around costs and affordability, insurance coverage, and hours of availability of care
- 9% reported problems accessing health care because the wait at health care facilities was too long
- 17% reported not having any health insurance
- There is a lack of health care information available in different languages
- 15% reported that public transportation takes too long to provide transport to health care facilities
- Mental health concerns were one of the most common issues identified by respondents, being more prevalent than high blood pressure, diabetes, or high cholesterol
- 8% of participants shared that they do not have enough financial resources to meet basic needs, including food, shelter, clothing, utilities, etc.
- 15% indicated that they would have to move within the next year (from Orange County) due to housing costs

Recapping on the leading causes of death within the County, 2014-2018 data indicates that heart disease (11.9 deaths per 100,000 population) and cancer (137.7 deaths per 100,000 population) top the charts, equaling roughly the same as all other causes of death that were identified (combined). [15]

4.2 – Emergency Services Overview

4.2.1 – Orange County Emergency Services Department

Orange County's Department of Emergency Services functions as a county department with a director overseeing four operating divisions: 9-1-1 Communications, Emergency Management, Emergency Medical Services, and Fire Marshal. There is also an Administrative Services function associated with this Department. Each division is overseen by a division chief serving as its primary administrator. [16] This organizational model is common throughout counties within North Carolina, where EMS oversight functions commonly fall under the County's Emergency Services Department.

4.2.2 – 9-1-1 Public Safety Answering Point Services

The 9-1-1 Communications Division for the County serves as the primary public safety answering point (PSAP) for all 9-1-1 calls throughout the County, including those requiring a fire and/or EMS response. The communications center answers approximately 200,000 phone calls per year, which consist of both administrative phone line calls and 9-1-1 calls. In FY 2021, nearly 112,000 calls for service were dispatched to countywide law enforcement, fire department, or EMS agency units. Employees within the communications center fill the role of both call-taker and dispatcher throughout their daily duties.

4.2.3 – Countywide Emergency Medical Services

4.2.3.1 – North Carolina EMS System and Orange County

The EMS system within Orange County replicates many others like it throughout North Carolina. In this system, the County operates the primary 9-1-1 response ambulance service (EMS agency) under the county's emergency services department. Additional supplemental ambulance services (typically) also exist to provide automatic or mutual aid support and/or interfacility transport services of patients between one location to another (such as from one hospital to another, or from a hospital to the patient's home). Many services functioning within this capacity are private (either for-profit or non-profit) vendors that operate within many counties or within larger cities and metropolitan areas. Regulation of such services – and their authorization to operate as an ambulance service within their respective areas – is by each county, which is a common practice in many states throughout the country. States such as North Carolina, Colorado, and Florida take this county-oversight approach, while states like Wisconsin and New York do not. States like California and Michigan take a similar approach but delegate this authority to regional authorities such as Medical Control Authorities or EMS Authorities.

The North Carolina Division of Health Service Regulation, Office of EMS, regulates EMS professionals (i.e., EMTs, paramedics), EMS providers, EMS education programs, and EMS instructors. They also set minimum standards and permitting requirements for response vehicles such as ambulances and non-transport vehicles for each provider level. The Office currently credentials EMS providers at four primary levels: Emergency Medical Responder (EMR), Emergency Medical Technician (EMT), Advanced Emergency Medical Technician (AEMT), and Paramedic. These credential titles and levels are consistent with those certified and recognized by the National Registry of EMTs (NREMT). [17]

NC General Statutes, Chapter 131E, Article 7, is the document which outlines the *Regulation of Emergency Medical Services* within the state. [18] NC Administrative Code 10A NCAC 13P outlines the *Emergency Medical Services and Trauma Rules* throughout the state, which further delegates that county governments have the authority to establish EMS Systems that define a scope of practice for EMS personnel functioning within the System and permit ambulance services (EMS providers) to operate within their System, among other authorities and responsibilities. [19]

4.2.3.2 – Orange County EMS System and Franchise Agreements

The Orange County Code of Ordinances, Chapter 14, *Article IV: Ambulance, Emergency Medical, First Responder and Rescue Service Granting of Franchise and Contracts to the Operators in Orange County*, serves as the governing language for the ability of ambulance services (EMS agencies) to exist within the County. This Article serves as an ordinance governing the granting of franchises for emergency medical and other prehospital emergency medical services, overseen by the Board of Commissioners and its advisory EMS Committee.

Outlined below are some of the highlights of this Ordinance with relevance to this Study:

- The document confusingly utilizes the abbreviation "EMS" to refer to an Emergency Management System, rather than the more-commonly utilized Emergency Medical System (which is also defined in the document and referred to as an Emergency Transportation Service) [Sec. 14-116]
- The EMS licensed care provider level of Advanced EMT is not defined in this document and, therefore, could be interpreted as not being a valid individual to function within the system, which includes the ability to drive an ambulance; the approval to drive an ambulance, furthermore, is granted by the Medical Director [Sec. 14-116] [Sec. 14-117(b)]
- OCEMS – because it is owned by the County – is not required to have a Franchise Agreement [Sec. 14-117(d)(2)]
- Fire departments within the County that operate as first responders – providing rescue and emergency services – are not required to have a Franchise Agreement [Sec. 14-117(d)(3)] but do partake in a local credentialing process (which is not defined in an Ordinance)
- All personnel of emergency medical service providers (agencies) shall be approved by the County's EMS Director prior to providing medical care within the County [Sec. 14-123(6)]; The EMS Director and EMS Operations Manager also sit on the EMS Committee, which is the committee having the authority to approve/disapprove additional franchise agreements [Sec. 14-131(c)]
- All emergency ambulances and rescue squad vehicles franchised solely in Orange County shall contain the words "PROUDLY SERVING WITH ORANGE COUNTY EMERGENCY SERVICES" lettered on both sides and the rear of the vehicle body [Sec. 14-124(b)]

Outlined below is a listing of ambulance services with active Franchise Agreements within the County:

- First Choice Medical Transport
- LifeStar Emergency Services
- North State Medical Transport
- Priority Care Ambulance
- South Orange Rescue Squad

4.2.3.3 – Medical Direction and Clinical Oversight

General medical oversight of the County's EMS system and OCEMS are overseen by a contracted physician Medical Director. This individual is contracted for approximately 20 hours of work per month by OCEMS and also oversees a collaborative physician fellowship program as a partnership with the University of North Carolina medical school and hospital system. Fellows within this program split their tenure between operations within the Orange County EMS system and the Wake County EMS system. The Medical Director and enrolled fellows are also able to respond to various 9-1-1 calls within the County in their own designated response vehicle on a per-preference basis. The Medical Director also participates in EMS Peer Review Committee meetings and respective quality assurance and continuous quality improvement and training functions.

4.2.3.4 – Orange County EMS

OCEMS serves as the primary 9-1-1 and emergency ambulance response and transporting service within the County. It operates out of six primary stations 24 hours per day and another two stations during a 12-hour daytime period. Further details about OCEMS will be expanded upon in this Report.

4.2.3.5 – South Orange Rescue Squad

South Orange Rescue Squad (SORS) functions as an independent (private, non-profit) EMS agency (ambulance service) within the County that provides rescue services, special event standby coverage, and 9-1-1 response including patient transport services during an overnight period as a primary supplement to OCEMS's operations. They also serve as a primary resource to provide unit staffing within the system when OCEMS units are near depletion or are completely depleted.

4.2.3.6 – Fire Department First Response System

Medical first responder services are provided throughout the County by 12 different fire departments (10 located within Orange County and two located outside of the County). Each responding fire department – for its medical calls – responds with a crew capable of providing patient care at the minimum Emergency Medical Responder (EMR) care level, however, some departments staff their responding fire apparatus with Emergency Medical Technicians (EMT). The fire departments vary in terms of staffing levels, as some operate with full-time staffing and others operate with volunteer or paid-on-call staffing, or a combination of the two. Each fire department is its own entity, non-affiliated with the County, that is contracted by the County to provide fire suppression, defensive hazardous materials response, rescue operations, and medical first response services. Their funding support is through a fire district tax model, not directly through County-raised taxes. Each department operates as its own entity within the County's greater EMS system and receives medical direction/oversight by the County's (OCEMS's) Medical Director. ***Table 4.1*** lists the fire departments operating as medical first responder units in Orange County.

Department	Township	EMS Provider Level
Caldwell Fire Department	Caldwell	EMT
Carrboro Fire and Rescue	Chapel Hill	EMT
Chapel Hill Fire Department	Chapel Hill	EMT
New Hope Fire Department	Chapel Hill	EMR
Cedar Grove Volunteer Fire Department	Cedar Grove	EMR
Efland Volunteer Fire Department	Cheeks	EMT
Mebane Fire Department	(Alamance County)	EMT
Orange Rural Fire Department	Hillsborough	EMR
Eno Fire Department	Eno	EMR
Orange Grove Volunteer Fire Company	Bingham	EMT
White Cross Volunteer Fire Department	Bingham	EMT
North Chatham Fire Department	(Chatham County)	EMR

Table 4.1 – Listing of Fire Departments in Orange County Operating as Medical First Response Agencies

4.2.3.7 – Mutual Aid System

As needed during periods of system stress (i.e., unavailable OCEMS units, periods of system "surge"), mutual aid requests for border standby or direct scene response are requested of neighboring EMS agencies such as Durham County EMS or of South Orange Rescue Squad (an in-County resource). Details involving requests (total calls) for mutual aid are outlined later in this Report.

4.3 – Hospital System Overview

OCEMS primarily utilizes the services of six local hospitals which account for 99.9% of the average patient transports. The Orange County EMS Triage and Destination Plan splits the hospitals into two main groups: specialty care facilities and community hospitals. University of North Carolina (UNC) Medical Center and Duke University Hospital are the two specialty hospitals, both equally capable of managing any medical emergency. The other four primary hospitals are designated as community hospitals. These facilities are designated for general emergency department care, only. ***Figure 4.1*** shows a map of the hospitals outlined in this report.

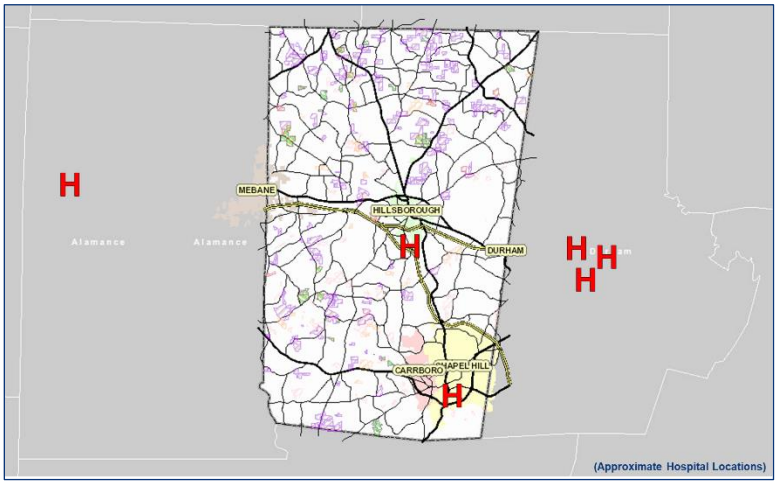


Figure 4.1 – Map of Local Hospitals

4.3.1 – Alamance Regional Medical Center

Alamance Regional Medical Center (Burlington, NC) is located approximately fifteen minutes west of Orange County and is a part of the North Carolina-based Cone Health network. Alamance Regional typically receives less than 1% of OCEMS's average transport volumes. Alamance self-reports as being capable of handling most basic emergencies. [20] Per the 2015 Alamance County Community Assessment, the hospital is the primary hospital for Alamance County and is utilized at a higher-than-normal rate by Alamance County residents. [21] They offer limited emergency services and, per the OCEMS destination protocols, is not an appropriate destination for any specialty care.

4.3.2 – Duke Regional

Duke Regional (Northern Durham, NC), part of the larger Duke Health network, is ten minutes east of Orange County. A small percentage (2.8%) of transports are taken to Duke Regional by OCEMS. The hospital functions as a local cardiac/chest pain facility with interventional cardiology services (e.g., angioplasty/cardiac catheterization, electrophysiology, pacemaker/defibrillator implantation, coronary artery bypass grafting), and a Primary Stroke Center (e.g., tPA administration). Due to the more distant location of the hospital, Duke University is utilized for specialty care over Duke Regional by OCEMS. [22]

4.3.3 – Duke University

Duke University Hospital (Durham, NC) is also a part of the larger Duke Health. Conveniently located five minutes east of Orange County, Duke University can manage any medical emergency, from the simple to the most complex. Duke University Hospital receives the second largest portion of OCEMS transports on average (16.2%). The hospital functions as a local cardiac/chest pain facility with interventional cardiology services (e.g., angioplasty/cardiac catheterization, electrophysiology, pacemaker/defibrillator implantation, coronary artery bypass grafting), is a Comprehensive Stroke Center (e.g., tPA administration, thrombectomy-capable, interventional neurovascular care), and is one of two local Level-I trauma centers. [23]

4.3.4 – UNC-Hillsborough

UNC-Hillsborough (Hillsborough, NC) is conveniently located within the County and is a part of the local UNC health network, but functions with limited capabilities. UNC-Hillsborough receives approximately 13.3% of the patient transports managed by OCEMS. OCEMS personnel are to divert adult patients meeting criteria for cardiac/heart attack, stroke, trauma activation, sepsis, cardiac arrest (active or post), pregnancy complaints, psychiatric complaints, seizures, or currently under dialysis, to a more well-equipped facility per their internal policies. UNC-Hillsborough is also not equipped to manage most pediatric emergencies. There have been recent improvements to the UNC-Hillsborough campus, including the addition of dialysis care as of July 2022, but it is unknown how these changes may impact operations. Of note, OCEMS has a special operational protocol in place to handle interfacility transfers from UNC-Hillsborough to UNC-Main when the normal transporting agency is unavailable. [24]

4.3.5 – UNC-Main

UNC-Main (also documented as UNC-Chapel Hill in the OCEMS destination policies) (Chapel Hill, NC) is one of the two hospitals located in Orange County and receives almost two-thirds (65.8%) of the patients transported by OCEMS. The hospital functions as a local cardiac/chest pain facility with interventional cardiology services (e.g., angioplasty/cardiac catheterization, electrophysiology, pacemaker/defibrillator implantation, coronary artery bypass grafting), is a Comprehensive Stroke Center (e.g., tPA administration, thrombectomy-capable, interventional neurovascular care), and is one of two local Level-I trauma centers in the region. UNC-Main also offers specialty burn care and is the primary destination for any burn victims from the region. [25]

4.3.6 – VA Medical Center-Durham

The VA Medical Center-Durham (Durham, NC) is located five minutes east of Orange County. As a VA hospital, Durham VA only receives a small portion of the transports handled by OCEMS. The hospital is across the road from Duke Hospital, and offers interventional cardiology services (e.g., electrophysiology procedures, coronary artery bypass grafts, and other services), but they note that their surgeons also practice at Duke Hospital, so "…many STEMIs go directly to Duke, bypassing the VA hospital." [26] The Durham VA does not offer any specialty stroke care or interventions. [27]

4.4 – Drivers of System Change

4.4.1 – System Environment

Affectively speaking, the environment in which an EMS system exists is largely influenced by its surroundings. Factors such as population and demographics influence communities and how they operate as individual ecosystems. Social determinants of health (***Figure 4.2***) also play a large role in the environment of a community (and its EMS system), as it can drive the call volumes and call types that may differentiate one community and EMS agency from another.

Centers for Disease Control and Prevention
"Social Determinants of Health" [28]

Social determinants of health (SDOH) are the conditions in which people are born, grow, live, work, and age. They are shaped by the distribution of money, power, and resources throughout local communities, nation, and the world. Differences in these conditions lead to health inequities or the unfair and avoidable differences in health status seen within and between different regions.

Social Determinants of Health

- **Education Access and Quality** – People with higher levels of education are more likely to be healthier and live longer
- **Health Care and Quality** – Access to health insurance, preventative care, illness screenings, and emergency services all improve overall health and life longevity
- **Neighborhood and Built Environment** – Safer neighborhoods and those with adequate transportation methods equate to better living and lifestyle choices
- **Social and Community Context** – People's relationships and interactions with others can have a large impact on their overall health and well-being
- **Economic Stability** – Employment rates and job availability all lead to access to food, health care, and housing opportunities

Figure 4.2 – Social Determinants of Health (Abstract)

Working to mitigate social determinants of health aids in solving problems at their root, rather than simply at their external symptom level. Trying to address an opioid epidemic, as an example, cannot be solved by simply supplying naloxone to every resident in the County, only addressing the symptom of a problem. Instead, society must dig deeper to address the mental health needs of the community to better mitigate

the factors that lead to addiction. Removing the drug altogether will certainly help in the equation, but that is not something that the EMS system or any one EMS agency can do. Instead, identifying addicted patients and referring them to the appropriate system of care will more immediately help to holistically impact the person behind the addition, the affect behind their problem.

Keeping with the discussion of opioid-related overdoses and deaths and how the local environment can change from one community to another, a 2017 Population Health Dashboard shows that more than 25% of the opioid-related deaths within the County throughout a five-year period occurred in the Town of Hillsborough, which only comprises approximately 6% of the County's total population. [29] This concentrated finding indicates that the local environment would be more statistically benefited from targeted preventative care and mitigation efforts to best address this local concern, rather than trying to immediately push a large-scale, countywide plan into areas where this problem is hardly a factor.

Another means of assessing local and regional environments is through third-party assessments and rankings, such as the *Healthiest Communities* rankings, which was developed by U.S. News and World Report in collaboration with CVS Health, with data analysis performed by the University of Missouri Center for Applied Research and Engagement Systems. This ranking assessment features comprehensive rankings drawn from an examination of nearly 3,000 counties on 89 different metrics across 10 categories. [30] Orange County's ranking and assessment information can be found in ***Figure 4.3***.

Orange County Healthiest Communities Rankings			
Overall Score		**Equity**	
Orange County Score:	**70** /100	Overall Score:	**33** /100
Orange County Rank:	**#234** /500	Educational Equity Score:	13 /100
Peer Group AVG Score:	*61 /100*	Health Equity Score:	53 /100
State Median Score:	*40 /100*	Income Equity Score:	30 /100
National Median Score:	*47 /100*	Social Equity Score:	72 /100
Alamance County Score:	*40 /100*	**Economy**	
Chatham County Score:	*57 /100*	Overall Score:	**73** /100
Caswell County Score:	*33 /100*	Employment Score:	79 /100
Durham County Score:	*54 /100*	Average Weekly Wage:	$1239 (NC $1081)
Person County Score:	*41 /100*	Unemployment Rate:	5.2% (NC 7.1%)
Wake County Score:	*74 /100*	Income Score:	72 /100
Population Health		Median House Income:	$79,718 (NC $63,428)
Overall Score:	**86** /100	Poverty Rate:	12.4% (NC 14.0%)
Access to Care Score:	76 /100	Opportunity Score:	53 /100
Pop. Without Health Ins:	10.5% (NC 13.4%)	Business Growth Rate:	9.3% (NC 8.9%)
Health Behaviors Score:	85 /100	**Housing**	
Smoking Rate:	14.1% (NC 18.6%)	Overall Score:	**44** /100
Health Conditions Score:	72 /100	House Affordability Score:	43 /100
Health Outcomes Score:	82 /100	Hours to Pay for Housing:	53.8 hours (NC 38.1)
Life Expectancy:	82.3 years (NC 78.1)	Housing Capacity Score:	40 /100
Mental Health Score:	73 /100	Housing Quality Score:	87 /100
Mental Distress in Adults:	12.3% (NC 14.5%)	**Public Safety**	
Community Vitality		Overall Score:	**63** /100
Overall Score:	**60** /100	Pub. Safe. Capacity Score:	28 /100
Comm. Stability Score:	55 /100	Per Capital on Emer. Svcs.:	$366 (NC $657)

Figure 4.3 – Orange County Healthiest Communities Ranking (2021)

Overall, Orange County seems to stand well in terms of its *Healthiest Communities* ranking when compared to other counties within its defined peer group and its neighboring counties. Its population health score (86) ranks the highest of those outlined in ***Figure 4.3*** and is likely a testament to its nearly 85% community composition of younger (less than 65 years old) residents. Its high mental health score (73) also complements its health behaviors score (85) and health outcomes score (82) within this same population health category.

4.4.2 – System Investment

EMS agencies are operated under a variety of organizational models and vary from county-to-county and from state-to-state, but often "fit" within a few general examples (i.e., municipal, fire-based, private). Recent focus within the industry has revolved around system investment in terms of individual agency recruitment and retention efforts, agency career development, system regulation and oversight, public funding and support, and the legislative definition of what it means to be considered "essential." As imagined, many of the hardships facing EMS agencies across the country revolve around funding mechanisms. Currently, many EMS agencies are not able to sustain operations based on billing services, insurance reimbursement, and fees-for-transport, alone. As a result, additional taxpayer support is sought to supplement the remainder of an agency's costs in order to maintain their state of readiness. In some communities, this support is positively displayed by the residents through municipal (including county government) general budget support – as is exemplified in Orange County. This fortune, however, is not displayed in all communities throughout the country, and the hardships faced by EMS agencies seem to be exacerbated as a result.

A 2015 article published by the then-Editor-in-Chief of the *Journal of EMS (JEMS)* titled "Understanding Why EMS Systems Fail" highlights common factors related to why and how EMS systems throughout different regions and ecosystems fail, or even collapse. [31]

Four of these factors are outlined below, including how their consideration and avoidance plays a relevant role in this Study:

- **Finance and Economics** – Financial troubles are often rooted in high labor costs, poor employee benefit packages, poor productivity patterns, operational design flaws, market regulation, and inadequate payment and reimbursement fee schedules. *This item particularly impacts OCEMS as it is actively having to increase its expenses in order to maintain a competitive wage for its workforce.*

- **Unregulated versus Regulated Marketplace** – While each state is uniquely different in many ways, the regulation of ambulance services within counties or even municipalities can either further complicate the challenges that EMS agencies face, or greatly ease them. *This item applies to OCEMS as it operates within a regulated marketplace and is the primary 9-1-1 agency as a result.*

- **System Design** – This is often the largest factor in influencing the costs of service provision as outlining and financially supporting a system structured around a static deployment model versus a dynamic deployment model will likely drastically impact a system's total costs. *This will play a large role toward guiding the future of OCEMS as it looks to this Study for further guidance.*

- **Political Willpower** – Internal, local, state, and national politics all impact the success of an EMS system by serving as its source of influence to help drive the finances, regulation, and design of EMS systems and individual agencies. *This directly impacts OCEMS and the County as it will need to consider how its future decisions may impact the local political landscape of the EMS system that it tries to maintain.*

What does the EMS system need to be, how does it need to look, and how do we influence others to invest in it? Answering these questions, determining what is needed based on the environment and supporting it with data will help to drive system change and investment. Looking toward the future of the Orange County EMS system and OCEMS (its primary EMS agency), the general sense of community support and the need

for system investment does seem present … which is a greatly positive attribute that the residents of the County should remain proud of and the administrators of OCEMS should remain optimistic towards.

4.4.3 – System Data

Objectively, utilizing data to support systematic decisions should be a focal element behind driving system change. In the wrong context, however, data can be seen as an inaccurate reflection of reality, it can be viewed as counterproductive, and it can be claimed outright inaccurate. Data alone should not drive decisions; instead, it should support decisions (***Figure 4.4***).

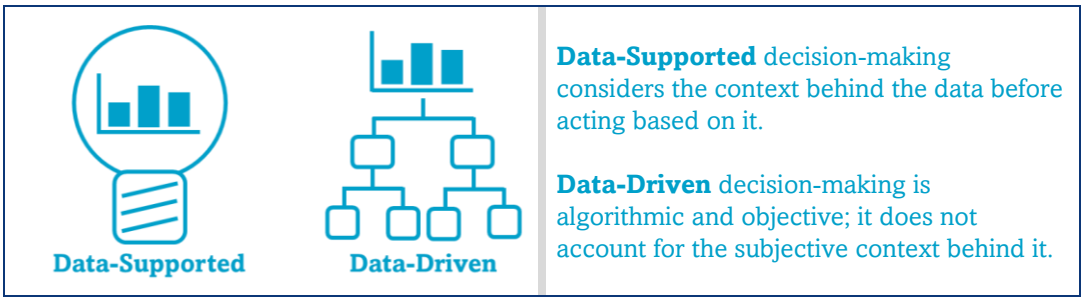


Figure 4.4 – Data-Supported vs. Data-Driven Decision-Making Image

Call volume trends, population patterns, and call acuity types are all different data metrics that can be factored into driving EMS system changes. These trends, patterns, and types should not be the sole indicators for influencing or driving change. There still needs to be a subjective approach toward truly analyzing any presented data.

With call volumes, for instance, gross volume numbers for the entire County do not accurately or solely reflect the staffing needs of the County; its environment and level of community investment must also be accounted for. Simply analyzing that the system has the demand for 10 ambulances still does not fully explain "where" and "when." The objective mathematics behind the need (10 ambulances) may subjectively not correlate with 24/7 coverage, but split coverage to account for peak times and daytime population shifts. These 10 full-time equivalent units may better equate to 12 ambulances for one half of the day and eight ambulances for the other half.

Data-supported decision-making, therefore, allows analysis of the system to occur while also accounting for the context behind that data, its story. If data analysis has taught us anything, it is that the year 2020 has forever impacted datasets because of its common negative decline in call volumes (sometimes upwards of or over 25% for some EMS agencies). Approaching data analysis and its result on driving system change should always be taken with a bit of healthy caution; wanting to validate that you are understanding the context behind the data before you make any decisions based on it.

4.5 – Consultant's Findings and Recommendations

4.5.1 – Consultant's Findings

- At the surface (subjectively), it appears as though OCES (the Department) and OCEMS (the Division) are viewed and recognized as one-in-the-same entity, rather than one being a fully operational division within the greater oversight department.
- The County appears to have adequate programs and resources in place through its Health Department and Department on Aging to address common community needs with respect to improving access to care and promoting better home living environments for its older populations.
- No one (directly) from OCEMS was identified as having a planning or developing role in the County's Community Health Assessment or Master Aging Plan. While the Plan does indicate roles for OCES, it makes no distinction between OCES (the Department) and OCEMS (the Division), but does specifically outline Fire Marshall (division) and other specific fire department agency responsibilities.
- While there are Franchise Agreement requirements for EMS and first response agencies operating within the County, they do not apply toward County-owned and operated resources or fire departments located within the County. The Ordinance outlining such Franchise Agreements also does not outline the Advanced EMT provider level, it mis-abbreviates "HIPAA" (as "HIPPA"), confusingly utilizes the abbreviation of "EMS" within an uncommon definition, places inconsistent wording on some vehicles and ambulances (not all, consistently), and delegates authority to the Medical Director, EMS Director, and EMS Operations Manager in areas that do not always seem appropriate.
- The overall system has an abundance of high-acuity patient care hospital resources within the County, making it fortunate in terms of patient access to care for a variety of medical or trauma emergencies.

4.5.2 – Consultant's Recommendations

- Emphasis should be placed on recognizing OCEMS as its own entity that is a part of the greater OCES department, but not one-in-the-same as the department.
- Take an active role in the planning and development process for the County's next Community Health Assessment, Master Aging Plan, and other related strategic master planning documents.
- Update the County Ordinance related to Franchise Agreements to create a more consistent EMS system structure whereby all EMS agencies operating within the system – regardless of affiliation, ownership, or provider level – must follow the same Franchise Agreement and Ordinance rules under the oversight of the County's Emergency Services Department and are completely separate from its EMS Division (including respective OCEMS positions).
- Consider re-structuring the EMS System Medical Director under the organizational oversight of the Emergency Services Director, rather than under the EMS Director, to better separate his/her affiliation from any one EMS agency and to provide independent medical oversight for administrative, quality assurance and continuous quality improvement, medical compliance/regulatory, and system cohesion purposes.
- Remove the authority from the Medical Director via Franchise Agreements to authorize individuals to drive ambulances.

- Either remove the Ordinance requirement for solely in-County Franchised EMS agencies – or require it for all Franchised and operating EMS agencies – to have the wording “PROUDLY SERVING WITH ORANGE COUNTY EMERGENCY SERVICES” on their apparatus and ambulances.
- Correct the Ordinance related to Franchise Agreements to read the correct abbreviation of “HIPAA,” rather than “HIPPA.”
- Edit the Ordinance related to Franchise Agreements to remove the abbreviation “EMS” from its currently expanded definition of Emergency Management System and apply it to the expanded definition of an Emergency Medical Service.

SECTION 5 – OCEMS CALL VOLUME DATA AND STANDARDS

5.1 – 9-1-1 Call-Taking, Dispatching, and Unit Deployment Overview

5.1.1 – 9-1-1 Call-Taking Process

When processing 9-1-1 medical (EMS) calls for service, a medical priority dispatching software (MPDS) is utilized to appropriately screen first party (patient is the 9-1-1 caller) and second party (someone with the patient is the 9-1-1 caller) 9-1-1 calls to follow a nationally accepted and accredited emergency medical dispatch (EMD) algorithm to potentially provide dispatcher-instructed pre-arrival care. Situations where someone witnesses a motor vehicle collision but drives away, for instance, may not follow through the MPDS/EMD process. This process starts each call with generic questions that help call-takers to bring the patient through a variety of scripted follow-up questions to ultimately classify or code the call based on the patient's chief complaint and their acuity level. The result of each 9-1-1 call that flows through this process is a dispatched chief complaint that is consistent for data tracking purposes and prioritized for response mode purposes. Call level priorities range from Omega (lowest priority) to Alpha through Echo (highest priority). These priority codes are typically associated with the types and numbers of units dispatched for responses, as well as their recommended use of lights and siren, as outlined in ***Table 5.1***.

Priority Level	Omega	Alpha	Bravo	Charlie	Delta	Echo
Acuity/ Condition	No assessed emergency, lowest priority	Non-life-threatening, low priority	Non-life-threatening, but more serious	Potentially life-threatening	Life-threatening, potentially critical	Life-threatening, immediately critical
Units Dispatched	Ambulance (only) or Fire Unit (only)	Ambulance (only)	Ambulance (only)	Ambulance and Fire Unit	Ambulance and Fire Unit	Ambulance, EMS Supervisor, and Fire Unit
Care Level	BLS	BLS	BLS	ALS	ALS	ALS
Injury/ Illness Example	Fall with lift assistance and no injuries	Minor injuries, minor bleeding	Abdominal pain with no other complaints	Shortness of breath but able to speak sentences	Chest pain, difficulty breathing, major bleeding	Not breathing, possible cardiac arrest
Response Mode	"Non-Emergent," No Lights and Siren	"Non-Emergent," No Lights and Siren	"Non-Emergent," No Lights and Siren	"Emergent," With Lights and Siren	"Emergent," With Lights and Siren	"Emergent," With Lights and Siren

Table 5.1 – MPDS/EMD Call Prioritization, Including Call and Response Details

As outlined in ***Table 5.1***, patients experiencing chest pain, but otherwise fitting other stable descriptions may be given a "Charlie" level priority, while those who are also experiencing difficulty breathing or are pale in complexion with the chest pain, or those patients who are unresponsive, may be given a "Delta" level priority. Typically, patients who experiencing a cardiac arrest event are dispatched with "Echo" level priority.

5.1.2 – 9-1-1 Dispatching and Unit Deployment

EMD codes are associated with different emergency response vehicles from local EMS agencies and/or local fire departments (not law enforcement; and these codes are not utilized for fire situations). ***Table 5.2*** outlines approximately two years of data (03/22/2020 through 03/07/2022) categorizing different 9-1-1 calls where the MPDS/EMD process was utilized. Of note, this data does not reflect total 9-1-1 calls for EMS within the County; it only reflects the calls where MPDS/EMD processes were utilized, as this function is not always indicated for use. Total 9-1-1 calls for this time period are estimated at approximately 24,000.

Details	Omega	Alpha	Bravo	Charlie	Delta	Echo	Totals
# Calls	**164**	**5723**	**3576**	**6302**	**5986**	**400**	**22,151**
% Calls	*0.8%*	*25.8%*	*16.1%*	*28.5%*	*27.0%*	*1.8%*	-----

Table 5.2 – 2-Year Orange County Call Data Using MPDS/EMD Call Prioritization (03/24/2020 – 03/07/2022)

Throughout this approximately two-year period, nearly 60% of the 9-1-1 calls processed fit what may be considered as higher acuity calls that often require some form of advanced life support (ALS) intervention, compared to only 40% needing basic life support (BLS) intervention. Likewise, the represented 60% of calls would have a recommendation of utilizing lights and siren during the response to the scene. Nationally, standard recommendations for the use of lights and siren while responding to a scene is approximately 50%. This information and supported data will be expanded upon later in this Study.

Currently during responses, EMS crews make an individual or supervisor-guided determination to respond to various incidents with the use of lights and siren (emergent) or without their use (non-emergent); they do not necessarily follow the EMD-recommended response mode associated with the prescribed priority code (e.g., without lights and siren for Bravo calls, with lights and siren for Charlie calls). ***Table 5.3*** shows a 3-year history of the actual response mode utilized by OCEMS crews to respond to various incident scenes, applying only to calls where an EMD code was given (this does not include all OCEMS responses).

Year	Emergent	Non-Emergent, Upgraded to Emergent	Non-Emergent	Emergent, Downgraded to Non-Emergent
FY 2019	4887	42	4374	87
FY 2020	5186	32	4144	76
FY 2021	4951	56	4877	84
3-Year AVG %	***52.2%***	***0.4%***	***46.5%***	***0.9%***
Grouped AVG %	***Emergent: 52.6%***		***Non-Emergent: 47.4%***	

Table 5.3 – 3-Year OCEMS Response Mode Data Based on Calls utilizing EMD (FY 2019 – FY 2021)

Correlating that Omega, Alpha, and Bravo calls ideally equate to non-emergent response modes and Charlie, Delta, and Echo calls ideally equate to emergent response modes, the data from ***Tables 5.2 and 5.3*** can be compared to one another to show that the EMD algorithm recommended that units respond without the use of lights and siren (non-emergent) 42.7% of the time, while EMS crews actually responded in a non-emergent fashion 47.4% of the time. The opposite emergent response data correlates to EMD recommendations for the use of lights and siren 57.3% of the time and crews actually responded with lights and siren 52.6% of the time. Overall, OCEMS appears to under respond (based on EMD recommendations)

for approximately 4.7% of its calls. This finding is by no means a concern, as national recommendations for the use of lights and siren (emergent responses) to scenes is recommended for 50% or less of dispatched calls. ***Figure 5.1*** highlights the recommendations supported by the National Highway Traffic Safety Administration (NHTSA) regarding the use of lights and siren for EMS responses.

U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA), Office of EMS
"Lights and Siren Use by Emergency Medical Services (EMS): Above All Do No Harm" [32]

This report is based on information provided to the National EMS Information System (NEMSIS) from patient care reports analyzed throughout the country and correlates attributes from the Uniform Vehicle Code into discussion points and examples of variations in laws and regulations related to the use of lights and siren for ambulances.

- *"While [the use of L&S] may be of clinical importance to patient outcome[s] in critical time-sensitive conditions like cardiac arrest, the consensus among the researchers in this field is that the time is not significant in most of the responses or transports."*
- *"For most conditions, EMS professionals can provide appropriate care to reduce the importance of saving a few minutes by L&S transport."*
- *"Each agency should measure their L&S use during response and transport, and quality improvement processes should be used to reduce the use of L&S response and transport to the minimum effective rate."*
- *"Justification is given for using benchmark targets of reducing L&S use during response to less than 50% and during transport to less than 5%."*
- *"Myths and facts must be separated from tradition and emotion when discussing [the use of L&S]."*
- *"… L&S use is a medical therapy. Like all therapies, it has potential benefits and potential risks…."*

Figure 5.1 – Lights and Siren Use by EMS (Abstract)

After response codes are determined and the dispatching process continues to physical unit dispatching, a computer-aided dispatching (CAD) software auto-assigns appropriate ambulance units first based on the acuity or care level (BLS or ALS) and then by the closest available unit. Additionally, fire department first response units (typically fire engines) are dispatched for higher acuity calls such as Charlie-, Delta-, and Echo-level calls, or where fire apparatus may be necessary for other firefighting and/or rescue operations, such as motor vehicle collisions.

Returning to the unit dispatching process, a consistent dilemma arises that has provoked a significant amount of stakeholder feedback – including from the OCEMS employees (EMTs and Paramedics) – related to units being bypassed or jumped over so that a more appropriate unit can respond to the call, even if that unit is significantly farther away than another nearby unit. This bypassing effect seems to occur with respect to both BLS and ALS calls, whereby (for example's sake) a nearby BLS unit is three minutes away from a scene but a further ALS unit (from nine minutes away) is dispatched because the patient's complaint meets ALS criteria. Some of these calls, for argument's sake, are between the two units while others would involve the further unit driving past the closer unit on the way to the call. ***Figures 5.2 and 5.3*** display these examples for visual reference, with Medic-1 being the ALS unit and Medic-5 being the BLS unit.

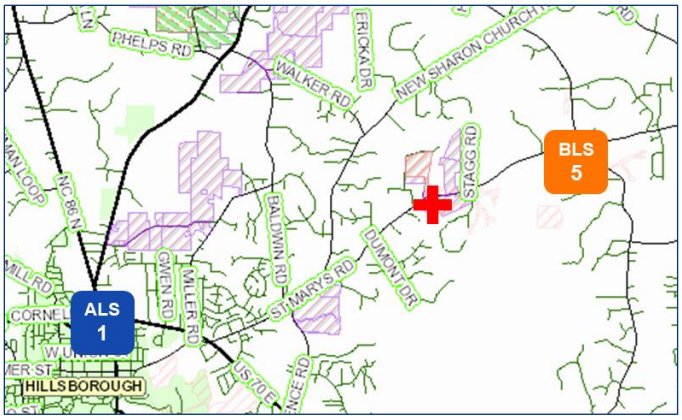


Figure 5.2 – Map Image of a Sample ALS Call Located Between Two Units, with the BLS Unit Closer in Proximity

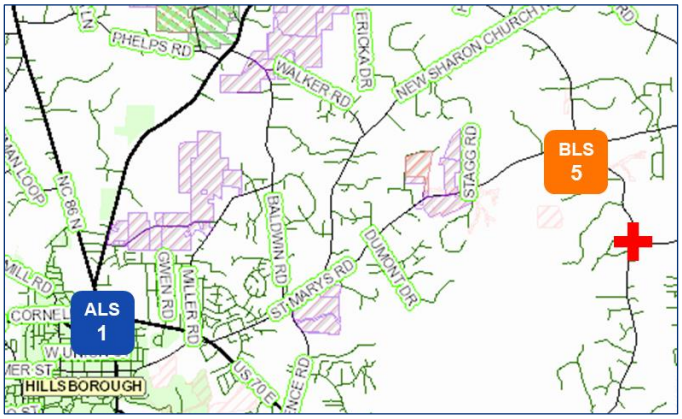


Figure 5.3 – Map Image of a Sample ALS Call Located Closer to the BLS Unit, Where the ALS Unit Would Have to Drive Past the BLS Unit During Its Response

When response time differences are anticipated to exceed a 2–5-minute difference, both the closest unit based on proximity and the most-appropriate unit based on level of care should be dispatched to incidents where units would otherwise be bypassing one another to respond to a scene.

5.2 – Call Volume Data

5.2.1 – Call Volume Trends

Call volume data was collected and analyzed for this Study following the County's fiscal year (July-June) calendar cycle. In total, seven total fiscal years (FY 2015 – FY 2021) of gross data were analyzed for this Study. FY 2022 was not included because of the Study's timeline, which completed its analysis phase around the turn of the fiscal year. ***Table 5.1*** shows the annual call volumes, which do not include all instances where EMS units were requested for move-ups or other specialty assignments, only 9-1-1 responses by OCEMS ambulances, which may include some duplications if multiple units were dispatched to the same incident, excluding any situations where an EMS Supervisor was dispatched. ***Figure 5.1*** shows this data in a graphic presentation.

Month	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	AVG
July	957	975	995	972	973	1003	952	**975**
August	979	975	1043	1038	1033	1034	987	**1013**
September	1047	1069	1067	1066	1042	1172	941	**1058**
October	1084	1082	1102	1070	1139	1067	950	**1071**
November	972	1078	1127	1087	1049	969	936	**1031**
December	970	1061	1079	1117	1041	1017	1011	**1042**
January	1035	995	943	1200	1059	987	967	**1027**
February	1005	958	1007	990	1018	1036	937	**993**
March	1040	1058	1097	1089	1153	959	1009	**1058**
April	1058	1074	1073	1081	1043	777	1069	**1025**
May	1071	1038	1060	1090	1071	887	1075	**1042**
June	1069	995	1015	1010	1047	900	1065	**1014**
TOTAL	**12,287**	**12,358**	**12,608**	**12,810**	**12,668**	**11,808**	**11,899**	**12,348**
MEDIAN	**1038**	**1048**	**1064**	**1076**	**1045**	**995**	**977**	**1035**
AVG	**1024**	**1030**	**1051**	**1068**	**1056**	**984**	**992**	**1029**
Trend	-----	*+ 0.6%*	*+ 2.0%*	*+ 1.6%*	*- 1.1%*	*- 6.8%*	*+ 0.8%*	***- 0.5%***

Table 5.1 – Call Volume History (7-Year, FY 2015 – FY 2021)

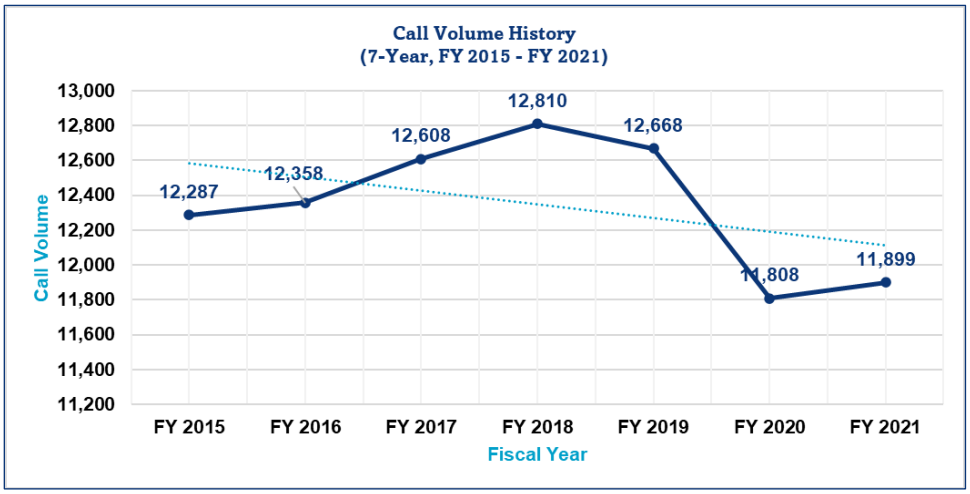


Figure 5.1 – Call Volume History (7-Year, FY 2015 – FY 2021)

Looking purely at actual call volumes, there is an observed FY 2015 through FY 2021 annual trend of (minus) - 0.5% over this given time period. When excluding FY 2020 and parts of FY 2021, which were impacted by the COVID-19 pandemic, call volumes appear to be steadily increasing at a rate of 0.8% each year. The impact of COVID-19, however, resulted in a nearly 7% call volume decrease in one year alone (FY 2019 to FY 2020). Call volumes, moreover, do appear to be returning to a positive trend and it is anticipated that OCEMS call volumes will return to or exceed trending values that would have likely occurred, had the pandemic never happened. ***Table 5.2*** and ***Figure 5.2*** show the projected call volume for FY 2022 through FY 2030 based solely on the annual trending call volume increase of 0.8%, which was the trending pattern prior to FY 2020.

Year	Projected Call Volume	Volume Increase	Call Increase
FY 2021	**11,899**	-----	-----
FY 2022	**11,994**	+ 0.8%	+ 95
FY 2023	**12,090**	+ 0.8%	+ 96
FY 2024	**12,187**	+ 0.8%	+ 97
FY 2025	**12,284**	+ 0.8%	+ 97
FY 2026	**12,383**	+ 0.8%	+ 99
FY 2027	**12,482**	+ 0.8%	+ 99
FY 2028	**12,582**	+ 0.8%	+ 100
FY 2029	**12,682**	+ 0.8%	+ 100
FY 2030	**12,784**	+ 0.8%	+ 102

Table 5.2 – Call Volume Projections for FY 2022 Through FY 2030 Based on a 0.8% Annual Increase

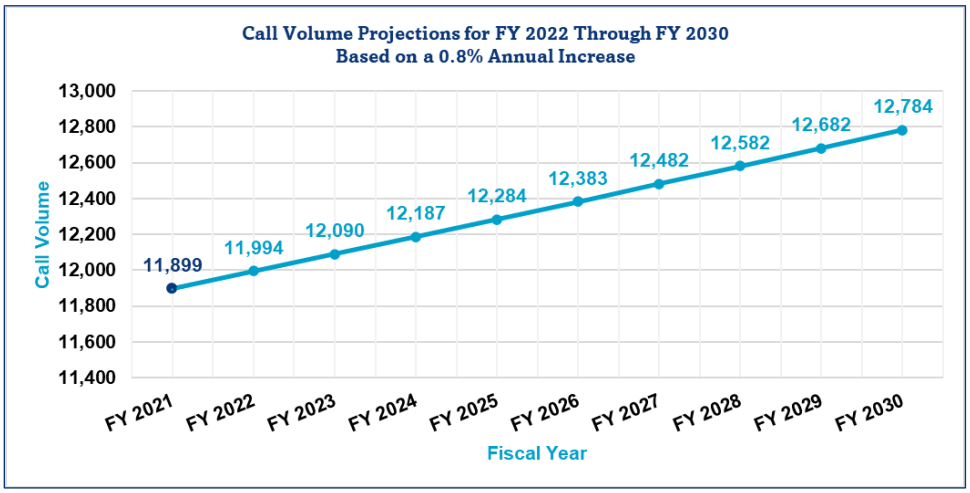


Figure 5.2 – Call Volume Projections for FY 2022 Through FY 2030 Based on a 0.8% Annual Increase

Trending solely on an annual call volume increase of 0.8%, it is projected that the call volume for OCEMS will reach approximately 12,784 calls for service by 2030. That results in an overall 7.4% increase from FY 2021 to the end of FY 2023.

Considering the County's growth projections (outlined in **SECTION 3**), another method to anticipate call volume growth is to correlate it with population growth. ***Table 5.3*** correlates historical call volume and population values with projected future values based on data already presented in this Report.

Year	Call Volume	Population	Call:Pop Ratio
2015	12,287	141,248*	1:11.5
2016	12,358	142,738*	1:11.6
2017	12,608	144,227*	1:11.4
2018	12,810	145,717*	1:11.4
2019	12,668	147,206*	1:11.6
2020	11,808	148,696	1:12.6
AVG	-----	-----	**1:11.7**
2021	11,899 (12,885***)	150,754**	1:11.7
2022	13,061***	152,813**	1:11.7
2023	13,237***	154,871**	1:11.7
2024	13,413***	156,930**	1:11.7
2025	13,589***	158,988**	1:11.7
2026	13,765***	161,047**	1:11.7
2027	13,941***	163,105**	1:11.7
2028	14,117***	165,164**	1:11.7
2029	14,292***	167,222**	1:11.7
2030	14,468***	169,281**	1:11.7

** Approximate Values based on 2010-2020, 10-year growth trend of 11.1%*
*** Projected Values based on 2020-2030, 10-year growth trend of 13.8%*
**** Based on AVG Call-to-Population Ratio for prior years' trending*

Table 5.3 – Historical Call Volume and Population Values Correlating to Projected Future Values

Considering the data presented in ***Table 5.2***, indicating a 2030 projected call volume of 12,784 calls based on a steady 0.8% call volume increase, and the data presented in ***Table 5.3***, indicating a 2030 projected call volume of 14,468 calls based on a correlation of one call per every 11.7 residents, and projected population volumes, the margin between the two is 1,684 calls, which is an 11.6% lesser value than the higher projected call volume of the two projections. Dividing for the middle of the two projections is the midline value of 13,626 calls. This midline value represents a 6.6% variance higher that the lower projection (12,784 calls) and a 5.8% variance lower than the high projection (14,468 calls). As a result, it seems reasonable to project that FY 2030 call volumes will reach approximately 13,626 calls, which does not account for move-ups, specialty assignments, or other dispatch notifications. This equates to an average call volume increase each year of 192 calls (+ 1.6%).

5.2.2 – Call Locations

Coinciding with the same seven-year data set (FY 2015 – FY 2021), call volumes were analyzed and corresponded to municipalities and zip codes within, and connecting to, Orange County. These municipalities and zip codes are referenced in **SECTION 3**. ***Figure 5.2*** shows call percentages per zip code, with its associated municipality name in parenthesis.

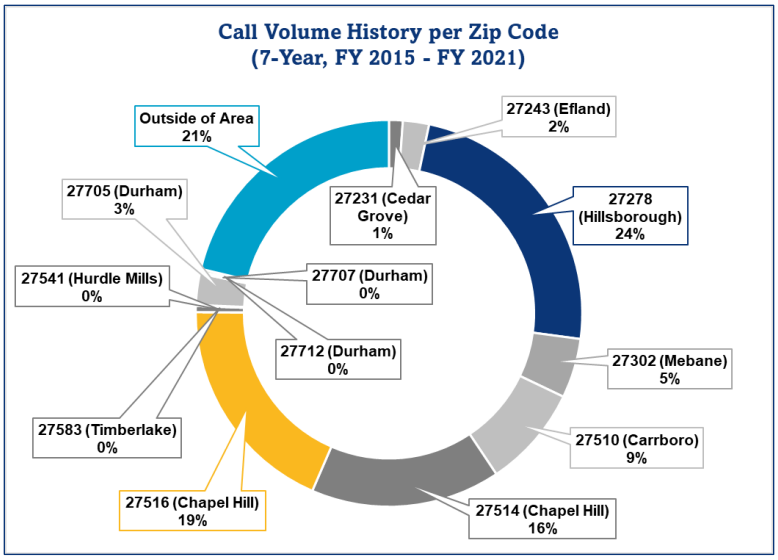


Figure 5.2 – Call Volume History per Zip Code (7-Year, FY 2015 – FY 2021)

Calls that are categorized as "Outside of Area" are either located outside of Orange County, their description was not defined in the prior **SECTION 3** municipality and zip code listings, or they are categorized as un-defined sources (municipality or zip code).

Overall, both the municipality and zip code volumes suggest that the municipalities and associated zip codes of Carrboro, Chapel Hill, and Hillsborough comprise the significant majority of call volumes within the County. Closely following – but still only equating to approximately 5% of the call volumes – is the area around Mebane near the Alamance County border. This data also correlates to heat map visualizations for both all call types and BLS-only call types (***Figures 5.3 through 5.5***).

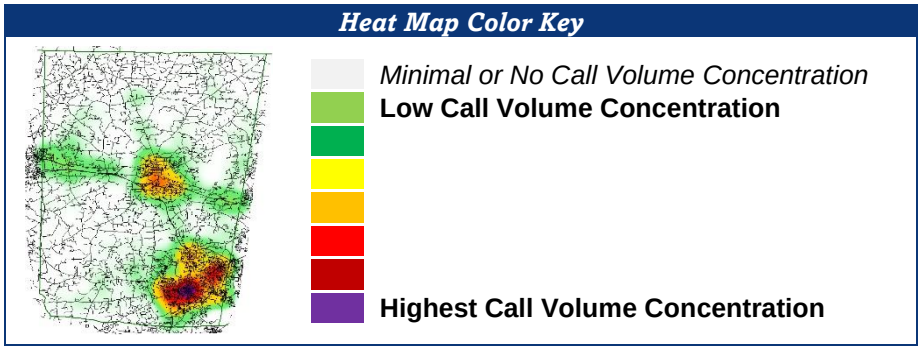


Figure 5.3 – Heat Map Color Key

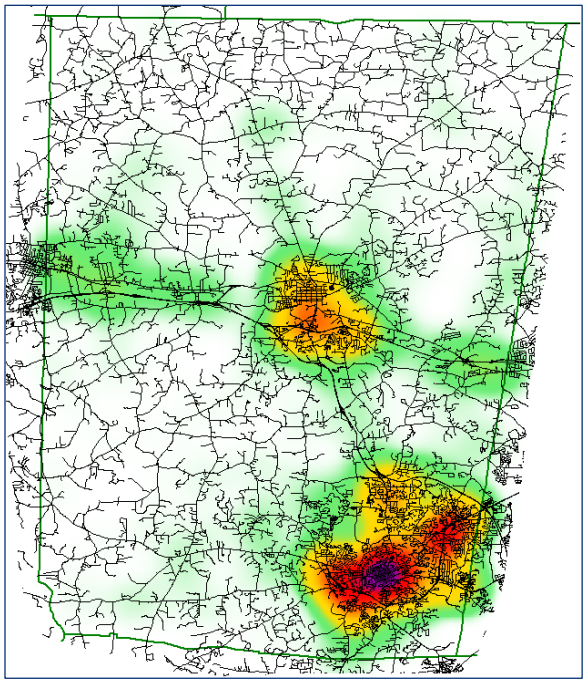


Figure 5.4 – Heat Map of All Call Types within Orange County

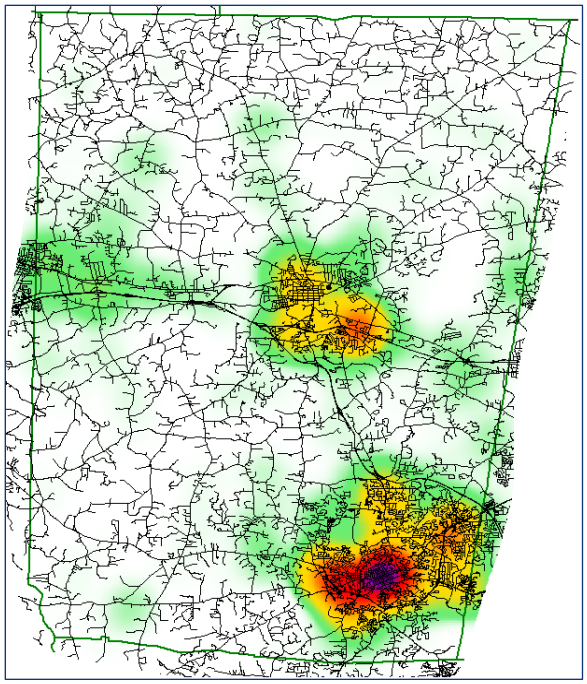


Figure 5.5 – Heat Map of BLS (Only) Call Types within Orange County

This heat map data shows the largest concentration of calls centered around and within the Towns of Carrboro and Chapel Hill, with extensions covering to the outlining borders of the Town of Chapel Hill, then north along the Interstate-40 corridor to Hillsborough, following westward toward Mebane and eastward toward Durham along the Interstate-85 corridor. Small pockets of increased call volume occurrences do sporadically appear on these maps as well, but the significant majority of the County's call volume occurs in areas that are closer to the population centers (Carrboro/Chapel Hill and Hillsborough), have close accessibility to major roadways leading into the population centers, or border larger communities within in neighboring counties (e.g., Mebane, Durham).

Factors like this greatly impact and challenge how EMS agencies like OCEMS and systems like what is seen within Orange County locate units, staff those units, and deploy ("move-up") those units during times of call influx ("surge").

5.2.3 – Call Types

Of the analyzed calls, it is important to identify which calls are generated by 9-1-1 (requests for service, calling 9-1-1) versus those that are generated for an interfacility transports (IFT), which is a facility's request for a transfer from one location to another without calling 9-1-1. In many settings throughout North Carolina and the nation, municipal EMS agencies often focus their attention toward – or solely respond to – 9-1-1 requests for service. ***Table 5.5*** shows the annual breakdown of 9-1-1 calls and IFT calls.

Year	Total Calls	9-1-1 Calls	*9-1-1 %*	IFT Calls	*IFT %*
FY 2015	**12,287**	11,222	*91%*	1065	*9%*
FY 2016	**12,358**	11,305	*91%*	1053	*9%*
FY 2017	**12,608**	11,440	*91%*	1168	*9%*
FY 2018	**12,810**	11,635	*91%*	1175	*9%*
FY 2019	**12,668**	11,434	*90%*	1234	*10%*
FY 2020	**11,808**	10,464	*89%*	1344	*11%*
FY 2021	**11,899**	10,638	*89%*	1261	*11%*
MEDIAN	**12,358**	**11,305**	***91%***	**1175**	***9%***
AVG	**12,348**	**11,163**	***90%***	**1186**	***10%***

Table 5.5 – OCEMS Annual Call Breakdown for 9-1-1 Versus IFT (7-Year, FY 2015 – FY 2021)

One factor that may alter the true volume of 9-1-1 versus IFT calls is improper documentation. For instance, IFT calls should only truly be documented as such when the caller does not utilize 9-1-1 to initiate an EMS response. Expanding this scenario, if the dispatch center receives a 9-1-1 call from a health care facility for the need to transport a patient from their facility to another location, the EMS crew should document this call as a 9-1-1 (scene response) rather than an IFT. If, on the other hand, the original call was received by a direct telephone number besides 9-1-1, then the EMS crew should document this call as an IFT and receive appropriate Physician Certification Statement (PCS) paperwork and Transfer Orders to accompany the patient during this transfer call. As a result of this, it is possible that OCEMS's calls are represented by a higher percentage of 9-1-1 calls than 91% annually.

If OCEMS's call volume actually reflects the 91% median that is observed, there may be an opportunity to defer IFT calls to a private vendor such as another Franchised private ambulance service within the County, or direct health care facilities to call 9-1-1 only for situations that require a more immediate ambulance response, such as a chest pain patient that goes to an urgent care clinic. Actions like this may help to promote 9-1-1-unit (ambulance) availability within the system rather than committing them to transports where time sensitivity or immediate patient intervention are not always the case.

Understanding and analyzing the types of calls (e.g., chief complaint, provider primary impression) that EMS agencies respond to also helps to determine a system's needs. A higher percentage of ALS calls (e.g., EMD code Charlie, Delta, and Echo), for instance, would necessitate the need for more paramedic-level unit staffing than EMT-level unit staffing. Increased call volumes for patients who experience falls, mental health crisis, opioid overdose, diabetic emergencies, etc., may influence the social determinants of health within a community and, therefore, help to direct further community risk reduction initiatives. ***Tables 5.6 and 5.7*** outline ALS/BLS call acuity levels (subjective analysis) and patient chief complaints based on 9-1-1 call-taker/EMD processes.

Year	Total Calls	ALS Calls	*ALS %*	BLS Calls	*BLS %*
FY 2015	**12,287**	7690	*63%*	4597	*37%*
FY 2016	**12,358**	7814	*63%*	4544	*37%*
FY 2017	**12,608**	8015	*64%*	4593	*36%*
FY 2018	**12,810**	7478	*58%*	5332	*42%*
FY 2019	**12,668**	7692	*61%*	4976	*39%*
FY 2020	**11,808**	7895	*67%*	3913	*33%*
FY 2021	**11,899**	7805	*66%*	4094	*34%*
MEDIAN	**12,358**	**7805**	***63%***	**4593**	***37%***
AVG	**12,348**	**7770**	***63%***	**4578**	***37%***

Table 5.6 – OCEMS ALS/BLS Call Acuity Level (Subjective Analysis Based on 9-1-1 Chief Complaint) (7-Year, FY 2015 – FY 2021)

Call Type	Call Volume	*Call %*
Falls	10,204	*12.0%*
Cardiac (including Cardiac Arrest)	7804 (1033)	*9.2% (1.2%)*
Motor Vehicle Collision (MVC)	7113	*8.3%*
Breathing Problems	6338	*7.4%*
Unresponsive	6190	*7.3%*
Overdose	2164	*2.5%*
Stroke	1952	*2.3%*
Diabetic Problems	1459	*1.7%*
Choking	324	*0.4%*
Drowning	20	*0.0%*
Other Medical Illness/Injury Calls	41,715	*48.9%*
TOTAL 7-YEAR CALLS	**85,284**	-----

Table 5.7 – OCEMS High-Volume and High-Acuity Call Breakdown (7-Year, FY 2015 – FY 2021)

Considering the call location information and EMD coding information presented earlier in this section, it can be correlated that there is an approximately 60/40 (or 65/35, 2:1) split between ALS/BLS calls within Orange County, and as a result of the call volume locations, the greatest emphasis of calls occurs within the population centers surrounding Carrboro/Chapel Hill and Hillsborough. As a result of this, there may not be an automatic need for a paramedic-level (ALS) ambulance to respond to all calls, especially if the MPDS/EMD call screening process is utilized and codes the call accordingly at the Omega, Alpha, or Bravo levels (which comprises of approximately 40% of the dispatched calls). Utilizing this information, a recommendation for OCEMS may be to consider an ambulance care level and appropriate staffing structure incorporating a 1:3 ratio, whereby there is one BLS (EMT) ambulance unit for every three ALS (paramedic) ambulance units within the system. This, theoretically, would allow for ALS units to be available for approximately 75% of the call volume, which is a safe overage consideration given the assessed 60-65% ALS call type demand.

5.3 – Unit Coverage, Response, and Deployment

5.3.1 – Unit Coverage

OCEMS currently staffs six ALS-level ambulances on a 24-hour shift schedule and two ALS-level ambulances on a 12-hour shift schedule (covering only a 12-hour period within the day), equaling a total of seven full-time ambulance equivalents. This, essentially, equates to one full-time (24/7) ambulance more than was staffed by the Agency during its 2011 Comprehensive EMS System Plan. At that time, the Agency's call volume was 10,719 calls (presuming those were actual calls that did not include move-ups) and a total of six full-time ambulance equivalents were staffed (four staffed for 24 hours and four staffed for 12 hours). This equated to an average of 1,787 calls per full-time ambulance equivalent. Today's current staffing equates to 1,700 calls per full-time ambulance equivalent, resulting in a 5% decrease in call volume workload than was experienced a decade earlier.

Ambulances are strategically located throughout the County at eight different locations, with six providing full-time, 24-hour staffing and two providing part-time, 12-hour staffing. Many of these stations are co-location ventures with local fire departments whereby the ambulance has a dedicated bay or garage stall and the EMS crews have dedicated dorm or bedroom space and share other common areas such as living, kitchen, and workspaces. Further details on each station can be found in **SECTION 6**. Moving into the FY 2023 calendar year, an additional two BLS ambulances are scheduled to be introduced to provide additional daytime (12-hour) coverage and will be located with existing units at two different locations (one in Chapel Hill and one in Hillsborough). ***Figure 5.6*** shows a map of the EMS stations and their locations within the County. ***Figure 5.7*** shows the EMS station locations with an overlying 10-minute response radius while ***Figure 5.8*** shows the stations with an overlying 20-minute response radius (both maps also show an underlying call heat map; stations are referenced as a "post" on the map but are not referred to as "posts" by the Agency).

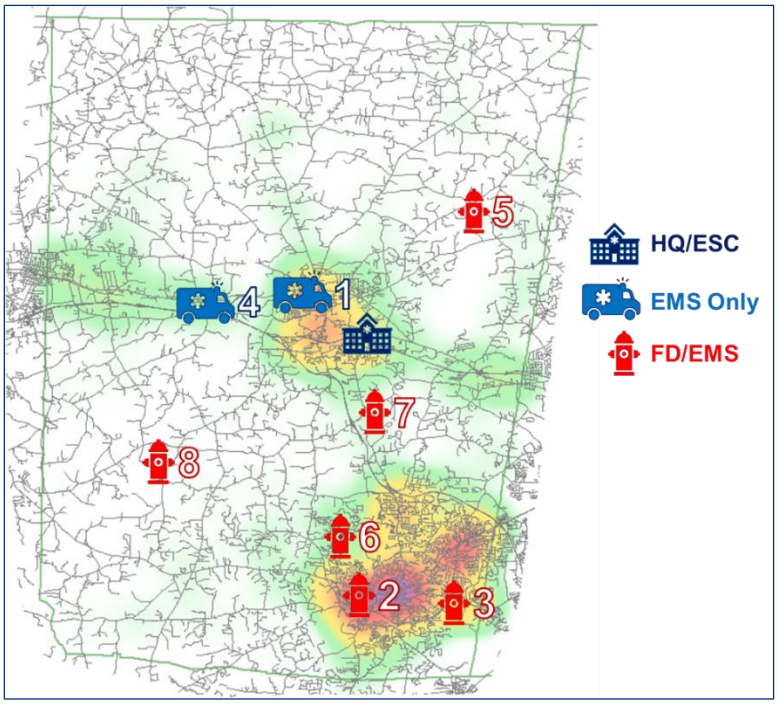


Figure 5.6 – Current Map of OCEMS Stations

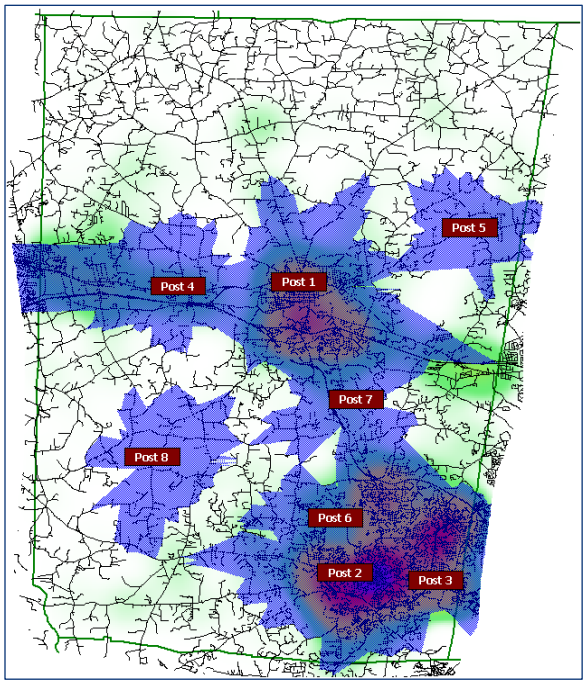


Figure 5.7 – OCEMS Station ("Post") Locations with an Overlying 10-minute Response Radius and Underlying Call Heat Map

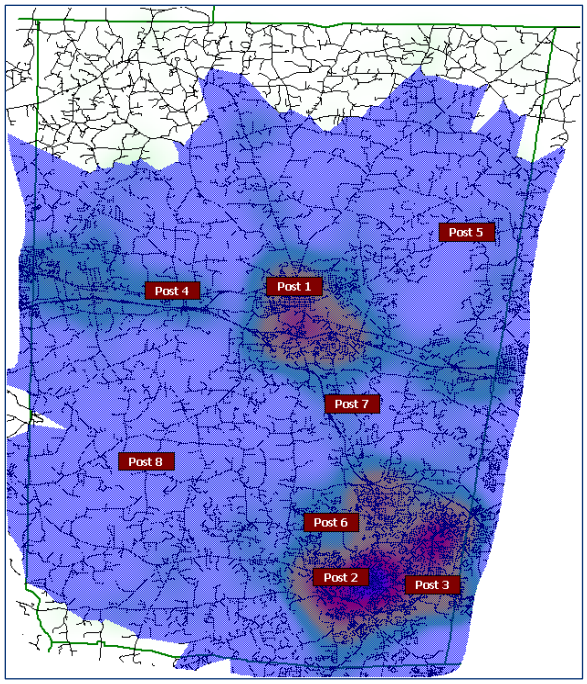


Figure 5.8 – OCEMS Station ("Post") Locations with an Overlying 20-minute Response Radius and Underlying Call Heat Map

As displayed in these visuals, the majority of OCEMS's ambulances (units) are staffed in either stand-alone EMS stations or within co-located fire stations (still referred to in this Report as EMS stations), whose location is within or nearby higher call volume areas or are in rural areas where longer response times would otherwise be experienced without a nearby ambulance or station. This coverage – in both the 10-minute and 20-minute modeling – does not cover the entire geography of the County. ***Figures 5.9 to 5.24*** show the overlapping 10-minute and 20-minute response radius and underlying call heat map for their respective station.

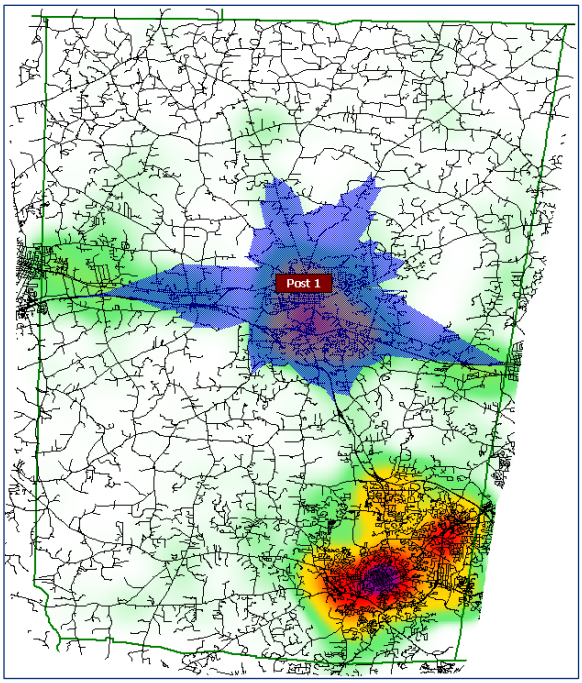


Figure 5.9 – OCEMS Station 1 ("Post 1") Location with an Overlying 10-minute Response Radius and Underlying Call Heat Map

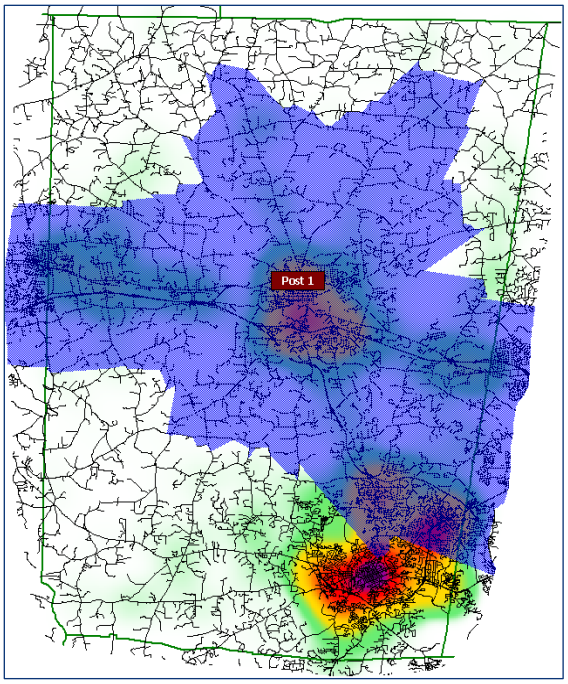


Figure 5.10 – OCEMS Station 1 ("Post 1") Location with an Overlying 20-minute Response Radius and Underlying Call Heat Map

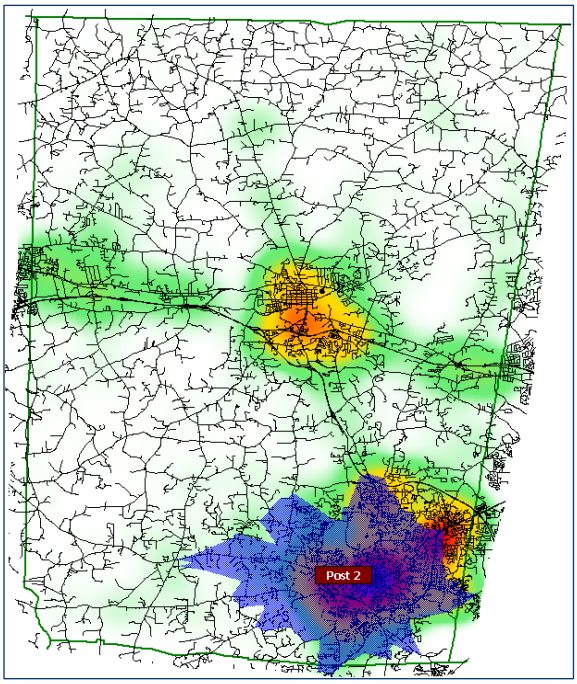


Figure 5.11 – OCEMS Station 2 ("Post 2") Location with an Overlying 10-minute Response Radius and Underlying Call Heat Map

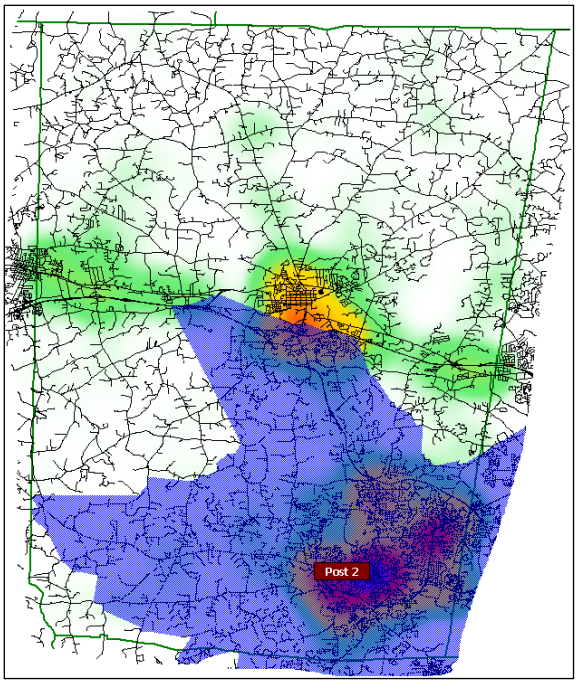


Figure 5.12 – OCEMS Station 2 ("Post 2") Location with an Overlying 20-minute Response Radius and Underlying Call Heat Map

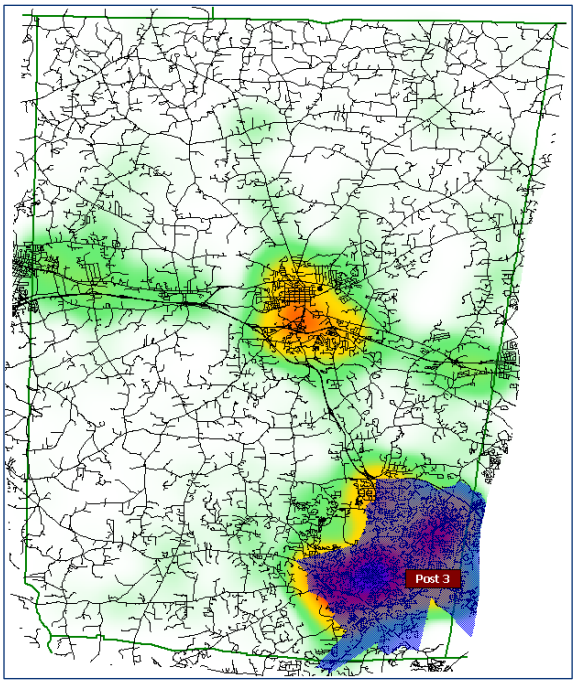


Figure 5.13 – OCEMS Station 3 ("Post 3") Location with an Overlying 10-minute Response Radius and Underlying Call Heat Map

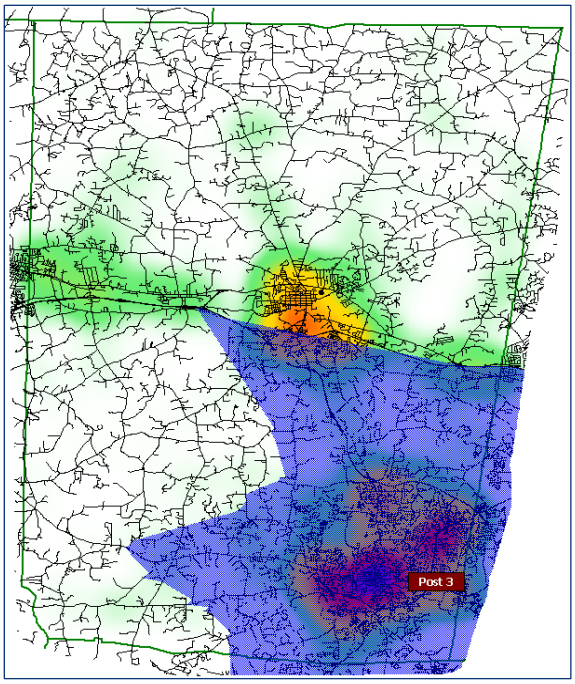


Figure 5.14 – OCEMS Station 3 ("Post 3") Location with an Overlying 20-minute Response Radius and Underlying Call Heat Map

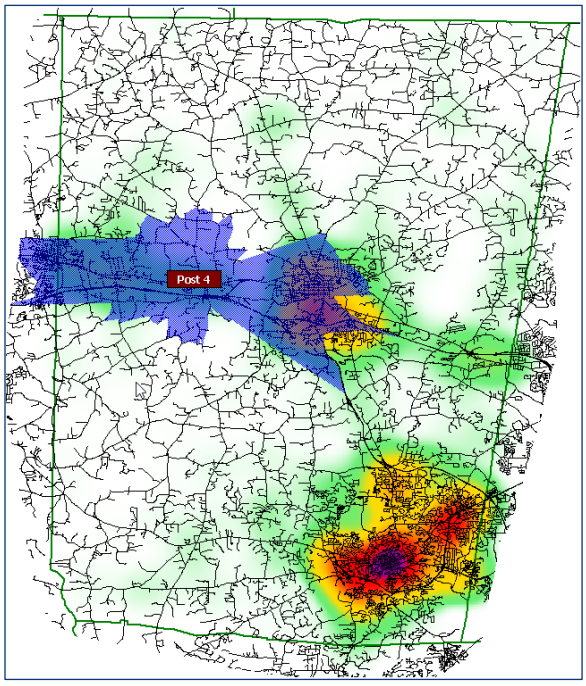


Figure 5.15 – OCEMS Station 4 ("Post 4") Location with an Overlying 10-minute Response Radius and Underlying Call Heat Map

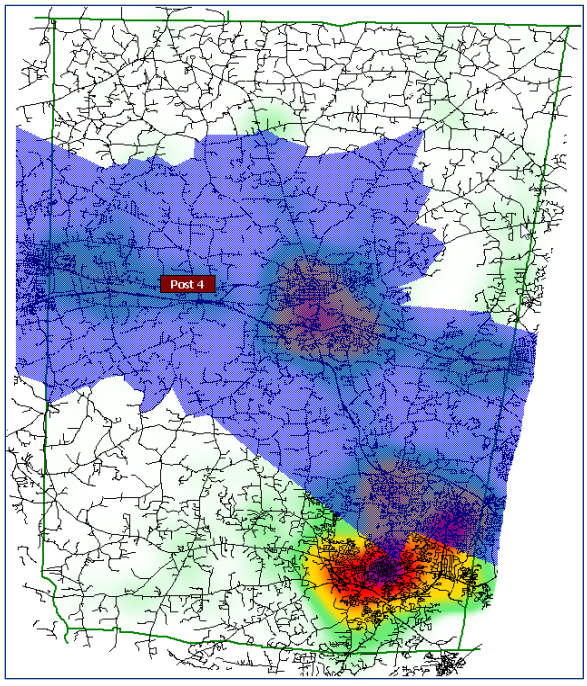


Figure 5.16 – OCEMS Station 4 ("Post 4") Location with an Overlying 20-minute Response Radius and Underlying Call Heat Map

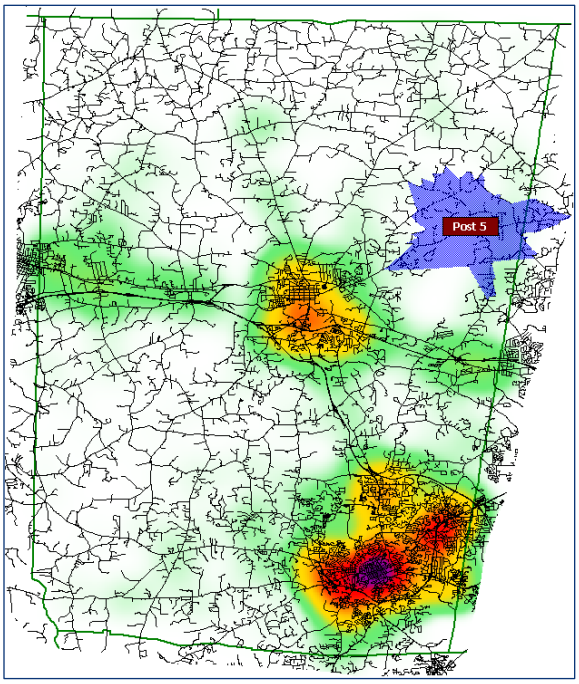


Figure 5.17 – OCEMS Station 5 ("Post 5") Location with an Overlying 10-minute Response Radius and Underlying Call Heat Map

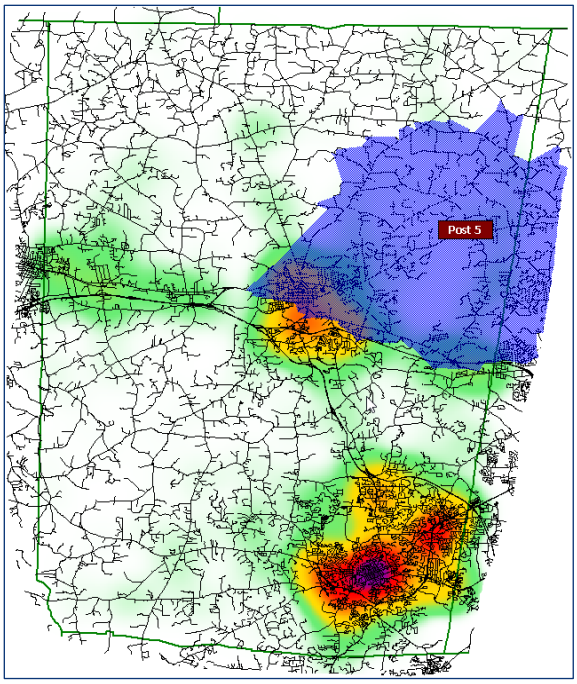


Figure 5.18 – OCEMS Station 5 ("Post 5") Location with an Overlying 20-minute Response Radius and Underlying Call Heat Map

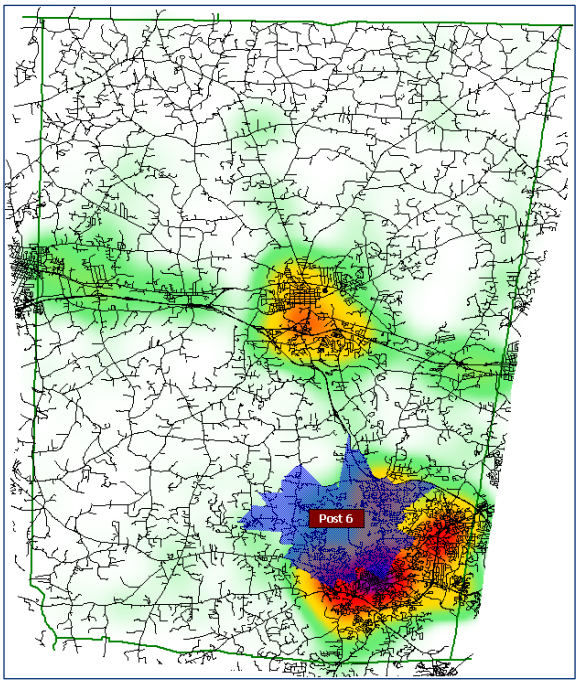


Figure 5.19 – OCEMS Station 6 ("Post 6") Location with an Overlying 10-minute Response Radius and Underlying Call Heat Map

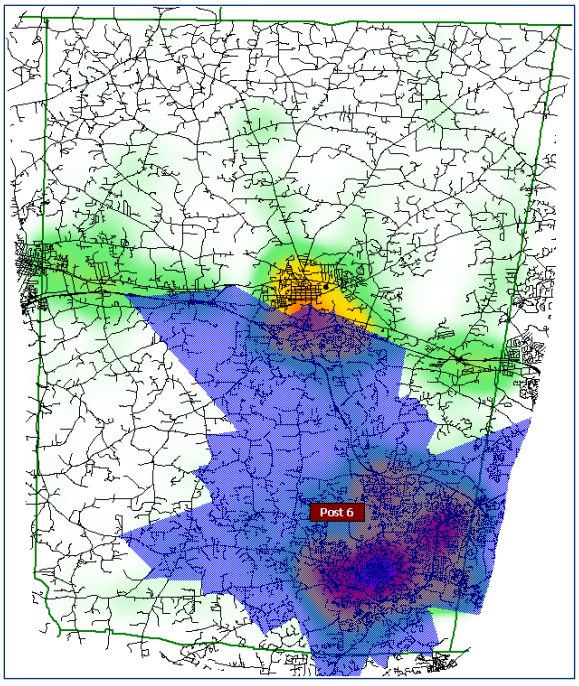


Figure 5.20 – OCEMS Station 6 ("Post 6") Location with an Overlying 20-minute Response Radius and Underlying Call Heat Map

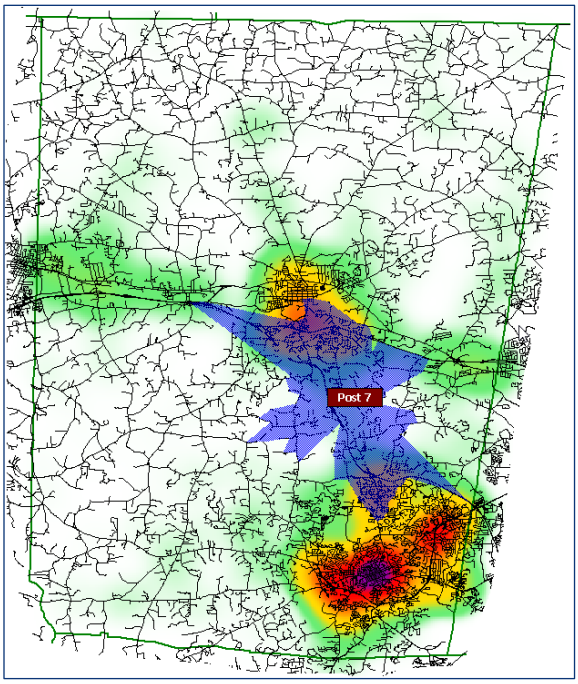


Figure 5.21 – OCEMS Station 7 ("Post 7") Location with an Overlying 10-minute Response Radius and Underlying Call Heat Map

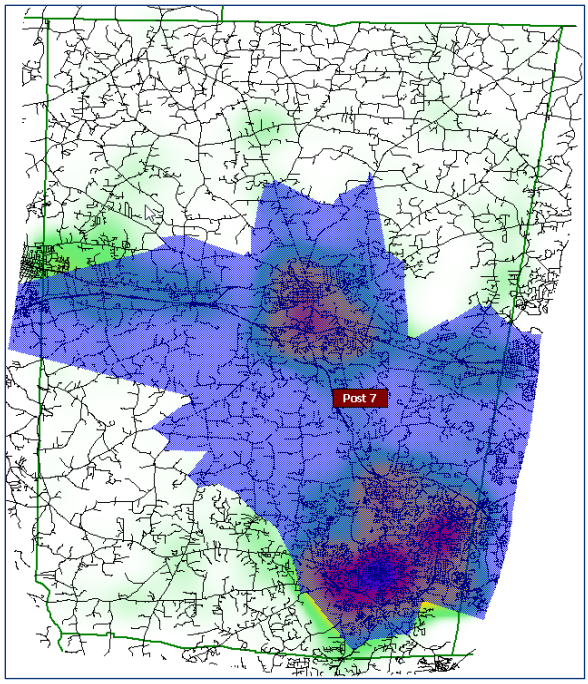


Figure 5.22 – OCEMS Station 7 ("Post 7") Location with an Overlying 20-minute Response Radius and Underlying Call Heat Map

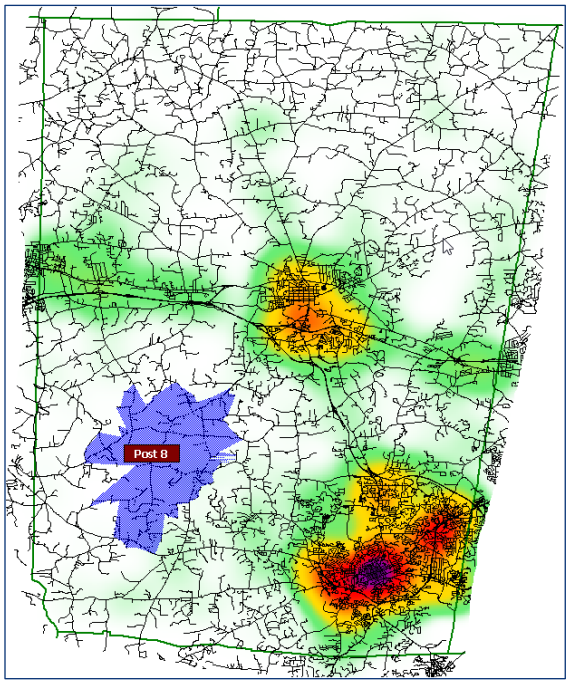


Figure 5.23 – OCEMS Station 8 ("Post 8") Location with an Overlying 10-minute Response Radius and Underlying Call Heat Map

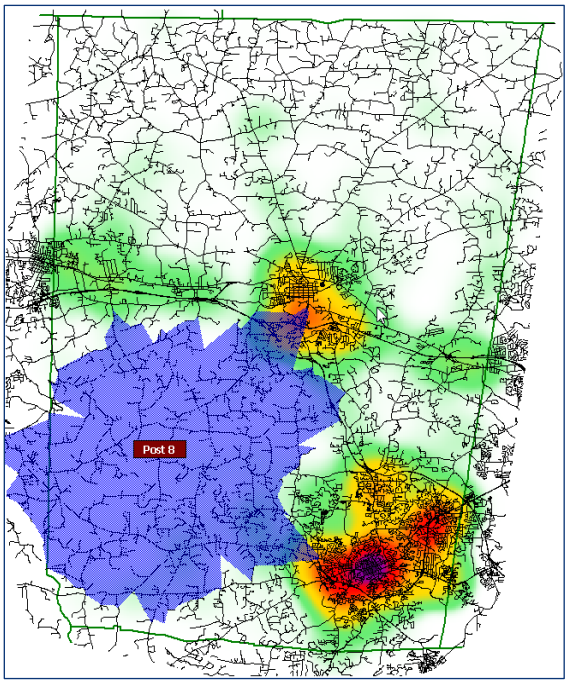


Figure 5.24 – OCEMS Station 8 ("Post 8") Location with an Overlying 20-minute Response Radius and Underlying Call Heat Map

In primarily static models, or station-based EMS systems, station location is everything. What sets EMS stations and staffing needs apart from fire departments (related to fire apparatus) is the purpose behind their station locations. Fire departments often focus on geographic coverage before call volume coverage because of their established response performance metrics and the Insurance Services Office (ISO) Public Protection Classification (PPC) rating. Within the EMS industry, station locations are primarily focused first on higher call volume areas, then on geographic coverage. Considering Orange County's call volume concentrations and large geographic expanse, creating an EMS system whereby call volumes are evenly divided amongst units and the farther reaches of the County can be responded to within a reasonable amount of time (within 10 minutes) is a valid priority. As a general point of reference, OCEMS staffs one full-time ambulance for every ~21,300 residents. It makes sense, therefore, that the majority of their stations are focused around the population centers within the County because that is where the call volume centers are, too.

Considering OCEMS's current staffing operations, Stations 1 through 6 are staffed 24/7 while Stations 7 and 8 are only staffed for 12 hours each day. This staffing model creates a daytime versus nighttime coverage gap in a central area between the two population centers within the County: Carrboro/Chapel Hill and Hillsborough. A regional display of each station and its 10-minute response radius helps to portray the gap that is created while Station 7 and 8 units are not in-service (***Figures 5.25 – 5.27***).

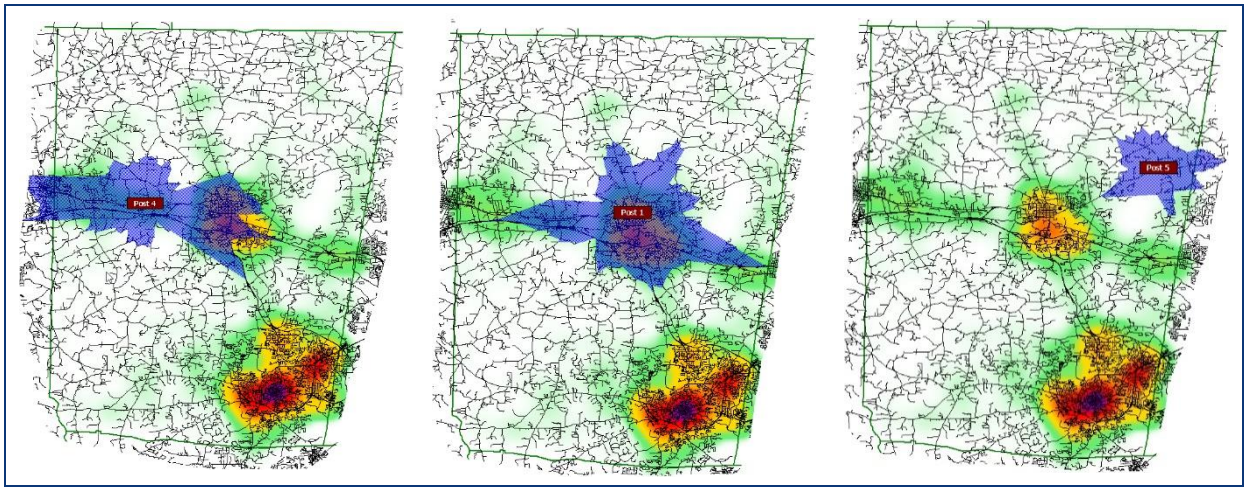


Figure 5.25 – Hillsborough (Northern) Region, OCEMS Stations ("Posts") 4, 1, and 5 Locations with an Overlying 10-minute Response Radius and an Underlying Call Heat Map

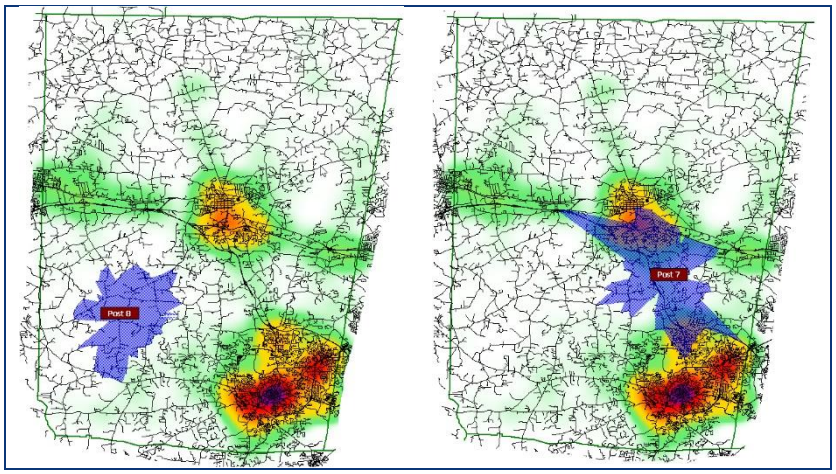


Figure 5.25 – Central Region, OCEMS Stations ("Posts") 8 and 7 Locations with an Overlying 10-minute Response Radius and an Underlying Call Heat Map

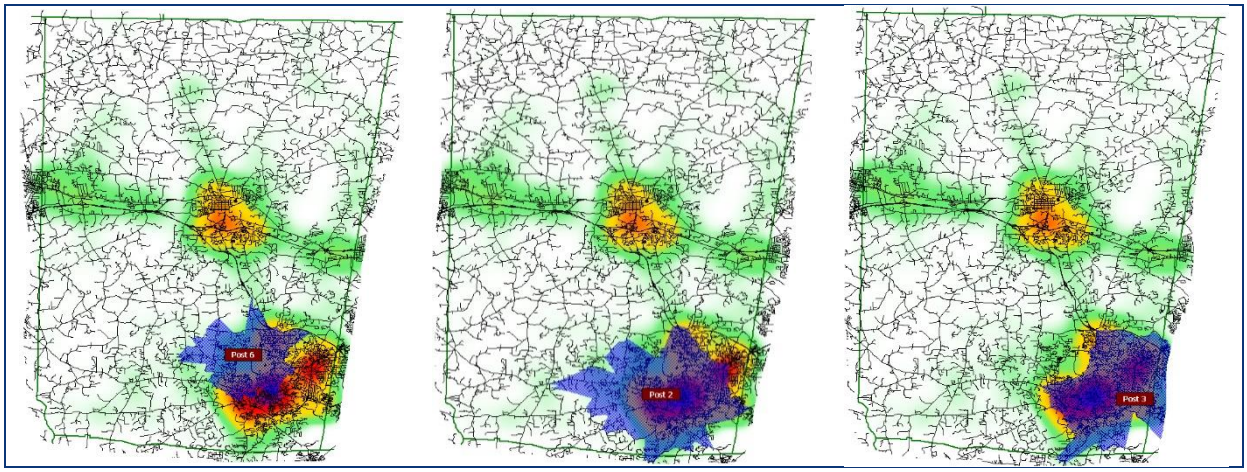


Figure 5.25 – Carrboro/Chapel Hill (Southern) Region, OCEMS Stations ("Posts") 6, 2, and 3 Locations with an Overlying 10-minute Response Radius and an Underlying Call Heat Map

When viewed from this perspective, it appears as though there are significant stretches within the County where a 10-minute response time is not feasible, presuming that all ambulances are located within their respective stations. This coverage gap is highlighted in the northern portion of the County throughout the entire day, while it only exists in the center (between Carrboro/Chapel Hill and Hillsborough) during the overnight hours. While clinically this may not play a significant factor for BLS calls (consisting of approximately 40% of the total call volume and where a 20-minute response time may be a reasonable clinical timeframe), it can be a clinically-significant factor for some of the remaining 60% of ALS calls, or more specifically, the approximately 25% of potentially high-acuity calls that require more immediate interventions and aggressive patient care management (clinical care).

Deciding "how long is too long?" is the complicating factor in this equation. Statistically, 40% of 9-1-1 EMS calls within the County can "afford" a 10- or even 20-minute waiting period. As a resident, however, the perception surrounding this time creates a very large window of questioning regarding system effectiveness to come into play – regardless of one's illness/injury acuity level. Providing ambulance coverage for an

entire system, therefore, requires its residents (taxpayers, financial supporters) to make a decision regarding how much time is "too long" to be waiting for an ambulance whenever someone calls 9-1-1 for help. Strategically placing ambulances throughout a large geographic area with the intent of affording all residents timely access to emergency care would require more ambulances to be placed in service (which also requires building more EMS stations and hiring more EMS personnel).

5.3.2 – Unit Response

OCEMS's growing annual call volume trends correlates to a growing trend with many of its individual ambulances (units) and has resulted in a forward pathway to budget for more units in the immediate future, particularly adding more daytime (peak, 12-hour) BLS units into its staffing matrix. ***Figures 5.26 and 5.27*** show hour of day call volume trends (4-year totals and average calls per hour of day, respectively).

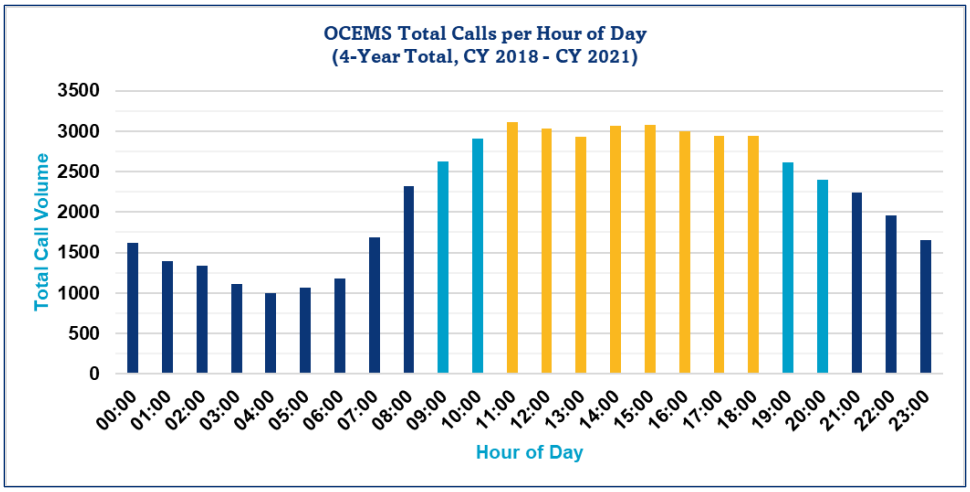


Figure 5.26 – OCEMS Total Calls per Hour of Day (4-Year Total, CY 2018 – CY 2021)

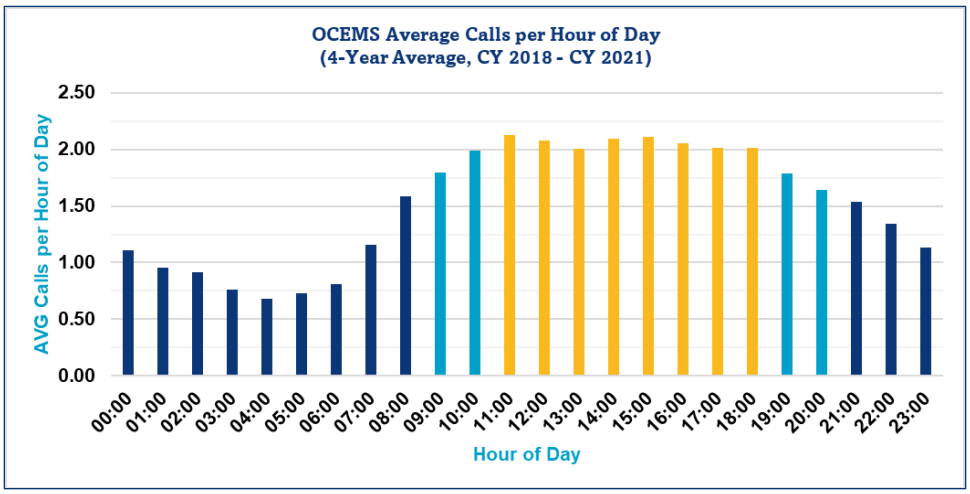


Figure 5.27 – OCEMS Total Calls per Hour of Day (4-Year Average, CY 2018 – CY 2021)

Noted in these figures are the color differences between the peak 8-hour time period (in gold, 11:00-19:00) and its extended peak 12-hour time period (in gold and light blue, 09:00-21:00). Putting the highlighted 12-hour peak time period into perspective, this time period encounters approximately 65% of the Agency's calls (per the 4-year period and per day). Data such as this is important in factoring in the staffing needs of the Agency, which includes employee shift schedules and operational deployment models utilized.

Breaking extended and annual call volumes down per year by each ambulance, ***Table 5.8*** shows the annual call volume totals per OCEMS ambulance ("MED"). Of note, the annual totals represented in this table show the calls that OCEMS responded to, not other EMS agencies such as South Orange Rescue Squad (SORS), Durham County EMS, or other neighboring EMS agencies in the form of automatic or mutual aid. Also, MED9 is listed as an additional unit that occasionally was staffed when overage personnel were available.

Unit	*Cover Hours*	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	MED	AVG
MED1	*24*	2153	2062	1851	1692	1943	1820	2063	**1943**	**1941**
MED2	*24*	2243	2266	2334	2434	2429	2368	2287	**2334**	**2337**
MED3	*24*	2129	2245	2346	2256	2066	2009	1845	**2129**	**2128**
MED4	*24*	1496	1424	1434	1463	1450	1511	1640	**1463**	**1488**
MED5	*24*	657	1021	1286	1265	982	1014	1159	**1021**	**1055**
MED6	*24*	1053	1192	1074	1058	1552	1663	1738	**1192**	**1333**
MED7	*12*	899	413	283	748	780	773	738	**748**	**662**
MED8	*12*	1008	1124	1115	1060	704	176	401	**1008**	**798**
MED9	*12*	584	588	678	578	522	151	0	**578**	**443**

Table 5.8 – OCEMS Annual Call Volumes per Unit, per Year (7-Year, FY 2015 – FY 2021)

This data highlights that MED1, MED2, and MED3 are the busiest units in the system. Geographically, these units are located in Hillsborough, Carrboro, and Chapel Hill, respectively. Factors that often increase the call volumes for other units such as MED4 and MED5, for instance, are the frequency of times that their units are pulled into local population centers (such as Hillsborough) to provide regional coverage while the primary unit is already on a call. This is also found in the southern portion of the County, where MED6, MED7, and MED8 are often pulled into Carrboro/Chapel Hill to provide regional coverage. These instances are referred to as "move-ups" by OCEMS (more details will follow in this Report related to "move-ups").

Regarding the amount of time dedicated to each call, or time-on-task, ***Table 5.9*** shows the most recent (FY 2021) allocations for each ambulance unit. Of note, the average calls per day is based on the full FY 2021 calendar year of 366 days (including leap year, February 29th). This analysis is also based on the presumption that each unit is in-service 100% of the calendar days.

Unit	FY 2021 Calls	AVG Calls per Day	AVG Time per Call	AVG Hours per Day on Calls
MED1	2063	5.6	69 minutes	6 hrs. 26 min.
MED2	2287	6.2	66 minutes	6 hrs. 49 min.
MED3	1845	5.0	65 minutes	5 hrs. 25 min.
MED4	1640	4.5	68 minutes	5 hrs. 6 min.
MED5	1159	3.2	70 minutes	3 hrs. 44 min.
MED6	1738	4.7	69 minutes	5 hrs. 24 min.
MED7	738	2.0 (12 hours)	73 minutes	2 hrs. 26 min.
MED8	401	1.1 (12 hours)	68 minutes	1 hr. 15 min.

Table 5.9 – OCEMS Call Time-on-Task Averages (Based on Full Calendar Coverage) (FY 2021)

Based solely on call volumes, alone, the overall workload of each on-duty crew appears to be low-to-average. Other factors throughout the day, such as inventory checks, training, and most particularly, move-ups, greatly impact this workload and add to the hours spent not having dedicated downtime.

What complicates the comprehensive unit analysis for this Study is the fact that not all ambulances ("MED" units) function as an ALS unit (as designed) or are even in-service 100% of the time. Throughout the course of the year, various units are "browned-out" (out-of-service) because of a lack of daily staffing due to various reasons for time off (i.e., vacation, illness). ***Table 5.10*** shows the unit staffing level, daily availability, and subsequent workload (Unit Hour Utilization – UHU) based on FY 2021 data and only on the total number of days that the unit was in-service. Of note, FY 2021 contained 366 days in the year because CY 2020 was a calendar leap year. While UHU is an imperfect measurement of unit workload, it remains one of the most common and widely used metrics within the EMS industry because of its simplicity to determine and utilize as a comparable metric between other units within an agency or system. ***Figure 5.28*** explains this in more detail, including various modifications that can be made to provide a more comprehensive view of unit workload.

Unit	*Cover Hours*	Days In-Service ALS	Days In-Service BLS	Total Days In-Service	Total Calls	AVG Calls per Day	UHU	Rating
MED1	*24*	351	11	**366** *(100%)*	**2063**	5.6	**0.23**	Below Average
MED2	*24*	347	18	**365** *(99.7%)*	**2287**	6.3	**0.26**	Average
MED3	*24*	314	43	**357** *(97.5%)*	**1845**	5.2	**0.22**	Below Average
MED4	*24*	353	11	**364** *(99.5%)*	**1640**	4.5	**0.19**	Below Average
MED5	*24*	259	53	**312** *(85.2%)*	**1159**	3.7	**0.15**	Below Average
MED6	*24*	325	34	**359** *(98.1%)*	**1738**	4.8	**0.20**	Below Average
MED7	*12*	272	10	**282** *(77.0%)*	**738**	2.6	**0.22**	Below Average
MED8	*12*	227	18	**245** *(66.9%)*	**401**	1.6	**0.14**	Low

Table 5.10 – OCEMS Unit Daily Staffing, Availability, and Workload (UHU) Analysis (Based on Unit Days In-Service, FY 2021)

Unit Hour Utilization (UHU)

Unit Hour Utilization (UHU) is a basic metric designed as an internal-agency quantifying tool to measure unit workload based on call volumes and on-duty hours. Its Standard formula presumes that 1 call takes 1 hour to complete and divides the number of calls by the total on-duty hours of the unit. The resulting value is then correlated to a range highlighting unit workload.

$$\frac{\text{\# Calls}}{\text{\# Hours On-Duty}} = \text{UHU (Standard)}$$

As an example, an ambulance responding to 6 calls during a 24-hour period would have a UHU of 0.25 [6 ÷ 24 = 0.25]. This value is often determined as an "Average" UHU (Note: this value is not commonly represented as a percentage, as it does not reflect productivity – which would be appropriately represented by a percentage).

< 0.15 Low	0.15-0.25 Below Average	0.25-0.35 Average	0.35-0.45 Above Average	> 0.45 High

This value and rating is not differentiated between 24-hour and 12-hour (or 8-10-hour) staffed units, but it could be fair to expect higher workload values from units that have on-duty crews working less than a 24-hour shift.

When units often have total call times (dispatch through clear times) of greater than 1 hour, a Modified UHU formula may be utilized, which multiples the quantity of the number of calls by the total number of hours to complete each call, then by the total on-duty hours.

$$\frac{\text{\# Calls x \# Hours per Call}}{\text{\# Hours On-Duty}} = \text{mUHU (Modified)}$$

With this example, an EMS agency covering a rural geographical area and having a total (average) call duration time of 1.5 hours and 3 calls per day would have a UHU of 0.19 [(3 x 1.5) ÷ 24 = 0.19].

Beyond the Standard and Modified UHU formulas is the potential to incorporate a more Comprehensive formula, which includes other shift activities such as unit move-ups, training, or community outreach. This formula adds these dedicated hours to the calls to provide a more comprehensive numerator to the equation.

$$\frac{\text{(\# Calls x \# Hours per Call) + (\# Activities x \# Hours)}}{\text{\# Hours On-Duty}} = \text{cUHU (Comprehensive)}$$

With any of these metrics, they remain designed to measure workload – not necessarily productivity – between units within the same agency/system, and for ambulance units (BLS and ALS alike), not necessarily fire apparatus.

Figure 5.28 – Unit Hour Utilization (UHU) (Abstract)

A common practice has been to downgrade units from an ALS unit (staffed with an EMT and Paramedic) to a BLS unit (staffed with two EMTs) when staffing numbers do not allow for full ALS coverage, often due to sick call outs, vacation, time off, etc. During such situations, often the impacted unit with the missing paramedic will be converted into a BLS unit by utilizing a pre-existing second EMT from another unit, or by "browning out" another unit (such as MED7 or MED8) in order to provide staffing for the otherwise 24-hour

unit. There does not seem to be a consistent process to follow in such situations as this often falls to the discretion of one of the supervisors to make this decision, regardless of any existing policies, memos, or preferred practices (this was communicated by many in our feedback process).

Expressed as an operational surprise, OCEMS does not have a firm policy on the daily staffing requirement for a standard number of units or their care provider level (ALS/BLS). As a result, ***Table 5.11*** shows a fractured system where not all units are staffed at the ALS level with paramedics each day, nor are all units uniformly staffed for the entire day. While instances of provider level downgrades and "brown-outs" should be allowed to occur to an extent, these parameters surrounding these instances should be clearly defined and strictly enforced, even if that means requiring mandatory hold-over overtime for staff members that have not been relieved by incoming shift replacements. Further details on this will be elaborated in **SECTION 6**.

Regarding unit workload, a one-year analysis was performed outlining each ambulance's Unit Hour Utilization (UHU) as a baseline metric for comparison. Only one year was analyzed because only one years' worth of definitive data was provided that included in-service days per year. As a point of clarification, the standard UHU metric only accounts for call volume workload during the on-duty time period; it does not account for move-ups, time spent on other miscellaneous tasks, or while performing training or continuing education. It is also primarily based on the factor that one call equals one total hour of time. It also should not necessarily be utilized as a tool to measure productivity or performance; rather, it is more of a comparison tool to gauge one unit's workload to another's within the same system.

In reference to OCEMS averages for time-on-task (time-per-call), utilizing the standard one hour per one call is a fairly accurate reflection of their total call times from initial dispatch to enroute, then arrival, then departure, then clearing from the hospital. Utilizing this metric for FY 2021 data, it appears as though most units actually have a below average rating, with only one being average (MED2) and one being low (MED8). Based on other findings, moreover, what appears to make units busier than they are is the frequency in which they are moved from their primary location to another for larger zone coverage (referred to as a "move-up"). Many of these instances occur during the daytime when call volumes are approximately twice as high compared to the overnight time period. This will be reviewed in more detail later in the Report.

Two metrics that are commonly utilized within the EMS industry to measure performance are turnout times (time from first dispatch-to-enroute) and response times (time from enroute-to-arrival). These are often utilized to measure performance, but in no way measure productivity, nor do they necessarily account for true performance based on patient outcomes. In many senses, response time standards are anecdotal and based on the theory that there is a 10% decrease in survivability for every minute that passes while someone is experiencing cardiac arrest, which is not the same as a heart attack. Even if this theory is wholly true, cardiac arrest situations typically account for an insignificant percentage of total call volumes. For OCEMS, it equates to approximately 1.2% of its annual call volumes. As such, utilizing this standard for 100% of calls when it applies to just over 1% of them seems to be more subjective than objective in reality. Nevertheless, common response time standards suggest that the first unit arrive on scene (for emergent situations, at least) within 08:59 (8 minutes, 59 seconds), at least 90% of the time. Turnout times often suggest 60 seconds (one minute) or less during daytime operations or 120 seconds or less (two minutes) during overnight operations if crews are allowed to sleep during their downtime. ***Table 5.11*** shows the 7-year average turnout time and response time for each primary ambulance unit.

Unit	AVG Turnout Time (mm:ss)	AVG Response Time (mm:ss)	*Primary Community Response Time (Average) (mm:ss)*
MED1	01:12	09:04	*Hillsborough (07:40)*
MED2	01:24	07:50	*Carrboro (04:46)*
MED3	01:16	08:57	*Chapel Hill (08:48)*
MED4	01:13	10:10	*Efland (07:58)*
MED5	01:16	10:55	*Hillsborough (08:53)*
MED6	01:12	09:54	*Carrboro (09:24)*
MED7	01:08	10:36	*Hillsborough (09:25)* *Chapel Hill (09:50)*
MED8	01:10	08:49	*Carrboro (05:53)* *Chapel Hill (09:06)*

Table 5.11 – OCEMS Average Turnout Time and Response Time per Primary Ambulance Unit, with Primary Community Response Time (7-Year, FY 2015 – FY 2021)

Evaluating turnout times and response times, both appear slightly high, overall. Considering approximately 65% (two-thirds) of the OCEMS total call volume occurs during daytime hours, it should be anticipated that the turnout times for each unit would be less than 60 seconds (one minute) on average – especially for MED7 and MED8 who are only in-service for 12 hours during the daytime. One of the most consistent pieces of feedback shared by fire department representatives and crews during stakeholder interviews and on-site discussions was that OCEMS crews were notoriously slow to turnout for calls. While anecdotal and subjective in expression, data like this validates their observations.

Regarding response times, they, too, appear sub-par. This observation is made not in part to the crews' need to simply drive faster to get to calls; rather, it is made as an observation reflective of the EMS station locations in relation to the call volumes within their respective communities, particularly within Hillsborough and Carrboro/Chapel Hill. MED1 appears too far north within Hillsborough when compared to heat map call volumes. While this station is slated to be moved more toward the southern end of Hillsborough, the same impact may be observed when this occurs as the unit will still likely be too far away from its call volume focus area. This data further supports the need for EMS crews to improve upon their turnout time. While response times are typically fixed, turnout times are based on the crew's ability to be more prepared to respond to calls while they are on duty.

MED2 does appear to have reasonable response times and, as such, is positioned in a prime location. MED3 appears to be too east and south of its call volume centers within both Carrboro and Chapel Hill. MED4 appears too far east from Mebane and too far west from Hillsborough to have more reasonable response times. This current station, however, is anticipated for replacement slightly more west in the near future, which will have a positive impact on responses toward Mebane and throughout Efland but will increase their response time into Hillsborough for second-call coverage. MED5 has reasonable overall response times given its rural location; however, most of its responses are actually within Hillsborough for second-call occurrences, which makes its current station too far northeast for Hillsborough coverage.

MED6 has acceptable response times given its current location but would likely be better suited slightly more northeast to provide better second-call responses into Chapel Hill while still maintaining close proximity to the area around southern Carrboro. MED7 seems to primarily serve as a split coverage unit for second-call situations in both Hillsborough and Chapel Hill. Considering its rural locale and central location between both population centers and heat map locations, it is located in an appropriate area for coverage. MED8 primarily covers a rural portion of the southwest area within the County, however, it does appear to be pulled into the Carrboro/Chapel Hill area for many of its calls. Further recommendations related to station locations and future planning will be made later in this Report.

5.3.3 – Unit Deployment

Current response operations utilized by OCEMS involve sending the most-appropriate, closest unit to each call. As outlined earlier in this Report, this does periodically result in a further unit bypassing a closer unit because the further unit is more appropriate for the acuity level of the call (be it BLS or ALS in nature). As outlined, it is recommended that this practice be altered to send the closest unit to each call whenever the further and more appropriate unit is anticipated to be further than 2-5 minutes away, depending on the acuity type or chief complaint of the patient. While this will create acute instances of two units responding to the same call, it could still be within the discretion of a dispatcher and supervisor to divert one of the units away from the original call to respond to another that has simultaneously occurred.

Once responses are initiated, various gaps in coverage within the County begin to be created, especially in the population and heat map centers. As a result, further units are pulled in on a "move-up" status to provide either coverage at an existing station or at a geographic location splitting the travel distance between two coverage locations. This is a common and acceptable practice within the EMS industry nationwide. What makes OCEMS unique in this regard is the frequency in which this occurs. ***Table 5.12*** outlines the number of move-ups that each unit experiences in a given year. ***Figure 5.28*** shows move-ups per hour of day (gold indicates the peak 8-hour timeframe; light blue plus gold indicates the peak 12-hour timeframe). ***Table 5.13*** shows the number of move-ups that occur within each community. ***Table 5.14*** shows a correlation between annual call volumes and move-ups.

Unit	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	MED	AVG
MED1	80	75	144	122	127	159	244	127	136
MED2	102	65	67	82	85	116	188	85	101
MED3	111	45	52	64	60	80	168	64	83
MED4	198	242	325	363	372	468	615	363	369
MED5	40	73	155	129	139	282	685	139	215
MED6	87	110	81	118	160	233	403	118	170
MED7	156	64	51	170	186	304	330	170	180
MED8	161	129	61	37	12	107	223	107	104
MED9	222	336	407	325	239	82	-----	239	230
TOTAL	1157	1139	1343	1410	1380	1831	2856	1380	1588

Table 5.12 – OCEMS Move-Ups per Unit (7-Year, FY 2015 – FY 2021)

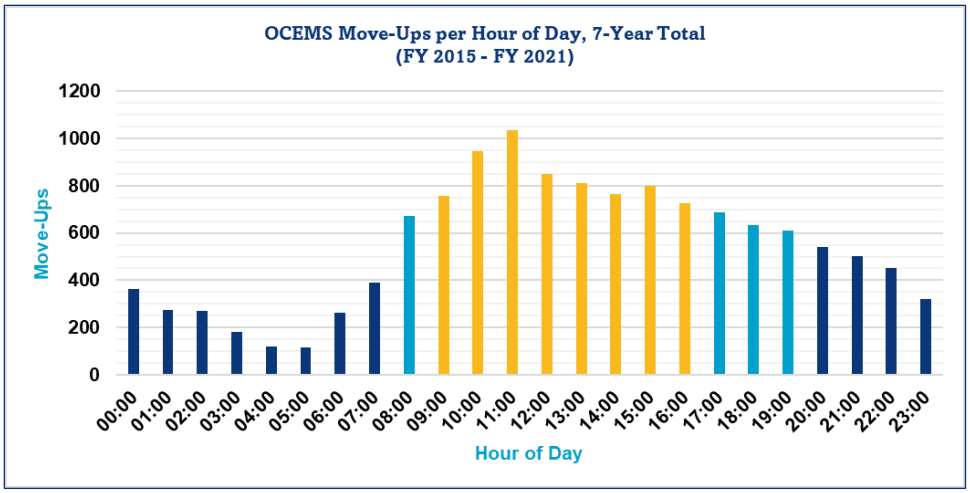


Figure 5.28 – OCEMS Move-Ups per Hour of Day (7-Year, FY 2015 – FY 2021)

Unit	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	MED	AVG
Carrboro	10	56	236	193	147	107	109	109	123
Cedar Grove	0	0	0	1	0	0	11	0	2
Chapel Hill	324	483	518	589	627	795	839	589	596
Durham	1	0	2	14	19	17	188	14	34
Hillsborough	815	586	570	586	570	895	1571	586	799
Mebane	0	1	1	4	1	10	10	1	4
Other/Unknown	7	13	16	23	16	7	128	16	30
TOTAL	1157	1139	1343	1410	1380	1831	2856	1380	1588

Table 5.13 – OCEMS Move-Ups per Community (7-Year, FY 2015 – FY 2021)

Item	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Total Calls	12,287	12,358	12,608	12,810	12,668	11,808	11,899
Move-Ups	1157	1139	1343	1410	1380	1831	2856
Correlation (Move:Call)	1:10.6	1:10.8	1:9.4	1:9.1	1:9.2	1:6.4	1:4.2

Table 5.14 – OCEMS Correlation Between Annual Call Volumes and Move-Ups (7-Year, FY 2015 – FY 2021)

Over time, not only have the instances of move-ups increased by volume, but they have also increased in frequency in terms of the ratio of move-ups per call, with FY 2015 having one move-up for every 10.6 calls, to FY 2021 increasing the frequency of move-ups nearly threefold and adjusting its ratio to one move-up for every 4.2 calls. Deployment actions like this create significant stress on the system by shifting resources away from more rural environments leaving longer response times to such areas should a call arise, decreasing rest for crews who now need to move out of their station more frequently, and by adding wear and tear to apparatus because of their increased road movement including miles and engine hours.

Move-ups especially occur as the County becomes depleted of units, even down to the point of only one or none being available. Situations like this are referred to as “surge”, where 1-2 units remain in the County for coverage. Surge occurrences, unfortunately, are not formally tracked and, therefore, cannot be fully quantified. At best, it can be presumed that instances of “surge” are most likely to occur during the identified peak move-up timeframes of 09:00-17:00 (8-hour peak timeframe) or 08:00-20:00 (12-hour peak timeframe). Overall, these peak “move-up” time periods correlate to 71% or 51% of the total move-ups that occur for OCEMS, respectively. As such, both daytime call volumes and daytime move-ups comprise the significant majority of the overall workload associated with OCEMS units.

Anecdotally speaking, it is perceived that this is a regular occurrence within a week’s timeframe. During such situations, remaining units are repositioned (moved-up) to centralized locations to cover the population and call volume centers of Hillsborough and Carrboro/Chapel Hill if two units remain. If only one unit remains, it is often moved to the Station 7 location where MED7 is located, as it is in a centralized location between both population centers. Additionally, South Orange Rescue Squad (SORS) is requested for staffing assistance. SORS, however, is not a full-time (career) service as it relies on volunteers, many of which are college students with an average tenure with the agency of only 1-2 years. It often takes upwards of 30-45 minutes before one SORS unit can be deployed into the system during daytime operations. During the overnight, SORS provides regular daily (overnight) on-duty and on-call coverage to help supplement OCEMS calls. Overall calls for OCEMS during the overnight hours, however, only consist of approximately one-third of the total annual call volume; thus, the likelihood of needing SORS to respond – let along provide coverage for system surge – is statistically low. Further details will be provided about SORS involvement within the EMS system in **SECTION 6**.

5.4 – Disposition and Transport Data Review

Once calls are dispatched, OCEMS units respond (or are cancelled) and make the determination to either transport patients to the hospital or to release them on scene. ***Table 5.15*** outlines call volume dispositions and transport percentages, while ***Figure 5.29*** shows the transport percentages to the primary receiving hospital for OCEMS. ***Figure 5.30*** shows the transport mode percentages (i.e., emergent, lights and siren) for patients transported to hospitals. ***Table 5.16*** shows the patient turnover and call turnaround times for the primary local receiving hospitals.

Text	CY 2018	CY 2019	CY 2020	CY 2021
Cancelled	1204	1301	1228	1399
Other – No Patient	97	402	764	571
Treatment, No Transport	2387	2448	2116	2735
Treatment with Transport	8773	9354	8408	9934
Gross Transport % (Based on All Calls)	***70%***	***69%***	***67%***	***68%***
Net Transport % (Patient Contact, Only)	***79%***	***79%***	***80%***	***78%***
TOTAL	**12,461**	**13,505**	**12,513**	**14,639**

Table 5.15 – OCEMS Call Dispositions and Transport Percentages (4-Year, CY 2018 – CY 2021)

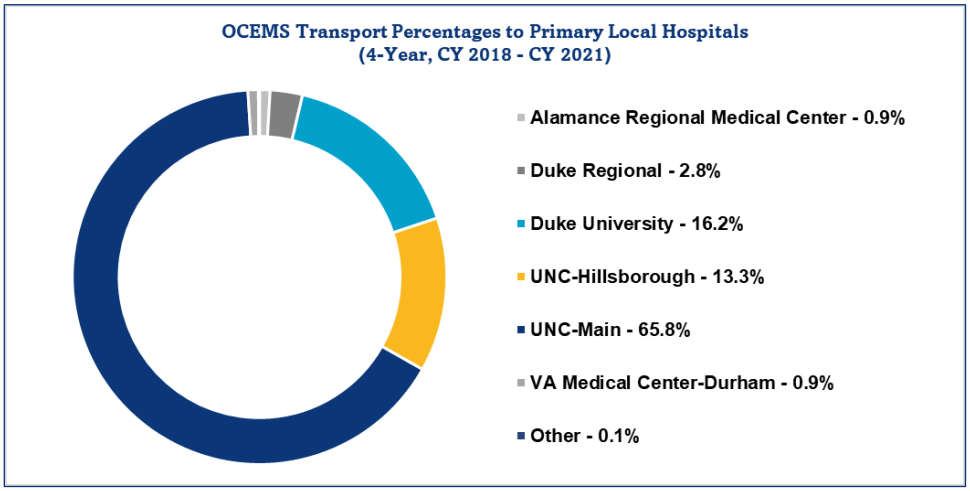


Figure 5.29 – OCEMS Transport Percentages to Primary Local Hospitals (4-Year, CY 2018 – CY 2021)

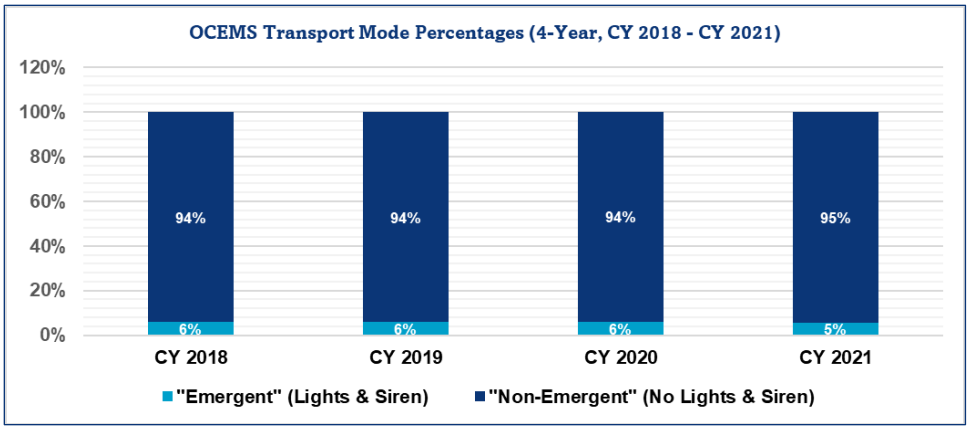


Figure 5.30 – OCEMS Transport Mode Percentages (4-Year, CY 2018 – CY 2021)

Hospital	CY 2018		CY 2019		CY 2020		CY 2021	
	Turnover (mm:ss)	*TAround (mm:ss)*	Turnover (mm:ss)	*TAround (mm:ss)*	Turnover (mm:ss)	*TAround (mm:ss)*	Turnover (mm:ss)	*TAround (mm:ss)*
Alamance RMC	**08:43**	*12:16*	**11:09**	*16:09*	**13:07**	*15:40*	**12:22**	*16:35*
Duke Regional	**12:59**	*12:54*	**14:26**	*10:42*	**16:38**	*18:53*	**16:07**	*22:24*
Duke University	**17:26**	*16:03*	**18:36**	*20:13*	**20:31**	*24:39*	**18:46**	*25:46*
UNC-Hillsborough	**20:07**	*12:23*	**09:28**	*17:08*	**10:12**	*18:29*	**09:39**	*20:20*
UNC-Main	**10:56**	*16:48*	**12:21**	*22:06*	**13:31**	*25:25*	**15:30**	*26:24*
VA Med. Ctr.-Dur.	**09:24**	*12:37*	**08:40**	*15:54*	**08:42**	*17:36*	**10:22**	*19:03*

Table 5.16 – OCEMS Patient Turnover and Call Turnaround Times per Hospital (4-Year, CY 2018 – CY 2021)

Respective disposition through transfer and turnover data shows that OCEMS has a relatively high patient transport rate (a positive attribute); nearly 80% of patients assessed on-scene seek ambulance transport to a local hospital. Of the hospitals within the region, UNC-Main hospital receives greater than half of all transport volumes by OCEMS. For such transports, OCEMS operates at or around the expected 5% emergent transport rate for its patients, as recommended by the NHTSA, Office of EMS. Once at the hospital, turnover times (time from ambulance arrival-to-transfer of care) is very commonly at or below a 20-minute marker. While there are not any established national standards to outline this metric, it is anecdotally reasonable to accept these numbers when comparing them to the "wall time" issues that other EMS agencies in metropolitan areas are growing to expect (which are sometimes experienced in hours, not just minutes). Subjectively, waiting at an emergency department much longer than the 20-minute window to turn over patient care should remain a focal point that EMS administrators are aware of and actively communicating with hospital administrators about.

Most of the time spent in the total turnover process seems to actually be spent by the crews after appropriate patient care has been transferred to emergency department (ED) staff. In CY 2021, all crew turnaround times were documented as greater than the time it took to arrive at the hospital and turn over patient care to the ED staff. In most instances, this process should not take much more than 10 minutes, accounting for quick unit and equipment decontamination, gathering of linens, gathering appropriate patient and hospital signatures, a short restroom break, and preparing the unit for the next potential call. There are situations, however, where this process can take extended periods of time – upwards of 30 minutes or even an hour – to account for a more thorough decontamination and debriefing process. These instances, however, are much lower in frequency than the average EMS call.

Options to potentially reduce turnaround times include the following:

- Ensure crews are appropriately documenting and transmitting patient care transfer (thus, appropriately documenting turnover)
- Have dispatchers perform 10-minute time checks after units arrive at the hospital (even after patient care has been transferred)
- Have supervisors perform occasional spot checks at the emergency departments when multiple crews are located at the same hospital
- Encourage crews to announce or document their available status as soon as feasible so that the system can begin to appropriately expand

Uniquely noted in the data presented in ***Table 5.15*** are instances where EMS crews might have improperly coded a disposition, such as referencing the "Treatment, Release AMA" option within the ePCR platform. This is likely an improper selection in many situations – or not the most accurate option – given its documented frequency when selecting choices for patients who do not wish to receive ambulance transport to a hospital. By selecting the "AMA" (against medical advice) option, it can be perceived that there is a high likelihood of risk associated with allowing these patients to remain on their own, without immediate health care transportation in place. Further quality assurance and documentation verification efforts should be pursued to identify potential crew patterns in documenting this instance and to verify that appropriate procedures are adhered to when this selection is made.

5.5 – Consultant's Findings and Recommendations

5.5.1 – Consultant's Findings

- Call jumping and unit bypassing appear to be common occurrences for both BLS and ALS units and calls.
- It is projected that FY 2030 call volumes will reach approximately 13,626 calls (excluding move-ups, specialty assignments, or other dispatch notifications).
- The largest concentration of calls is centered around the border of the Towns of Carrboro and Chapel Hill, with extensions covering to the rest of the Town of Chapel Hill, then north along the Interstate-40 corridor to Hillsborough, following westward toward Mebane and eastward toward Durham along the Interstate-85 corridor.
- There is an approximately 60% ALS to 40% BLS call volume comparison.
- 9-1-1 calls may comprise greater than 90% of OCEMS call volumes, presuming that crews are incorrectly documenting calls as IFT rather than 9-1-1.
- OCEMS currently staffs only one full-time ambulance equivalent more than it did 10 years ago, despite a population increase of approximately 20,000 residents and a steadily rising call volume.
- There are significant coverage gaps within the County where a 10-minute response time is not feasible, presuming that all ambulances are located within their respective stations.
- The peak 12-hour timeframe with the highest hourly call volume is between 09:00-21:00, during which nearly 65% of the daily call volume occurs.
- OCEMS does not have a defined or strictly adhered to minimum unit staffing, unit downgrade, or unit brownout policy. Instances of system "surge" are not tracked and, therefore, cannot be quantified.
- Unit move-up frequency has increased in occurrence over the recent years, having one move-up for every 4.2 calls in FY 2021 compared to one move-up for every 10.6 calls in FY 2015. Approximately 71% of unit move-ups occur during the hours of 09:00-17:00.
- Ambulance units have an overall low-to average UHU based on call volumes alone.

5.5.2 – Consultant's Recommendations

- When response time differences are anticipated to exceed a 2–5-minute difference, both the closest unit based on proximity and the most-appropriate unit based on level of care should be dispatched to incidents where units would otherwise be bypassing one another to respond.
- It may be feasible to incorporate or allow a unit care level that consists of one BLS unit for every three ALS units.
- Verify the accuracy of 9-1-1 (scene response) and IFT call documentation to more accurately adjust response operations and unit deployment, and to assure that proper documentation practices are being utilized.
- Either decrease move-up practices or increase units in high heat map areas to lessen the move-up workload and stress on crews.
- Verify that "AMA" documentation is appropriate and provide any indicated quality assurance and/or crew follow-up and education, if needed.

SECTION 6 – OCEMS FACILITIES AND FLEET OVERVIEW

6.1 – Stations and Facilities

Outlined in this section are station profiles highlighting each EMS station currently staffed or utilized by OCEMS. In total, there is one headquarters location shared with other Emergency Services divisions, eight stations with ambulances including one with a supervisor, and an additional station with only an EMS supervisor (no station profile provided). ***Figure 6.1*** displays a map of the current EMS stations and indicates if they are EMS-only (standalone) or co-located stations that are shared in some capacity with local fire departments. ***Figures 6.2 through 6.10*** display each station profile.

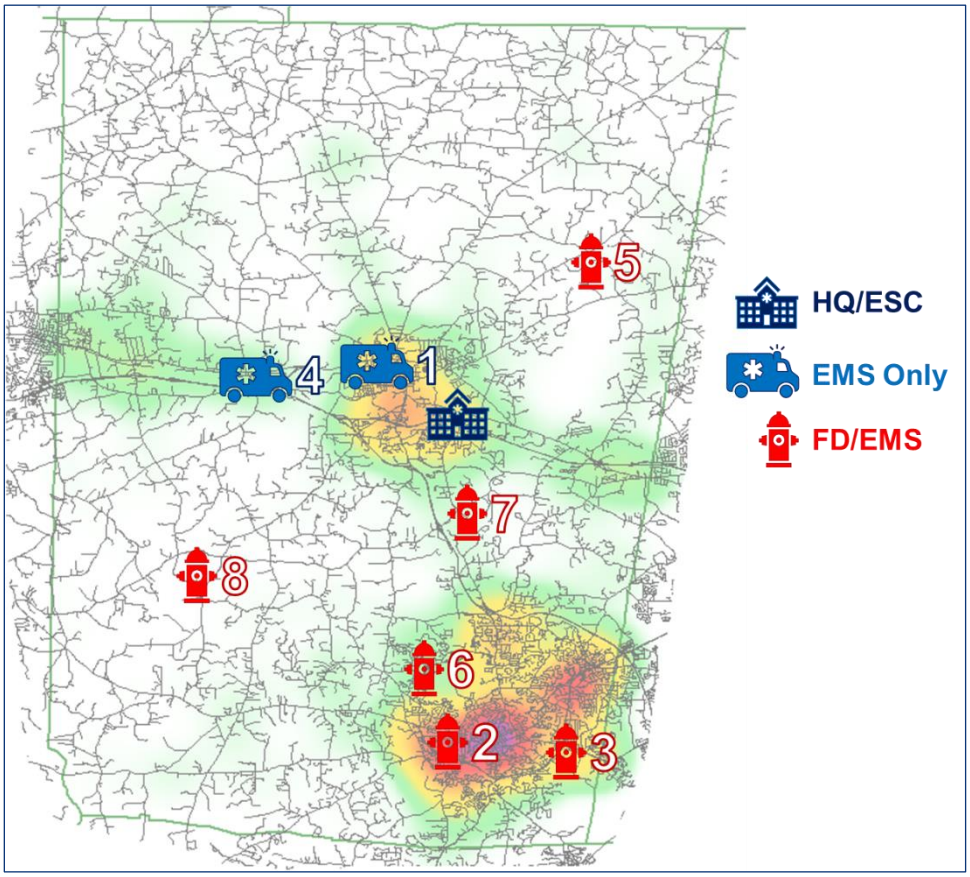


Figure 6.1 – Current OCEMS Station Locations

Station Profile:	**Orange County Emergency Services Center (ESC) and EMS Headquarters**

Location	
Street Address:	510 Meadowlands Dr.
Community:	Hillsborough
Co-Location Entity:	Shared with OCES
Staffing Profile	
Coverage:	N/A
Units:	N/A
Total Personnel:	Admin staff (Only)
(Additional)	Dispatch staffing 24/7
Ownership and Costs	
Ownership Status:	Owned (County)
Lease cost:	N/A
FD Ownership:	N/A
FD Station:	N/A
(Additional)	
Construction	
Year Constructed:	~2000
Year Occupied:	~2000
Construction Type:	Non-Combustible
Square Footage :	22,736 (total)
(Additional)	

Space Needs	
Apparatus Bay:	N/A
Dayroom:	N/A
Sleeping/Dorm:	N/A
Restroom/Shower:	Adequate
Office/Work:	Needs Improvement
Kitchen:	N/A
Laundry:	N/A
Staff Lockers/Storage:	N/A
Training/Meeting:	Inadequate
Equipment/Supply:	Inadequate
Decontamination:	N/A
(Additional)	Warehouse space
(Additional)	
Access and Visibility	
Apron/Driveway:	Adequate
Major Roadway:	Adequate
Staff Parking:	Adequate
Community Parking:	Adequate
Station Markings:	Adequate
Curb Appeal:	Adequate
(Additional)	
(Additional)	
Safety and Security	
Generator Power:	Adequate
Camera Monitoring:	Adequate
Gated Access:	None
Door Security:	Badge access
Window Security:	None
(Additional)	

Additional Notes

- Outside unit parking – direct sun exposure to equipment in trailers and heat in storage units
- Outgrown administrative office space with no available meeting or training space
- Recent mold/mildew issues being mitigated – have significantly impacted warehouse abilities
- Potential for on-site expansion or additional construction of new and dedicated EMS or warehouse space

Additional Images




Consultant's Summary

OCEMS has outgrown the size and capabilities of this facility. It is better suited to use as the ESC while a new facility is sought for its own headquarters, or significant expansion is performed to update the facility to meet the expanded needs of EMS.

Figure 6.2 – Orange County Emergency Services Center and EMS Headquarters, Station Profile

Station Profile: **OCEMS Station 1**

Location	
Street Address:	304 Revere Rd.
Community:	Hillsborough
Co-Location Entity:	None

Staffing Profile	
Coverage:	24 hours
Units:	MED1 (ALS)
Total Personnel:	2
(Additional)	

Ownership and Costs	
Ownership Status:	Owned (County)
Lease cost:	N/A
FD Ownership:	N/A
FD Station:	N/A
(Additional)	

Construction	
Year Constructed:	1960
Year Occupied:	2010
Construction Type:	Lightweight
Square Footage:	1,310 (EMS)
(Additional)	

Space Needs	
Apparatus Bay:	Inadequate
Dayroom:	Adequate
Sleeping/Dorm:	Needs Improvement
Restroom/Shower:	Needs Improvement
Office/Work:	Needs Improvement
Kitchen:	Needs Improvement
Laundry:	Adequate
Staff Lockers/Storage:	Needs Improvement
Training/Meeting:	None
Equipment/Supply:	Adequate
Decontamination:	Inadequate
(Additional)	
(Additional)	

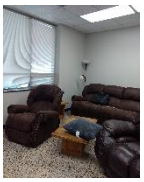
Access and Visibility	
Apron/Driveway:	Adequate
Major Roadway:	Adequate
Staff Parking:	Adequate
Community Parking:	Adequate
Station Markings:	Needs Improvement
Curb Appeal:	Inadequate
(Additional)	
(Additional)	

Safety and Security	
Generator Power:	None noted
Camera Monitoring:	None
Gated Access:	None
Door Security:	Keypad doors
Window Security:	None
(Additional)	

Additional Notes

- Shared dorm space with partial dividers
- No apparatus bay, decontamination space, or vehicle security available; canopy covering, only

Additional Images



Consultant's Summary

This station has an abandoned visual appeal as it is adjacent to a seemingly abandoned strip mall and offers subjectively insufficient amenities for 24-hour shift operations, as it appears cramped, outdated, and simply lacking overall. Its operations, instead, are more in line with the needs of 12-hour crew operations. It is recommended to cease operations from this station once the new planned FD/EMS co-location station is constructed toward the southern end of Hillsborough. If unit staffing is indicated covering the northern portion of Hillsborough, it is recommended to find or construct a new station with better amenities and overall security. This station does not gleam with a positive "welcome to Orange County EMS" appeal.

Figure 6.3 – OCEMS EMS Station 1, Station Profile

Station Profile:	**OCEMS Station 2**

Location	
Street Address:	301 W. Main St.
Community:	Carrboro
Co-Location Entity:	Carrboro FD
Staffing Profile	
Coverage:	24-hour
Units:	MED2 (ALS)
Total Personnel:	2
(Additional)	
Ownership and Costs	
Ownership Status:	Leased
Lease cost:	$6,000 (Annually)
FD Ownership:	Carrboro FD
FD Station:	Station 1
(Additional)	
Construction	
Year Constructed:	1951
Year Occupied:	Unknown
Construction Type:	Non-combustible
Square Footage:	7,900 (total)
(Additional)	

Space Needs	
Apparatus Bay:	Adequate
Dayroom:	Adequate
Sleeping/Dorm:	Needs Improvement
Restroom/Shower:	Adequate
Office/Work:	Needs Improvement
Kitchen:	Adequate
Laundry:	Adequate
Staff Lockers/Storage:	Inadequate
Training/Meeting:	Adequate
Equipment/Supply:	Needs improvement
Decontamination:	Adequate
(Additional)	
(Additional)	
Access and Visibility	
Apron/Driveway:	Adequate
Major Roadway:	Adequate
Staff Parking:	Adequate
Community Parking:	Adequate
Station Markings:	Needs Improvement
Curb Appeal:	Adequate
(Additional)	
(Additional)	
Safety and Security	
Generator Power:	Adequate
Camera Monitoring:	None
Gated Access:	None
Door Security:	Keypad doors
Window Security:	None
(Additional)	

Additional Notes

- Primarily shared living and amenity space with full-time FD crews
- Single-dedicated EMS room purposed as a dorm room with bunk style beds (and no dividers), also functioning as an office and storage space

Additional Images

Consultant's Summary

EMS crews appears to be tucked into a corner inside this fire station, but with adequate (shared) living amenities, otherwise. From the exterior, this station is branded solely as a fire station with no indication of EMS presence. It appears adequate for 12-hour shift operations but needing improvement for 24-hour shift operations.

Figure 6.4 – OCEMS Station 2, Station Profile

Station Profile:	**OCEMS Station 3**

Location	
Street Address:	1003 Hamilton Rd.
Community:	Chapel Hill
Co-Location Entity:	Chapel Hill FD
Staffing Profile	
Coverage:	24-hour
Units:	MED3 (ALS)
Total Personnel:	2
(Additional)	
Ownership and Costs	
Ownership Status:	Chapel Hill FD
Lease cost:	26% cost sharing
FD Ownership:	Chapel Hill FD
FD Station:	Station 2
(Additional)	
Construction	
Year Constructed:	2018
Year Occupied:	2018
Construction Type:	Non-combustible
Square Footage:	11,246 (total)
(Additional)	

Space Needs	
Apparatus Bay:	Adequate
Dayroom:	Adequate
Sleeping/Dorm:	Adequate
Restroom/Shower:	Adequate
Office/Work:	Adequate
Kitchen:	Adequate
Laundry:	Adequate
Staff Lockers/Storage:	Adequate
Training/Meeting:	Adequate
Equipment/Supply:	Adequate
Decontamination:	Adequate
(Additional)	
(Additional)	
Access and Visibility	
Apron/Driveway:	Adequate
Major Roadway:	Adequate
Staff Parking:	Adequate
Community Parking:	Adequate
Station Markings:	Needs Improvement
Curb Appeal:	Adequate
(Additional)	
(Additional)	
Safety and Security	
Generator Power:	Adequate
Camera Monitoring:	None
Gated Access:	None
Door Security:	Keypad door
Window Security:	None
(Additional)	

Additional Notes

- Primarily shared space with full-time FD crews – living space, office workspace, amenities
- Individual sleeping space for each crew member

Additional Images

Consultant's Summary

While a shared space location, the complete aesthetic vibe of this station is that of a fire station. From the exterior, this station is branded solely as a fire station with no indication of EMS presence. This station does offer completely adequate sleeping space, as each EMS crew member had their own private room. The overall appeal of this station is that it is a prime and busy downtown fire station.

Figure 6.5 – OCEMS Station 3, Station Profile

Station Profile: **OCEMS Station 4**

Location	
Street Address:	209 Mount Wiling Rd.
Community:	Efland
Co-Location Entity:	None

Staffing Profile	
Coverage:	24-hour
Units:	MED4 (ALS)
Total Personnel:	2
(Additional)	

Ownership and Costs	
Ownership Status:	Leased, Eno FD
Lease cost:	(Undisclosed)
FD Ownership:	N/A
FD Station:	N/A
(Additional)	

Construction	
Year Constructed:	~1992
Year Occupied:	1992
Construction Type:	Lightweight
Square Footage:	1,260 (EMS)
(Additional)	

Space Needs	
Apparatus Bay:	Inadequate
Dayroom:	Inadequate
Sleeping/Dorm:	Inadequate
Restroom/Shower:	Inadequate
Office/Work:	Inadequate
Kitchen:	Inadequate
Laundry:	Inadequate
Staff Lockers/Storage:	Inadequate
Training/Meeting:	None
Equipment/Supply:	Inadequate
Decontamination:	Inadequate
(Additional)	
(Additional)	

Access and Visibility	
Apron/Driveway:	Needs improvement
Major Roadway:	Adequate
Staff Parking:	Adequate
Community Parking:	Adequate
Station Markings:	Adequate
Curb Appeal:	Inadequate
(Additional)	
(Additional)	

Safety and Security	
Generator Power:	None
Camera Monitoring:	None
Gated Access:	None
Door Security:	Keypad door
Window Security:	None
(Additional)	

Additional Notes

- Ambulance parked outside due to insufficient bay space, uncovered, unprotected
- Window air conditioner unit supplying climate control
- Primarily completely open living and sleeping space

Additional Images

Consultant's Summary

This station appears grossly neglected. Its living and sleeping space are not adequate for 24-hour shift operations and its overall building construction and integrity appears weak, at best. Rusted exterior doors and worn corrugated sheet metal paneling surround this facility giving it a neglectful appearance and an unsecure feel, overall. Surrounding rodent traps and the warning of snakes around the perimeter hardly make this station feel welcoming or accommodating – especially while sleeping overnight inside of it.

Figure 6.6 – OCEMS Station 4, Station Profile

Station Profile: **OCEMS Station 5**

Location	
Street Address:	5501 St. Mary's Rd.
Community:	Hillsborough
Co-Location Entity:	Eno FD

Staffing Profile	
Coverage:	24-hour
Units:	MED5 (ALS)
Total Personnel:	2
(Additional)	

Ownership and Costs	
Ownership Status:	Leased
Lease cost:	$6,000 (Annually)
FD Ownership:	Eno FD
FD Station:	Station 2
(Additional)	

Construction	
Year Constructed:	2007
Year Occupied:	2019
Construction Type:	Non-combustible
Square Footage:	7,000 (total)
(Additional)	

Space Needs	
Apparatus Bay:	Adequate
Dayroom:	Adequate
Sleeping/Dorm:	(Not observed)
Restroom/Shower:	Adequate
Office/Work:	Adequate
Kitchen:	Adequate
Laundry:	(Not observed)
Staff Lockers/Storage:	(Not observed)
Training/Meeting:	Adequate
Equipment/Supply:	Adequate
Decontamination:	Adequate
(Additional)	
(Additional)	

Access and Visibility	
Apron/Driveway:	Adequate
Major Roadway:	Adequate
Staff Parking:	Adequate
Community Parking:	Adequate
Station Markings:	Needs Improvement
Curb Appeal:	Adequate
(Additional)	
(Additional)	

Safety and Security	
Generator Power:	Unknown
Camera Monitoring:	None
Gated Access:	None
Door Security:	Keypad door
Window Security:	None
(Additional)	

Additional Notes

- Updated appearance with ample apparatus bay space
- Shared space with volunteer fire department members, affording minimal daytime interruptions or competition for space

Additional Images

Consultant's Summary

Primarily utilized as a volunteer fire station, OCEMS is the primary (regular) occupant of the living space of this facility. Although interior access was not gained, views from exterior windows looking inward give the impression that the facility is adequate in terms of living and sleeping space, and it is sufficient for 24-hour shift operations. From the exterior, however, this station is branded solely as a fire station with no indication of EMS presence.

Figure 6.7 – OCEMS Station 5, Station Profile

Station Profile:	**OCEMS Station 6**

Location	
Street Address:	1411 Homestead Rd.
Community:	Carrboro
Co-Location Entity:	Carrboro FD
Staffing Profile	
Coverage:	24-hour
Units:	MED6 (ALS), EMS11
Total Personnel:	3
(Additional)	
Ownership and Costs	
Ownership Status:	Leased
Lease cost:	$9,000 (Annually)
FD Ownership:	Carrboro FD
FD Station:	Station 2
(Additional)	
Construction	
Year Constructed:	2010
Year Occupied:	2014
Construction Type:	Non-combustible
Square Footage:	6,700 (total)
(Additional)	

Space Needs	
Apparatus Bay:	Adequate
Dayroom:	Adequate
Sleeping/Dorm:	Needs Improvement
Restroom/Shower:	Adequate
Office/Work:	Adequate
Kitchen:	Adequate
Laundry:	Adequate
Staff Lockers/Storage:	Adequate
Training/Meeting:	Adequate
Equipment/Supply:	Adequate
Decontamination:	Adequate
(Additional)	
(Additional)	
Access and Visibility	
Apron/Driveway:	Adequate
Major Roadway:	Adequate
Staff Parking:	Adequate
Community Parking:	Adequate
Station Markings:	Needs Improvement
Curb Appeal:	Adequate
(Additional)	
(Additional)	
Safety and Security	
Generator Power:	Adequate
Camera Monitoring:	None
Gated Access:	None
Door Security:	Keypad doors
Window Security:	None
(Additional)	

Additional Notes

- Primarily shared living and amenity space with full-time FD crews
- Separate EMS Supervisor and (shared) crew sleeping space; dividers needed in crew room
- Separate EMS Supervisor office

Additional Images

Consultant's Summary

Visually, this station appears updated and matching its local surroundings within the community. From the exterior, this station is branded solely as a fire station with no indication of EMS presence, even though there are an equal amount of OCEMS employees as there are FD crew members residing at this station. The only area needing general improvement to this station is the need for better room division and privacy in the EMS crew sleeping room.

Figure 6.8 – OCEMS Station 6, Station Profile

Station Profile:	**OCEMS Station 7**

Location	
Street Address:	4700 NC Hwy 86
Community:	Chapel Hill
Co-Location Entity:	New Hope FD
Staffing Profile	
Coverage:	12-hour
Units:	MED7 (ALS)
Total Personnel:	2
(Additional)	
Ownership and Costs	
Ownership Status:	Leased
Lease cost:	$6,000 (Annually)
FD Ownership:	New Hope FD
FD Station:	Station 2
(Additional)	
Construction	
Year Constructed:	1975
Year Occupied:	2019
Construction Type:	Non-combustible
Square Footage:	4,900 (total)
(Additional)	

Space Needs	
Apparatus Bay:	Adequate
Dayroom:	Adequate
Sleeping/Dorm:	N/A
Restroom/Shower:	Adequate
Office/Work:	Adequate
Kitchen:	Adequate
Laundry:	None
Staff Lockers/Storage:	Inadequate
Training/Meeting:	Adequate
Equipment/Supply:	Adequate
Decontamination:	Adequate
(Additional)	
(Additional)	
Access and Visibility	
Apron/Driveway:	Adequate
Major Roadway:	Adequate
Staff Parking:	Adequate
Community Parking:	Adequate
Station Markings:	Needs Improvement
Curb Appeal:	Adequate
(Additional)	
(Additional)	
Safety and Security	
Generator Power:	Unknown
Camera Monitoring:	None
Gated Access:	None
Door Security:	Keypad door
Window Security:	None
(Additional)	

Additional Notes

- Shared space with un-staffed fire station; basic overall amenities

Additional Images

Consultant's Summary

This station serves as one of the 12-hour shift stations for OCEMS and is co-located with the volunteer resources of New Hope FD. The facility is (overall) adequate for 12-hour shift operations but is not adequate for 24-hour shift (with sleeping) operations. Additional shared space includes meeting/classroom areas for crew privacy, if needed. From the exterior, this station is branded solely as a fire station with no indication of EMS presence.

Figure 6.9 – OCEMS Station 7, Station Profile

Station Profile:	**OCEMS Station 8**

Location	
Street Address:	6800 Orange Grove Rd.
Community:	Hillsborough
Co-Location Entity:	Orange Grove FD
Staffing Profile	
Coverage:	12-hour
Units:	MED8 (ALS)
Total Personnel:	2
(Additional)	
Ownership and Costs	
Ownership Status:	Leased
Lease cost:	$6,000 (Annually)
FD Ownership:	Orange Grove FD
FD Station:	Station 1
(Additional)	
Construction	
Year Constructed:	1973
Year Occupied:	Unknown
Construction Type:	Non-combustible
Square Footage:	3,500 (total)
(Additional)	

Space Needs	
Apparatus Bay:	Adequate
Dayroom:	Adequate
Sleeping/Dorm:	N/A
Restroom/Shower:	Adequate
Office/Work:	Adequate
Kitchen:	Adequate
Laundry:	Adequate
Staff Lockers/Storage:	Adequate
Training/Meeting:	Adequate
Equipment/Supply:	Adequate
Decontamination:	Adequate
(Additional)	
(Additional)	
Access and Visibility	
Apron/Driveway:	Adequate
Major Roadway:	Adequate
Staff Parking:	Adequate
Community Parking:	Adequate
Station Markings:	Needs Improvement
Curb Appeal:	Adequate
(Additional)	
(Additional)	
Safety and Security	
Generator Power:	Unknown
Camera Monitoring:	None
Gated Access:	None
Door Security:	Keypad doors
Window Security:	None
(Additional)	

Additional Notes

- Shared space staffed FD crews; many shared amenities
- Dedicated EMS living/lounge space
- Off-duty ambulance found unlocked and with keys accessible in the EMS living area

Additional Images

Consultant's Summary

This part-time coverage (12-hour) EMS station appears to be adequate for its 12-hour shift operations and as a shared-space and co-location facility overall. From the exterior, however, this station is branded solely as a fire station with no indication of EMS presence.

Figure 6.10 – OCEMS Station 8, Station Profile

6.2 – Units and Fleet

Vehicles associated with EMS agencies in North Carolina are required to be inspected by the State's Office of EMS (NCOEMS) and entered in to their logistical and regulatory program (Continuum) prior to operation. This requirement only applies to vehicles that will be operated at the Advanced EMT (AEMT) level or higher. Vehicles operated at the EMT or medical responder level (only) are subject to requirements set forth by each individual county EMS system.

6.2.1- Ambulances

Ambulances are commonly sorted into three models: Type-I, Type-II, and Type-III. Some manufacturers also include a medium duty designation for ambulances that feature a commercial chassis. Type-I ambulances are ambulances mounted on a truck chassis. This type of ambulance is a heavier duty unit than the Type-III style and frequently features a 4x4 option. Type-II ambulances are a van-style ambulance, which are commonly viewed as an interfacility transport or BLS unit in the U.S. but are widely used as the sole model for all EMS operations (including 9-1-1 ALS transports) throughout the rest of the world. Type-II ambulances are very versatile and commonly have a more economical purchase price and maintenance costs. Type-III ambulances are units based on a van-style cutaway, compared to the Type-I truck front. OCEMS utilizes mostly Type-I ambulances with some medium duty ambulances still listed in reserve.

As part of this Study, a compliance check of the ambulance fleet was completed, revealing the following:

- The following units were not listed in the NCOEMS system as being updated/registered: 3063, 3052, and 3051
- The following units were listed as "Out of Service" in NCOEMS records, but listed as "Active" per OCEMS records: 2030, 888, and 842
- The following units had expired permits: 2024 and 842
- The following units have permits expiring in 2022: 3042 and 2030
- An additional four units have permits that expire Q1 of 2023

Table 6.1 outlines a listing of OCEMS's Type-I ambulances in use. ***Figures 6.11 through 6.13*** show examples of the Type-I and Type-I Medium Duty ambulances currently in use (respectively).

ID	Model Year	Date Acquired	Make/Model	Mileage	Status
3063	2020	06/01/2021	Ford F550 4x4 Ambulance	20,136	Active
3052	2021	09/07/2020	Ford F550 4x4 Ambulance	23,853	Active
3051	2021	09/07/2020	Ford F550 4x4 Ambulance	20,515	Active
3042	2020	09/07/2020	Ford F550 4x4 Ambulance	54,394	Active
2068	2019	04/06/2019	Ford F550 4x4 Ambulance	62,001	Active
2067	2019	07/23/2019	Ford F550 Ambulance	80,732	Active
2030	2018	10/13/2018	Ford F550 4x4 Ambulance	88,291	Active
2051	2018	02/04/2019	Ford F450 4x2 Ambulance	78,506	Active
2029	2018	01/02/2018	Ford F550 4x4 Ambulance	75,647	Active
2024	2016	01/04/2017	Ford F550 4x4 Ambulance	135,657	Active
991	2016	01/04/2017	Ford F550 4x4 Ambulance	131,579	Active
957	2016	11/26/2015	Ford F550 4x4 Ambulance	178,275	Active
888	2013	09/27/2013	Freightliner Ambulance	156,042	Active
845	2012	03/02/2012	Freightliner Ambulance	192,379	Active
842	2012	01/10/2012	Freightliner Ambulance	208,523	Active

Table 6.1 – OCEMS Ambulance Listing

Figure 6.11 – OCEMS Type-I Ambulance (Front/Side View, New Design)

Figure 6.12 – OCEMS Type-I Ambulance (Side/Rear View, New Design)

Figure 6.13 – OCEMS Type-I "Medium Duty" Ambulance (Front/Side View, Old Design)

General ambulance lifespan recommendations indicate replacement after a 5-7-year period, depending upon the vehicle's miles, engine hours, and overall condition. Options do exist to remount the patient compartment of an older ambulance onto the chassis of a new ambulance, which can create some cost savings for some agencies, but is not guaranteed. Today, national and international supply chain issues related to vehicles have extended ambulance manufacturing timelines upwards of 2-year past request. Various patient compartment modifications can be made, however, some states are also beginning to provide specific configuration standards that, for instance, remove the traditional bench seat and replace it with a single rotating, track-moving bucket seat with 3-, 4-, or 5-point safety belts.

Current OCEMS ambulance fleet utilization practices involve an unassigned fleet practice to each ambulance asset. This means that – on any given day – the ambulance with ID# 1234 could be functioning as MED1, MED6, or any other in-service unit. This is seen as a best practice as it allows for complete fleet rotation of available units, rather than always assigning ID# 1234 as MED1 (as an example). Under an assigned format, emphasis would be placed on assuring that crews are typically working in their assigned unit whenever possible, which would likely create a greater need to switch units more frequently as their assigned unit needs preventative maintenance or associated repairs performed. With an unassigned fleet, however, crews do not need to worry about which physical vehicle they are in except for the purposes of ePCR documentation, vehicle inspection performance, and/or the need to report any maintenance or repair

issues. Under this format, if a crew needs to swap into another vehicle, their unit identifier stays the same, they just operate in a new or different vehicle until it needs to be swapped out of, which may be months away, not days away. There is also no need to classify ambulances as "frontline" or "reserve," as all vehicles should remain in a "ready" state and 100% equipped; turn-key ready for immediate staffing or turnaround.

This practice, in theory, also levels out the overall traveled miles and engine hours on the entire fleet long-term. For instance, an assigned MED1 unit may have higher engine hours and less overall miles because of the response and transport durations of its increased call volume, while MED 8 would have increased miles but less engine hours because of a decreased call volume but increased traveling distance. Overall, the unassigned fleet practice is a format recommended to continue by the Agency.

Aligning with the recommended 5-7-year lifespan, OCEMS should outline and establish a vehicle replacement plan with its fleet services team (those who perform the maintenance and repairs on OCEMS vehicles) to assure that there is a readily replenished fleet and appropriate budgeting available on an annual basis. Considering the current years and miles of the existing ambulance fleet, it would be recommended to budget for 2-3 new replacement ambulances each year, beginning as soon as possible. Of note, the OCEMS ambulance fleet currently appears to be high in overall quantity, as it has a near 1:1 ratio of in-service-to-spare units in stock. In many EMS agencies a 2:1 or even 3:1 ratio is more commonly seen. Details surrounding these observations and recommendations are forthcoming in this Section.

With OCEMS's transition to incorporating BLS units into its staffing operations, the Division (County) has purchased two Type-II ambulances (van style) to facilitate a quicker delivery timeline, accommodate to less interior space needs, and to experiment with a less-expensive ambulance model for future fleet integration. Considering the significant price difference of Type-II models compared to Type-I models ($100,000 compared to $300,000-450,000, respectively), it is highly recommended that OCEMS seriously consider a future, gradual full-fleet integration toward Type-II ambulances. This consideration should include evaluating what storage space and movement space is needed inside of their ambulances, given that industry recommendations are to provide as much secured and seat-belted patient care area as possible, all while eliminating interior projectiles and reducing unnecessary equipment overstock. ***Figures 6.14 through 6.19*** show the patient compartment interior space and open available cabinet space of the current Type-I ambulance utilized by OCEMS as an example of how the "need for space" argument is not as practical as it is preferred. ***Figures 6.20 through 6.23*** also show examples of a Type-II ambulance interior that could be highly effective toward sufficing OCEMS's equipment and space needs.

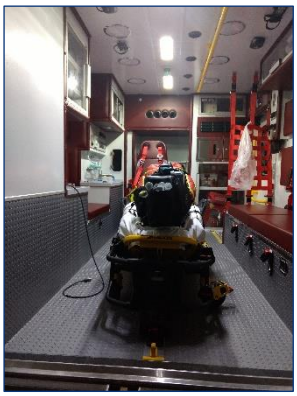


Figure 6.14 – OCEMS Ambulance, Patient Compartment Interior View 1

Figure 6.15 – OCEMS Ambulance, Patient Compartment Interior View 2

Figure 6.16 – OCEMS Ambulance, Patient Compartment Interior View 3

Figure 6.17 – OCEMS Ambulance, Patient Compartment Interior View 4

Figure 6.18 – OCEMS Ambulance, Patient Compartment Interior View 5

Figure 6.19 – OCEMS Ambulance, Patient Compartment Interior View 6

Figure 6.20 – Type-II Ambulance, Exterior View [33]

Figure 6.21 – Type-II Ambulance, Patient Compartment Interior View 1
[34]

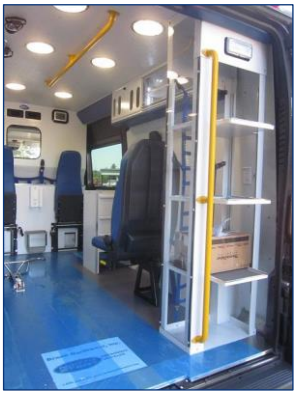


Figure 6.22 – Type-II Ambulance, Patient Compartment Interior View 2
[35]

Figure 6.23 – Type-II Ambulance, Patient Compartment Interior View 3
[36]

6.2.2 – Supervisor and Support Vehicles

OCEMS uses a variety of vehicles to serve as supervisory, administrative, or support resources for a variety of operational purposes. For those vehicles utilized as an emergency response resource, NCOEMS provides some regulations related to vehicle licensing and necessary equipment. Other vehicles that are

not used primarily for response operations do not need to meet such criteria. ***Tables 6.2 and 6.3*** outline the details regarding such vehicles within the OCEMS and OCES fleet (Note: the OCES fleet vehicles are shared amongst all OCES divisions and are not necessarily dedicated to OCEMS administrative staff members, only).

ID	Model Year	Date Acquired	Make/Model	Mileage	Use
2020	2017	06/02/2017	Dodge Durango AWD	114,360	Supervisor
2019	2017	11/03/2017	Dodge Durango AWD	117,441	Supervisor
950	2015	07/01/2015	Dodge Durango AWD	67,134	Ops Manager
938	2015	05/02/2014	Ford Police Interceptor SUV	121,407	Supervisor (Spare)
861	2012	08/19/2012	Ford F150	138,878	Deputy Ops Manager

Table 6.2 – OCEMS Supervisor Vehicle Listing

ID	Model Year	Date Acquired	Make/Model	Mileage	Use
725	2007	07/12/2007	Dodge Charger	70,632	Spare
724	2007	07/12/2007	Dodge Charger	123,950	Spare
723	2007	07/12/2007	Dodge Charger	168,792	Spare
722	2007	07/12/2007	Dodge Charger	92,372	MD Vehicle
720	2007	06/05/2007	Dodge Charger	107,198	Spare

Table 6.3 – OCES Support Vehicle Listing

As part of this Study, a compliance check of the response vehicle (non-transporting, including supervisor vehicles) fleet was completed, revealing the following:

- Permits for 726, 723, 2019, 2024, and 842 are expired
- Units 2030 and 3042 expire in late 2022; an additional four units will expire Q1 of 2023
- If the 700 series vehicles are not intended to be licensed, as suggested by OCEMS records, they should be removed from NCOEMS database to ensure compliance
- NCOEMS has records for units 726 and EMS 1 which were not noted in OCEMS records
- Units 861 and 723 are listed as Out-of-Service in in the NCOEMS database, but are listed as Active per OCEMS

Figures 6.24 and 6.25 show two examples of additional OCEMS vehicles (one supervisor and one support, respectively).

Figure 6.24 – OCEMS Supervisor Vehicle

Figure 6.25 – OCEMS Support Vehicle

Currently, OCEMS does not have enough staff-dedicated vehicles available to maintain fluid operations. This finding is supported by multiple stakeholder interviews which highlight that training, quality, and community paramedic staff members do not readily have vehicles available for their (dedicated) use and must rely on the availability of OCES fleet vehicles – which are shared amongst all OCES divisions. Overall, each of the current administrative staff members should have dedicated vehicles available for their workplace use and appropriate for their functions, with both the EMS Chief (Ops Manager) and Deputy Ops Manager having dedicated response vehicles available for take-home and workplace use. This should also include an available fleet of respective reserve or back-up vehicles for specific functions/needs, such as supervisor response units, tow vehicle, and cargo vehicles for moving equipment.

6.2.3 – Fleet Services

Throughout the duration of this Study, the fleet (Motor-pool) services provided to OCEMS have been categorized as subpar due to a lack of qualified and available staffing and high overall turnover. Preferred maintenance and repair should be performed by a certified Emergency Vehicle Technician (EVT) mechanic with appropriate credentialing to perform mechanical work on ambulances, not just consumer or even commercial vehicles. As a result, private vendor contracting has been considered by the Division, but the practicality surrounding this would result in a traveling mechanic to frequent the EMS units either in their current station or amongst other mechanical staff within the Motor-pool facility. Further mechanical work beyond basic maintenance and repair would necessitate the ambulance being driven or towed to Durham (as an example) to facilitate unit readiness. The unreliability of the County's fleet services has resulted in the need for OCEMS to maintain a larger overall ambulance fleet than it needs because of the extended timeframes experienced to perform regular preventative maintenance or minor repair tasks.

As outlined previously in this Report, OCEMS maintains a nearly 1:1 ratio of in-service-to-spare units as a result of these practices. In addition, the County appears to have a common practice of not replenishing damaged or unrepairable units (as expressed to our firm) once the unit is considered paid-in-full and no longer funded via loan. This practice is another reason that OCEMS has had to maintain a larger ambulance fleet, as unforeseen ambulance damages and repairs could result in a lack of expressed financial support to make the fleet whole again, even when that damaged unit is a new one. At least three ambulances have been maintained past their 5-7-year lifespan as a result of this practice and continual fear that the Agency will not receive new units if any more become damaged.

Of note, one newer ambulance was damaged (***Figures 6.26 through 6.28***) – potentially totaled – during the course of this Study, which poses the question of whether or not a new unit will be ordered as a replacement for it, or if it will just be considered a loss and an older unit will have to remain in operation even longer to take its place.

Figure 6.26 – OCEMS Damaged Ambulance, Image 1

Figure 6.27 – OCEMS Damaged Ambulance, Image 2

Figure 6.28 – OCEMS Damaged Ambulance, Image 3

Under the Agency's current operations, approximately 11-12 ambulances should suffice to maintain adequate operations. With the expansion of its BLS ambulance program forthcoming, and the addition of two new Type-II ambulances, the fleet size should expand to approximately 14-15 units based on typical need. Considering the expressed practices and reliability of the current fleet services, it may be recommended to maintain a new future fleet of at least 15-17 ambulances until a long-term, reliable solution can be achieved. This solution will likely be best served in the form of two fleet services EVT mechanics being dedicated to OCEMS operations (vehicles), or by having OCEMS branch away from the current fleet services and funding its own two EVT mechanics for their sole use. These future mechanics would likely be best located at the existing fleet services facility (***Figure 6.29***), as it is fairly centrally located within the County (however, not ideally central between Hillsborough and Carrboro/Chapel Hill), is located at a County fuel pump station, and is already a mechanic-equipped facility that is capable of providing vehicle lifting and appropriate maintenance operations.

Figure 6.29 – Orange County Fleet Services Facility

6.3 – Consultant's Findings and Recommendations

6.3.1 – Consultant's Findings

- Poor fleet services staffing appears to have resulted in the need for OCEMS to maintain more ambulances than traditionally needed for a system of its size.
- There is an expressed and identified need for more OCEMS-dedicated administrative staff vehicles, as many current vehicles are shared amongst all OCEMS divisions.
- OCEMS has outgrown its current EMS headquarters space at the Emergency Services Center, as it has no training space, meeting space, interior and covered unit storage space, and inadequate office space at the current facility.
- The majority of the current EMS stations (including co-located fire stations) have less-than-ideal sleeping quarters with a shared sleeping room having no dividers between beds.

6.3.2 – Consultant's Recommendations

- Consider building a new EMS headquarters station that is capable of accommodating all future administrative staff and respective equipment, along with full logistics and supply warehousing capabilities and the potential for EMS units to be located at the facility (station) for system deployment.
- Consideration should be placed toward recognizing OCEMS presence at each station as a part of any leasing contracts.
- Consider a full fleet transition to Type-II ambulances in the future, with a gradual transition.
- Consider adding more EMS station security features, such as closed security surveillance monitoring at the Emergency Communications Center.
- EMS-dedicated mechanics need to be funded and staffed either within the fleet services department/division, or directly within OCEMS (preferred).

SECTION 7 – STAFFING AND OPERATIONS OVERVIEW

7.1 – Staffing and Shift Operations

7.1.1 – Staffing Overview

Daily staffing operations within OCEMS primarily incorporate the staffing and deployment of ALS-level units staffed with one EMT (BLS provider) and one Paramedic (ALS provider). As previously outlined in this Report, occasionally units will be downgraded to the BLS level and staffed with two EMTs. These crews and units are statically positioned in stand-alone EMS stations and co-located fire stations throughout the County. When call volumes in a given area increase and deplete available units, further units are often temporarily transferred into that area – or to a location splitting the difference between their primary area and the open coverage area – in a process referred to as "move-up(s)." Respective call volumes and move-up volumes are outlined in more detail previously in this Report.

As outlined previously in this Report, there are occurrences of unit "brownout" (temporarily closing of units, placing them out-of-service) due to staffing shortages, or more specifically, due to no operational mandates for minimum required unit staffing. Practices like this can drastically impact the system as a whole, as this leads to further unit move-ups, continually increased response and coverage areas, and increased crew workload despite an overall average call volume.

Staffing oversight is provided by two Shift Supervisors who operate in a vehicle separate from the ambulance units (a non-transport SUV). Both are geographically positioned within the County with one covering the northern portion (Hillsborough and other townships) and the other covering the southern portion (Carrboro/Chapel Hill and other townships).

Crews operate on one of two operational models working either a 12- or 24-hour shift. 24-hour crews operate on a 4-platoon system where they work 24 hours (06:00-06:00 the following day) and then have three days off. This schedule equates to an average of 42 hours/week. 12-hour crews also work an average of 42 hours/week but in 12-hour increments, having four shifts during one week (totaling 48 hours) and three shifts the next (totaling 36 hours). Of note, these 12-hour units do not provide overnight coverage, they only provide 12-hour daytime coverage. Both formats are common within the EMS industry.

As of July 1, 2022, the total staffing number (Full-Time Equivalent – FTE – allocations) for OCEMS is 86 positions. Of the 86 total positions, six positions maintain administrative or non-operational roles and the remaining 80 positions are maintained by operational personnel – including eight Supervisors. Further details related the complete organizational structure of OCEMS can be found later in this Report. Of the 80 operational positions, there are currently 10 vacancies within the Division. Four of these 10 positions, moreover, are newly budgeted positions as of this date. An additional four positions will also be budgeted as of August 1, 2022. Considering the six full-time equivalent ambulances staffed by OCEMS (six 24-hour and two 12-hour units) and the additional one full-time equivalent unit added with the new staffing (which is two additional 12-hour units), this brings the unit level to eight full-time equivalent units. Dividing the staffing allocations per full-time ambulance, OCEMS allocates nine FTEs for EMT/Paramedic employees, one FTE for Supervisors, and 0.75 FTEs for administrative staff, totaling 10.75 FTEs per full-time ambulance. As a matter of perspective, a minimum of eight employees (four EMTs and four Paramedics) is needed to staff one ambulance full-time, based on the Agency's 24-hour/4-platoon structure. Current 12-hour units only require four FTEs, however, these units are only in-service for 12 hours of the day, so having complementary AM/PM (24-hour) of these units would also necessitate a minimum of eight FTEs. Budgeting for one additional FTE per ambulance is intended to account for overage needs to cover

scheduled and unscheduled time off. Without this additional FTE budgeting, additional overtime budgeting would be necessary, and more unit "brownouts" would be likely, under the Agency's current practices.

Crews are currently located and deployed from eight stations during the daytime hours and six during the overnight hours. These stations are comprised of a combination of stand-alone EMS and co-located fire stations. Further details related to these facilities can be found in **SECTION 6** of this Report. One of the Supervisors is currently deployed from a separate co-located fire station, while the other is deployed from a station that is actively staffed by an ambulance crew. Administrative personnel are located at the Emergency Services Center (ESC), serving as the EMS Headquarters.

During the daytime hours, six of the eight stations are staffed by 24-hour (shift) units, while two of the eight are staffed by 12-hour (shift) units covering only the daytime portion (not overnight). During the overnight period, the six stations with 24-hour units are staffed and additional staffing assistance is provided by one BLS unit from SORS. Further details on this arrangement will follow in this Report.

7.1.2 – Station Bidding and Rotations

Historically, crews have been able to bid for their shift and station locations on an annual basis. Recently, this station rotation has incorporated the practice of providing a "sister station" for each 24-hour crew. This teams a traditionally busier station assignment with a less busy station assignment on a rotating basis. If 24-hour shifts remain in use by OCEMS for the future, it is recommended that this practice remain in effect and on a monthly rotation basis (or another timeframe agreed upon by the employees). A clear policy, including the rules related to station rights and the order in which bids are made should be clearly identified in a Division policy.

7.1.3 – Staffing Demand

In evaluating the current system specific to OCEMS, the prior referenced metric of Unit Hour Utilization (UHU) can be utilized to identify a baseline system need, given the annual call volume of the Agency for the year. This metric, again, does not account for additional workload items such as unit move-ups, on-duty training, or other engagement events. ***Table 7.1*** shows the staffing demand based on seven-year median call volumes.

Call Volume	UHU	Calls/Full-Time Unit	Full-Time Units Needed
12,358	0.25 (Average)	6/Day, 2190/Year	5.6
12,358	0.30 (Average)	7.2/Day, 2628/Year	4.7
12,358	0.35 (Average)	8.4/Day, 3066/Year	4.0
12,358	0.40 (Above Average)	9.6/Day, 3504/Year	3.5
12,358	0.45 (Above Average)	10.8/Day, 3942/Year	3.1

Table 7.1 – OCEMS Unit Demand Based on 7-Year Median Call Volumes (FY 2015 – FY 2021)

Again, UHU accounts solely for call volume demand and does not factor the total time per call, the need for remaining unit coverage while some units are responding to calls, nor does it account for the geographical coverage of the system. Considering the size of the County and the size of the coverage gaps that are created when a unit responds to a call, it would be reasonable to maintain a coverage level that is approximately 33-50% greater than the baseline UHU demand (allocating one additional ambulance for every two or three in existence). ***Table 7.2*** shows this adjustment.

Call Volume	UHU	Baseline Units Needed	Adjusted Increase 33%	Adjusted Increase 50%
12,358	0.25 (Average)	5.6	7.5	8.4
12,358	0.30 (Average)	4.7	6.3	7.0
12,358	0.35 (Average)	4.0	5.3	6
12,358	0.40 (Above Average)	3.5	4.7	5.3
12,358	0.45 (Above Average)	3.1	4.1	4.7

Table 7.2 – OCEMS Adjusted Unit Coverage Based on 7-Year Median Call Volumes (FY 2015 – FY 2021)

Based on these findings and considering the predominant 24-hour shift that is utilized by OCEMS, it is strongly recommended that the Agency and County keep its unit workload and staffing toward the lower end of the average range and account for the 50% adjustment in staffing, at a minimum. This equation and these factors, again, are only considering the mathematical unit demand and the need to backfill these units to account for the otherwise coverage absence. Given the prior data outlined in this Report, there are approximately two calls that occur during each peak hour of the day, with the potential for four active incidents – statistically – to be occurring as calls overlap from one hour to the next. This analysis, again, is purely mathematical and does not account for situations where highs and lows occur to result in this average volume. There certainly are days and times where OCEMS experiences four or more calls within one hour timeframe, thus, depleting its active units by 50%. These instances are statistically low and are more likely to occur during the 09:00-21:00 timeframe, but they do occasionally occur.

Respective to this peak timeframe (12-hour, 09:00-21:00), approximately 65% of the Agency's calls occur during this period. As such, baseline unit coverage should be maintained throughout this time period (as a minimum) with the additional account for backfill coverage – especially considering the County's size and the geographical footprint of each coverage area – emphasized during the daytime hours. Utilizing the UHU and adjusted values generated, ***Table 7.3*** outlines an example of what baseline staffing for daytime (peak) and overnight unit staffing should look like given the Agency's current 12-hour and 24-hour staffing model.

UHU	Baseline Units Needed	Adjusted Units Needed	Daytime	Overnight
0.25 (Average)	6 (5.6)	8-9 (8.4)	8-12	6-8

Table 7.3 – OCEMS Adjusted Unit Coverage Example with Daytime and Overnight Hour Comparison

Because of the higher call volume presence during the daytime (peak) hours (09:00-21:00), a greater unit presence is suggested in order to maintain appropriate countywide coverage as population shifts occur from commuters and workers. Likewise, a return to baseline values is more appropriate during the overnight hours when call volumes are statistically lower. The emphasis on having more units available during the daytime, however, does not necessarily equate to the need for more stations. Rather, many of these additional or peak units should be dually located within existing stations and should be a second unit within such facilities, or they could be floating units that are designed to backfill coverage gaps that are created as static units are deployed to respond to calls that they are closer to. **PHASE 2** of this Report will expand upon this analysis and provide recommendations respective to future OCEMS staffing operations, unit needs, and overall organizational structure.

7.2 – Minimum Unit and BLS Unit Requirements

Currently, OCEMS primarily staffs its ambulances with an ALS-level configuration including one EMT and one Paramedic. During staffing periods where more than the minimum number of Paramedics are off, typically accounting for sick time, units may be downgraded to the BLS level and staffed with two EMTs. The re-allocation of crew members to provide adequate ALS coverage in call volume or population centers does not seem to follow a consistent practice amongst the Supervisors, as there is not a clear or followed policy regarding unit downgrades and brownouts. If this practice of downgrading is to continue, it is strongly recommended that a policy be developed to outline this practice, including which units are approved for downgrading. Additionally, there should never be an instance where two credentialed Paramedics are staffing one unit while two EMTs are staffing another. Instead, one Paramedic and one EMT should be relocated to create two units that are both staffed with one Paramedic and one EMT. If a BLS unit can be upgraded to an ALS unit, it should be, whenever feasible.

*Of consideration, each of the newer ambulances utilized by OCEMS displays the title "Paramedic" on them – which could be misleading to the general public if no Paramedic is onboard while it is responding to their emergency (**Figure 7.1**).*

Figure 7.1 – OCEMS "Paramedic" Ambulance (Side/Rear View)

As a matter of primary recommendation, a firm minimum unit staffing policy should be developed that outlines the need to staff a defined number of ALS units, regardless of the personnel or provider staffing levels of the day. This policy would strictly enforce the need to allow for voluntary overtime staffing first, followed by an inverse-seniority mandatory overtime policy if employees do not voluntarily fill the vacancy. Outlined below is an example process to fill daily minimum staffing needs.

- Voluntary Overtime Staffing (First)
    - First, filled by employees with zero voluntary overtime shifts for the calendar year, based on seniority.
    - Second, filled by employees with one voluntary overtime shift for the calendar year, based on seniority.
    - Third, filled by employees with two … etc. … until the entire available employee roster is exhausted.
- Mandatory Overtime Staffing (If voluntary overtime staffing does not fill the vacancy)
    - First, filled by employees with zero mandatory overtime shifts for the calendar year, based on inverse seniority.
    - Second, filled by employees with one … etc. … until the entire available employee roster is exhausted.
    - If no one can be reached to fill the vacancy via mandatory overtime, then the remaining employee set to be going off-duty (but awaiting replacement) should be mandated to work for a maximum of four hours for 12-hour crews, or 12 hours for 24-hour crews, while continued efforts are taken to fill the remainder of the shift's hours.

Brownout parameters, in addition, should be clearly defined and strictly adhered to. Based on the prior unit demand coverage example provided (in ***Table 7.3***), ***Table 7.4*** outlines an example matrix that could be implemented to highlight this minimum staffing, unit downgrade, and unit brownout policy, based on OCEMS's current practice of staffing both 12-hour and 24-hour (shift) units. This matrix includes the addition of two BLS units that are currently budgeted for this fiscal year.

		FULL STAFFING MATRIX			*MINIMUM STAFFING MATRIX*			
Time Period	**Adjusted Units Needed** (High End)	**24-Hr. ALS Units**	**12-Hr. ALS Units**	**12-Hr. BLS Units**	***24-Hr. ALS Units***	***12-Hr. ALS Units***	***12-Hr. BLS Units***	***Allowed Brownout***
Daytime	12	6	4	2	***6***	***2***	***1***	***3***
Overnight	8	6	2	0	***6***	***1***	***0***	***1***

Table 7.4 – Example OCEMS Minimum Unit Staffing, Unit Downgrade, and Unit Brownout Matrix

As indicated, OCEMS is currently planning for the addition of two BLS (12-hour) units into its current daytime staffing matrix of six staffed 24-hour units and two staffed 12-hour units. Evaluating the current BLS unit deployment practices (when there is a unit downgrade), the current BLS units seem to be dispatched to a smaller selection of Omega, Alpha, and Bravo coded calls, as opposed to all respective coded calls. Call types typically include patient complaints of back pain, falls, minor bleeding, sick calls, traffic and transportation incidents, and minor traumatic incidents. Current practices also include that BLS units do not typically respond to ALS-level calls even if they are the closer unit; instead, a further ALS unit is dispatched. Considering the current practices, it is recommended that BLS units be allowed to respond to all Omega, Alpha, and Bravo coded calls and – regardless of the acuity of the call – the closest unit (ALS or BLS) be dispatched to all calls where the more appropriate unit is anticipated to arrive in greater than two minutes (with the further BLS unit, if indicated, responding without the use of lights and siren) – if the system's status allows; this excludes during periods of "surge" activation. Once the initial unit arrives, the second responding unit may be cancelled, if indicated. The second unit, then, may be better suited to provide primary coverage (move-up) in the newly opened coverage area. When the more appropriate (e.g., BLS for Omega, Alpha, Bravo; ALS for Charlie, Delta, Echo) is anticipated to arrive within 2 minutes, then the more appropriate should be solely dispatched. Considering the call volume locations, BLS units should primarily be deployed from stations around the Hillsborough and Carrboro/Chapel Hill population centers. Future consideration should also be placed on incorporating BLS staffing levels at the AEMT level, which can serve as somewhat of a hybrid between BLS and ALS levels of care.

Overall, a minimum unit staffing number of six ALS units (24/7) should be maintained within the system, with an additional two units during the daytime hours (totaling eight ALS units). These should be firm numbers and mandatory overtime staffing will be utilized if voluntary overtime staffing is not achieved.

7.3 – Defining System Surge

System "surge" does not seem to be clearly defined or measured within OCEMS operations. A review of the Standard Operating Guidelines (SOGs), EMS-0048 dated 12/01/2010, outlines a grossly outdated *Response to EMS Calls* guideline that warrants immediate revision and updating. Anecdotally, "surge" is defined within OCEMS as when only two units are remaining within the system; "panic surge" is defined for when only one unit is remaining within the system. When this occurs, the remaining unit(s) are relocated to centralized positions within the County with the purpose of statistically being available for a call to occur within either the Hillsborough or Carrboro/Chapel Hill population centers. During situations where only one unit remains, South Orange Rescue Squad (SORS) is requested to provide unit coverage primarily to the Carrboro/Chapel Hill region (as they are located in that area). Additional mutual unit coverage may be requested from neighboring counties, such as Durham County EMS, to have a unit stage at the County line.

Because "surge" is not clearly defined in policy format, and its occurrences or time periods are not tracked, it is difficult to both quantify and quality these instances. As a result, our firm recommends creating a policy that outlines the following components and actions surrounding "surge" criteria:

- "Surge" should be defined as any situation where 25% or less of the minimum units are available for response. During daytime hours, the unit number will be higher than overnight hours based on this percentage, and further tracking should be divided as such (i.e., "Daytime Surge," "Overnight Surge"). The 25% value should be considered the rounded-up whole number of units (e.g., 2.25 should be rounded to three units).
- During periods of system "surge," remaining units should be geographically relocated ("moved-up") to provide coverage to the Hillsborough and Carrboro/Chapel Hill population centers – even if that necessitates moving out of a static station and posting at a predetermined location within the area. If a third unit is available, it should be placed between these two locations or units to provide additional response support. Available Supervisors should geographically relocate to rural areas. North of Hillsborough and West of Carrboro/Chapel Hill to provide further zone coverage.
- "Surge" policies should be outlined and coordinated with the dispatch center to hold low-acuity calls (e.g., Omega, Alpha, Bavo) and only dispatch available units to higher-acuity calls (e.g., Charlie, Delta, Echo). Dispatching of units to lower acuity calls may occur once additional units above "surge" criteria are met but will keep the remaining units in "surge" until the available unit number reaches above the "surge" activation number. As an example, if "surge" is activated at three remaining units and a fourth unit becomes available but immediately becomes assigned to another call (or any other unit, immediately, based on their proximity), then "surge" should remain enacted until a fourth unit can remain available and without any calls pending.
- During periods of "surge," units should be directed to transport patients to the closest hospital. Deviation from this – such as for instances requiring immediate specialty care – should require Supervisor approval. Units should be made aware via radio communications and unit cellphone messaging of when the "surge" procedures are activated and deactivated for this purpose.
- Once the system reaches one unit below the "surge" activation number, mutual aid Countyline standby should be requested by a neighboring EMS agency.
- Instances and time periods of "surge" should be tracked either automatically via software or manually via dispatcher or Supervisor tracking. Start and end times should be tracked and trended, duration times should be totaled, and instances where mutual aid standby requests occurred should be tallied.

7.4 – Utilization of South Orange Rescue Squad

South Orange Rescue Squad (SORS) exists within the County's EMS system but is a separate entity from County ownership and corporate oversight, as it is its own legal corporation – 501(c)(3). As such, its administrative oversight should be completely separate from OCEMS, in addition to its billing practices. One active observation was made respective to the billing practice relationship between OCEMS and SORS and further investigation and recommendations related to this practice have already been communicated with Department and Division management. Due to the sensitivity and ongoing investigation of this practice, further details will not be expanded upon in this Report.

Staffing operations by SORS are primarily volunteer in nature, as the agency relies on over 100 volunteers to maintain its staffing roster. SORS primarily provides services for special event coverage, specialty rescue response, system "surge" staffing, and contracted overnight BLS unit staffing as a supplement to OCEMS. Overall, SORS responds to approximately 325 calls per year (based on a 7-year average) with 98% of those calls within the Carrboro/Chapel Hill area. They also provide unit move-up coverage approximately 16 times per year, with 55% of those instances in the same area, and the remainder in the Hillsborough area.

During daytime hours of operations, SORS does not provide any dedicated staffing for its units. Instead, it relies on any of its over 100 volunteer members or assigned on-call members to provide 9-1-1 response from their residence to their station, and then to the scene or location. This total activation and response time can take upwards of 30 minutes, as indicated by OCEMS stakeholder interviews. Related to the volunteer members of the agency, a significant majority are comprised of local college students that dedicate 1-2 years to the agency before moving away or moving on, many of which are medical school students. Because of this high concentration of college student membership, providing coverage during school schedules and during large school break periods is difficult, as these members are typically unable to dedicate time to unit coverage. As a result of the high turnover and decreased long-term reliability of this membership, SORS's workforce could be described as transient and non-sustainable for the future, especially considering the hardship that many volunteer (non-career) EMS agencies are facing throughout the country. With a roster volume of such high numbers and a call volume of such low numbers, there is also a statistically low probability that any SORS members are able to maintain any form of call volume exposure or skills competency to be considered as an equal to what the members of OCEMS experience.

During the overnight hours, the longstanding practice of utilizing a SORS unit for additional 9-1-1 BLS coverage has been maintained by OCEMS primarily as an act of political good will. Looking directly from a system continuity standpoint, the practice of utilizing SORS as a primary means of unit staffing would be more reliably suited by staffing an (or more) OCEMS unit(s) instead of SORS units. This justification simply comes down to the level of skills competency and call volume exposure that OCEMS providers have compared to SORS providers. As such, it is recommended that OCEMS transition SORS unit staffing out of their overnight staffing matrix and reallocate such calls to OCEMS units. This, understandably, will be seen as an unpopular recommendation by many stakeholders – including SORS membership and management.

In FY 2022 (only including July 2021 through March 2022; 75% of the FY), OCEMS paid contracted services fees to SORS totaling nearly $200,000. This arrangement is in place as OCEMS provides the billing services for SORS as a gratuity and then returns the recovered money to SORS as the form of a contracted service. While this practice has come under question by our firm and has already been brought to the attention of the Department and Division, this money, nevertheless, could easily and more effectively be directed toward OCEMS staffing of ALS or BLS units instead of SORS units.

Expanding beyond 9-1-1 response operations, OCEMS should also be prepared to handle complete event coverage for events that SORS currently provides staffing, or pass this opportunity completely to private vendors, such as other Franchised ambulance services. Given the sheer volume of members needed to maintain the operations of SORS, these 100+ members do not necessarily indicate a strength of the

organization; rather, this could be seen as a challenge or even as a threat to their organization. The existing short-term longevity of their membership creates extremely high levels of turnover, a significant loss of overall long-term provider experience, and a significant risk to the reliability of the organization as a whole. It, like many other volunteer EMS agencies that remain in existence in primarily urbanized areas, faces the real risk of closure or collapse as funding sources remain minimal and volunteer reliance continues to decrease.

Again, it is completely understood that these recommendations will likely create some political tension between OCEMS, SORS, and even the elected officials within the County; however, our firm stands by the recommendation that OCEMS transition away from the utilization of SORS units as a means to primarily staff the 9-1-1 EMS system within the County.

7.5 – Supply Chain Management

Current supply chain management for EMS durable and disposable supplies is loosely overseen by OCEMS (Division), but primarily provided by Emergency Management (division) staff. As such, these staff members are not identified as FTE-dedicated employees of OCEMS. While the rationale behind this practice is understood, it is not recommended by our firm. Moving forward, it is recommended that support staff utilized for supply chain management be dedicated as FTEs under the OCEMS/Division budget and responsibility oversight. This move will promote a more internally focused and controlled environment where staff are dedicated to the specific mission of EMS, rather than the entire mission of Emergency Services, which potentially includes Emergency Management.

Supply chain operations and storage are presently maintained out of the ESC which, as indicated in **SECTION 6**, has the potential to be ideal for this operation, but has faced a significant hurdle with regards to climate control under its own roof. This has resulted in the massive warehouse space that exists, being unavailable to equipment surplus storage or even supply chain operation to exist beyond one- or two-weeks' timeframe due to a lack of storage availability for such equipment items.

While advanced supply tracking software utilized by this team is available and implemented, it appears as though the team is limited in its ability to utilize the software as intended. This is due to storage limitations and the past practice of transporting large stocks of equipment around to the stations regardless of their communicated need. Further opportunities are available for equipment replenishment at existing stations or storage "hub" locations within the County, but such transitions would require some workload distribution re-planning on the team's part. Again, with these employees not being directly overseen by the Division, such changes may be more difficult to manage and implement.

7.6 – Consultant's Findings and Recommendations

7.6.1 – Consultant's Findings

- OCEMS does not have a defined or strictly adhered to minimum unit coverage, unit downgrade, or unit brownout policy.
- Instances of system "surge" are not tracked and, therefore, cannot be quantified.
- OCEMS currently allocates nine FTEs for EMT/Paramedic employees, one FTE for Supervisors, and 0.75 FTEs for administrative staff; totaling 10.75 FTEs per full-time ambulance.
- Support services and logistics staff are employed by Emergency Management, not by OCEMS.

7.6.2 – Consultant's Recommendations

- OCEMS needs to develop a firm policy outlining minimum unit staffing numbers, unit downgrade procedures, and unit brownout practices. A clear mandatory overtime policy should also be constructed to outline the process behind voluntary overtime versus forced or mandatory overtime staffing in order to meet minimum unit staffing and coverage requirements.
- Develop a defined system "surge" policy that outlines crew notification, unit move-up, and time tracking processes that should occur during respective time periods.
- Daytime full coverage unit staffing is recommended at 12 units, with a minimum of nine units in-service. Overnight full coverage unit staffing is recommended at eight units, with a minimum of seven units in-service.
- Utilization of South Orange Rescue Squad for regular operational staffing should be discontinued and increased emphasis should be placed on appropriate OCEMS up-staffing and resource support.
- Support staff employees utilized for supply chain management should be dedicated as FTEs under OCEMS (Division) budgeting and oversight, not under OCES (Department) budgeting and oversight.

SECTION 8 – OCEMS MANAGEMENT, ADMINISTRATION, AND FINANCIAL OVERVIEW

8.1 – Management

8.1.1 – Organizational Structure

Orange County EMS resides within the Emergency Services Department as one of four functioning Divisions, all under the oversight of the Emergency Services Director. This form of organizational oversight is common with many North Carolina county governments, as well as within other states such as Florida. Within this Division, general administrative oversight is provided by the Division Chief, serving as the Divisions highest-ranking position. OCEMS's organizational chart for OCEMS is provided in ***Figure 8.1***.

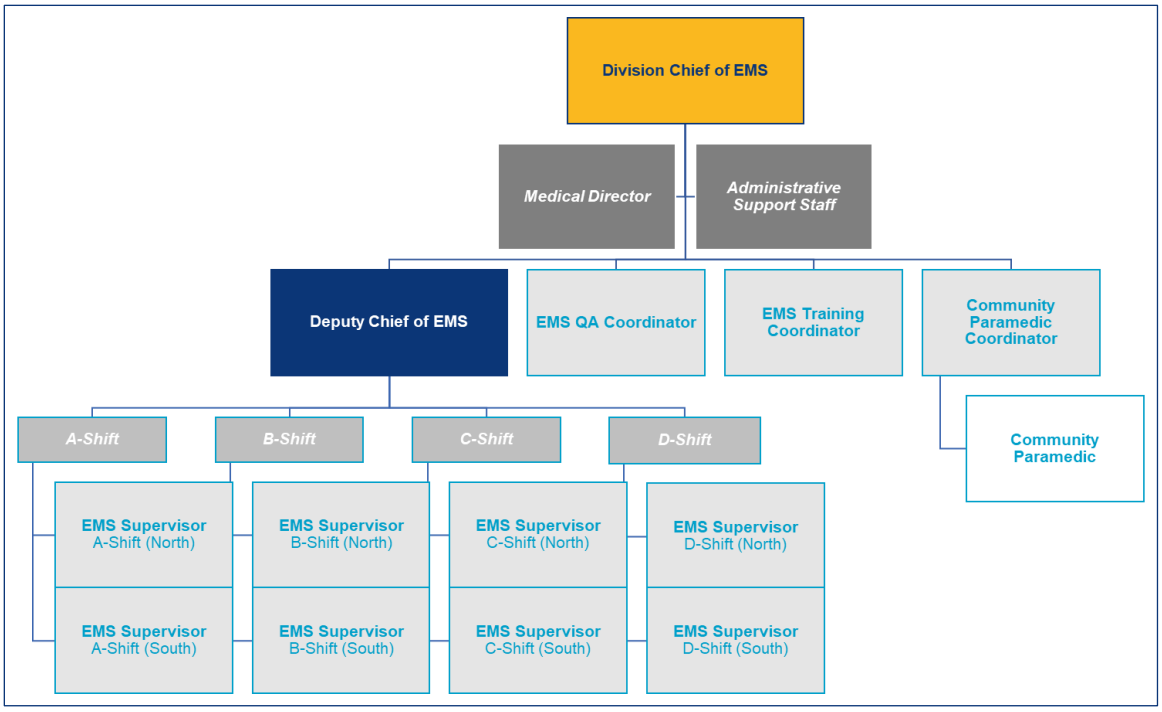


Figure 8.1 – OCEMS Organizational Chart

Referring back to the entire FTE allocations for OCEMS, only six of the 86 FTE positions serve in a primarily non-operational capacity. Of those six, four could be considered to have primary administrative functions found within EMS organizations. Overall, the organizational hierarchy and management structure within the Agency appears lacking in strength. As a result, many administrative duties must be spread amongst the two primary administrators of the Agency: Operations Manager and Deputy Operations Manager. Of note, the proposed FY 2023 organizational chart utilizes the titles of Division Chief of EMS and Deputy Chief of EMS to refer to these positions. This nomenclature better aligns with local fire department structures and allows for better position comparison.

Within the fire service, additional collar insignia also helps to differentiate various ranks and positions for visual reference. It was not observed that OCMES utilizes any collar insignia as a visual reference, however, it is recommended that this practice be instituted. ***Figure 8.2*** shows examples of what EMS-oriented insignia could look like (using traditional fire service bugles as a reference).

Figure 8.2 – Example EMS Rank Collar Insignia

Coinciding with different corporate titles, both the current EMS Operations Manager and Deputy Operations Manager positions are grossly under-titled related to their actual duties and responsibilities, which are director-oriented. The current QA Coordinator and Training Coordinator are also somewhat under-titled and better align with managerial or coordinator roles. The strength of the organizational structure – chain of command – within OCEMS, nonetheless, appears lacking and warrants further evaluation for expansion, which will be forthcoming in this Report.

8.1.2 – Agency Brand and Presence

OCEMS's brand – image – is largely not of its own. Coinciding with its alignment with the Emergency Services Department, OCEMS's logo (***Figure 8.3***), vehicle design, and official (County) website make little reference at all to "Orange County Emergency Medical Services;" rather, they primarily reference "Orange County Emergency Services." Navigating around the County's/Departments/Division's website provides little information into the Agency as a whole, including recruitment efforts, billing inquiries, or call statistics. There is no Annual Report to reference, nor are either of the prior reports referenced in this Study available for public consumption. Compared to the County's neighboring and competing Durham County EMS and Wake County EMS, OCEMS's brand and online presence appear dismal.

Figure 8.3 – Orange County Emergency Services Patch / Logo

8.2 – Administration

8.2.1 – Human Resources

Human resource responsibilities – particularly the onboarding and recruitment of employees – is maintained by a dedicated FTE position within the Department titled as the Recruitment and Outreach Coordinator. Responsibilities within this function and beyond onboarding and recruitment are also collaborated with the County's Human Resources Department. Given the size (number of FTEs) of the Department as a whole, it may be advantageous for the Department to add more staffing to support its comprehensive human resources needs, as one person (FTE) may not be adequate to support this entire Department.

8.2.2 – Billing Services

Billing services are currently operated by the County's Tax Administration office primarily as a result of a poor prior experience with a private EMS billing vendor. While there can be efficiencies noted in such practices, there can also be significant concerns, especially when billing personnel are not familiar with EMS billing regulations, healthcare billing codes, and other applicable billing practices. Currently, none of the current billing staff in this office hold recognized ambulance compliance officer, documentation specialist, or coding credentials. Throughout the course of this Study, some billing and EMS documentation practices have come into question are were brought to the Department's and Division's attention, thus sparking an internal review of such practices. Due to the sensitivity of these findings, further details will not be elaborated in this Report. Further financial impacts (billing revenues) will, however, be expanded upon later in this Report. Nevertheless, our firm strongly recommends that the County/Department/Division reconsiders contracting for private vendor EMS billing services, along with regular 3rd party (independent) audits of its billing practices, by an experienced EMS billing professional (a firm).

8.3 – Financial Overview

A general overview of OCEMS finances is shown in ***Figure 8.3***, which highlights actual FY 2021, budgeted FY 2022, and requested FY 2023 expenditures and revenues.

	2020-21 Actual Expenditures	2021-22 Original Budget	2022-23 Base Budget	2022-23 Department Requested	2022-23 Manager Recommended
Personnel Services	6,085,436	6,363,752	7,071,562	7,777,259	7,777,259
Operations	602,863	659,375	659,375	859,556	825,214
Capital Outlay	144,788	4,000	4,000	270,116	22,116
Total Division Expenditures	**$ 6,833,087**	**$ 7,027,127**	**$ 7,734,937**	**$ 8,906,931**	**$ 8,624,589**
Total Revenues	3,300,450	2,905,000	2,905,000	3,706,667	3,706,667
County Costs (net)	**$ 3,532,637**	**$ 4,122,127**	**$ 4,829,937**	**$ 5,200,264**	**$ 4,917,922**

Figure 8.3 – OCEMS Budget Overview (FY 2021 – FY 2023)

Reviewing the FY 2021 actual expenditures, personnel expenses account for approximately 89.1% of overall expenditures while operating expenses account for approximately 8.8% and capital expenditures account for approximately 2.1%. Our firm's experience in prior budget analysis often outlines a slightly different experienced and average allocation of these expenditure percentages, with personnel typically averaging about 75%, operations about 20%, and capital about 5%.

Respective to revenues, OCEMS has had a 4-year (CY) average transport rate of 68.5% for all of its calls. Given the prior documented 11,899 calls for FY 2021, that equates to approximately 8,151 transports for the year. With over $3.3 million in generated revenues, approximately $2.5 million of that revenue (based on a 3-year average and reported in the Department's FY 2023 budget request data) is from ambulance transports. That equates to an approximate fee recovery of $307 per ambulance transport.

Looking at a per call basis as a gross revenue number, rather than a net revenue number, OCEMS generates approximately $210 per call (Note: this is only a comparison value as OCEMS is not able to bill for every call, only ambulance transports). When compared to the total expense per call, OCEMS encounters approximately $575 in expenses per call, resulting in an overall net cost ($575 – $210) of $365 per call (based on FY 2021 values). This net cost, therefore, is what is needed via taxpayer support to supplement the Agency's operations.

Throughout the course of budget preparation for the 2023 fiscal year, the Department's research realized that OCEMS was generally charging below the Centers for Medicare and Medicaid Services (CMS) allowable base rates for ambulance transport fees. In addition, OCEMS was charging largely one-half the amount as comparable Durham County and Mecklenburg County EMS agencies. As a result, the Department's recommendation was to increase its baseline ambulance transport rates and loaded miles rates to better align with both its comparable agencies and with what CMS actually reimburses for. This positive change is anticipated to increase ambulance revenues by approximately $530,000 per year, nearly $34,000 of which is purely from increasing its fee schedule rates to match the CMS allowable rates. This total revenue value is presuming that a full collections potential is met.

Also impacting future expenses will be an increase in personnel expenses as a result of significant local wage increases by neighboring EMS agencies, Wake County EMS, in particular. This increase is largely reflective of the requested FY 2023 increase of $1.4 million in personnel expenses, compared to its FY 2022 original budget. This wage increase, nevertheless, is a necessary step in order to remain competitive and to offer a more sustainable wage within the rising cost environment of the Research Triangle area.

8.4 – Consultant's Findings and Recommendations

8.4.1 – Consultant's Findings

- OCEMS is lacking in administrative staff support and role and responsibility delegation options, in addition to career development pathway options.
- OCEMS has poor brand recognition as its own entity, as it is branded more with the Emergency Services Department than it is as its own entity.
- OCEMS billing services are currently performed by the County's Tax Administration office, not a professional (3rd party/private) EMS billing vendor.

8.4.2 – Consultant's Recommendations

- Re-brand OCEMS to have its own identity as a part of the Emergency Services Department, not one-in-the-same as the Department.
- Return to contracting out for EMS billing services with a 3rd party/private vendor, in addition to performing regular billing practice audits utilizing an independent resource to accomplish this.
- Consider having the Human Resources Department provide dedicated staff to the EMS Division or Emergency Services Department and located at their respective facility for improved direct communications and to provide on-site human resource needs.

SECTION 9 – OCEMS CLINICAL OVERVIEW

9.1 – Medical Direction and Oversight

OCEMS is currently supported with Medical Director (MD), physician oversight, services by a locally contracted emergency medicine physician on a 20-hours/month basis. This physician is independently contracted but does have clinical practice and admitting privileges with one of the local hospital systems, which is common among many other privately contracted physician relationships throughout the country. This relationship is more coincidental than it is a requirement. In partnership with the individual MD contract and services is a relationship with a local University of North Carolina-Chapel Hill medical school fellowship program. Within this fellowship program, new physicians completing emergency medicine residencies are eligible to be involved in a joint rotating Wake County EMS and Orange County EMS fellowship program to function as associate medical directors under the direction of the contracted Medical Director. In this program, fellows collaborate with the MD to provide online and offline medical direction services, clinical operating guideline development, quality assurance services, and direct incident response with the utilization of a dedicated "chase car" (unfortunately, no reliable CAD data was available to document actual response numbers for this resource).

The MD for OCEMS also functions as the MD for the County's EMS system, which has involvement in Franchise Agreement oversight, EMS Committee involvement, and first responder entity collaboration and medical direction. This system – on paper – incorporates OCEMS; however, its design seems to be dictated or overseen by OCEMS (not to the MD's fault). This places the MD role in a potentially conflicting situation, as they are contracted by OCEMS, but also oversee the system that is supposed to statutorily oversee OCEMS. The MD also provides such services to the partnering first response fire departments within the County, but commonly without any compensation, while still having the obligation to provide training and quality assurance services to them proportionately, equally, and appropriately.

Many of the rural fire departments that the MD oversees operate at the EMR level, while the more urbanized departments with wholly career staff members operate at the EMT level. Clinically, the MD argues that upgrading all first responder agencies to the EMT level as a minimum should be a requirement. Within the current County EMS system, it remains acceptable for fire departments (non-transporting EMS response agencies) to operate at either level. In some counties, such as the neighboring Durham, local ordinance language requires these agencies to all operate at the EMT level and under the direct clinical oversight of the County's respective emergency services department (not directly to the EMS division). Within Orange County, this ordinance language does not exist and, according to many of the interviewed fire department stakeholders, instituting such language would be more of an operational and financial hindrance – being seen as an unfunded mandate – rather than an operational benefit.

In review of this practice, our firm recognizes the pros and cons presented by each stakeholder including their respective arguments and opinions and believes that maintaining the current EMR/EMT (optional) system is best for the County's immediate future. Considering that fire department medical first response units primarily respond to higher acuity calls and motor vehicle collisions, the actual and intended needs of their care is and should be focused on immediate intervention for life-threatening illnesses or injuries (i.e., cardiac arrest, major bleeding/hemorrhage) and rapid patient contact. While requiring all responding fire department medical first response units to upgrade to the EMT level of care can be argued as an overall clinical improvement or enhancement, the overall impact clinically does not seem to outweigh the operational, financial, and administrative impact that would be encumbered by the fire departments, particularly as it relates to crew recruitment and the cost impact for the more rural fire departments. This may be an unpopular opinion of those providing medical oversight, but therein lies another observation of the County's EMS system as a whole, where there needs to remain a separation between response operations and clinical oversight.

9.2 – Training and Continued Education Program

Initial training including new hire onboarding and current provider continued education is primarily handled internally by an OCEMS Training Coordinator and accompanying Field Training Officers (FTOs). The Training Coordinator is a daytime staff member while the FTOs are assigned to active response ambulances.

New hire onboarding begins after candidates have been hired based on the Division's pre-employment evaluation process. This process involves satisfactory completion of a written exam, passing verbal interviews, and completion and passing of selected medical and trauma skills. This process was evaluated by our firm and some preliminary findings and recommendations were communicated with the Department during the course of this Study and before this Report was drafted. In follow-up, the Department communicated with our firm some immediate actions to incorporate our recommendations and, as a matter of practice sensitivity, this Report will not expand upon these processes in more detail.

Evaluation of the Division's new hire onboarding process reveals a timeline and topic coverage that is heavily focused on OCEMS internal operations, which is entirely appropriate and applauded by our firm. This two-week process for both EMTs and paramedics, however, does seem short in overall length. Current hiring practices place more emphasis on skills validation during the pre-employment process, which our firm does not recommend. We feel it is more advantageous to perform in-depth skills validation during the actual employment onboarding and recruit academy phase of the new hire process as this allows for better documentation of satisfactory performance, or the need for remediation, and due process or progressive discipline, if necessary. Skills validation performed before being hired – if this practice is continued – should be done with complete transparency to the candidate so that they are fully aware of what they are being evaluated on, regardless of local, state, or even national accepted practices.

As a consideration, initial onboarding of EMTs should consist of the current schedule plus an additional 1-2 weeks of BLS skills performance and knowledge competency. Paramedic onboarding should also include this BLS component, plus an additional two weeks of ALS-specific skills performance and knowledge competency. Following this onboarding (recruit academy) should be the established field review period and on-the-job performance evaluations before full Medical Director and Training Coordinator clearance is approved. For experienced (lateral transfer) candidates, an expedited process may be indicated, excluding the first two weeks of operational content that the Division currently provides.

Once hired and performing as an EMT or paramedic, continued education (CE) and as-needed initial education is primarily conducted on a monthly basis during various full-day (one day) continued education sessions. These sessions are typically 6-8 hours in length and are considered as overtime hours for each employee. Additional web-based continued education is offered via the learning management system (LMS) utilized by the Division. CE schedules are designed around the National Registry of EMT's (NREMT) National Core Competency Requirements (NCCR), which are often more specific and stringent than individual states' CE requirements. This is a practice (NREMT/NCCR content) that our firm highly recommends continuing. Respective to the actual delivery of CE hours, the primary reason for incorporating off-duty (therefore, overtime) training is because the on-duty (daytime) EMS units are typically too busy to attend scheduled daytime training because of either their active response to 9-1-1 calls or their move-up and staging for potential future calls. The consistent practice of unit move-ups, as a result, necessitates this practice of providing CE and in-service training during off-duty (overtime) hours. As an example, the in-service training performed to incorporate the training and skills validation on the deployment of the Division's mechanical chest compression devise took an estimated 4-5 times longer than anticipated because of this constant unit movement practice. In an ideal setting, all CE and in-service training would be conducted while crews are on-duty and without interruptions created by 9-1-1 calls or unit move-ups.

Regarding physical training resources, OCEMS has barely any dedicated training equipment – including airway management mannequins – and no consistent Division or Department-available classroom or skills lab space. The current ESC/EMS Headquarters is in no way designed to facilitate regular training attendance, nor are any of the Division's existing EMS stations. Currently, OCEMS relies completely on its local Durham Technical College (DTC) campus for both available training space and updated training equipment. ***Figure 9.1*** shows the Agency's complete equipment cache, which is located at the Durham Technical College campus. ***Figures 9.2 and 9.3*** show a portion of DTC's dedicated EMS equipment and one of its classroom settings.

Figure 9.1 – OCEMS Training Equipment Cache at Durham Technical College Campus

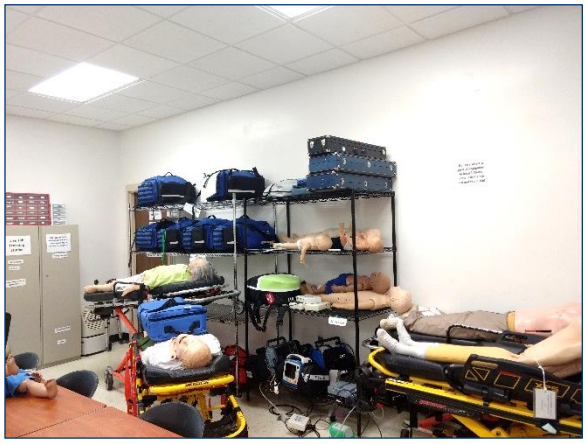


Figure 9.2 – Durham Technical College Dedicated EMS Equipment Cache

Figure 9.3 – Durham Technical College Dedicated EMS Classroom

Considering the agency size, call volume, and clinically-progressive environment surrounding OCEMS, its training capabilities are subpar compared to where they should be, and not to the fault of its current Training Coordinator or FTO staff. As a result of a lack of continual footprint growth (primarily, financial dedication) within this area of the Division, it will take substantially more immediate dedicated funding to bring the Division up to where it should be with regards to physical training space and dedicated training equipment, including simulated ambulance resources, or a dedicated training ambulance. This should be an immediate focus in the Division's next budgeting cycle, if not before.

Additionally, reliance on one full-time Training Coordinator to not only coordinate but to also perform necessary CE and in-service training is insufficient for an agency the size of OCEMS. This includes the continued need and program growth of the Division's FTO, who are designed more as new hire onboarding resources than they are continued education resources, however, there is some opportunity for both disciplines. Expanding from CE and in-service training is the need for the professional development of supervisory and administrative staff, which the current Training section cannot feasibly handle. Further collaboration and regular partnerships with Quality Assurance/Improvement resources should also be of a high priority for the Training section.

9.3 – Quality Assurance/Improvement Program

Quality Assurance/Improvement (QA/QI) responsibilities are also coordinated by one dedicated individual, the Quality Coordinator. Although the Agency's Medical Director does perform some QA/QI duties and training delivery, they are only contracted for 20 hours of work each month, and the necessary hours that need to be dedicated to QA/QI alone far exceed this minimal time allocation.

On a daily basis, many initial QA/QI responsibilities are delegated to the shift supervisors, however, it was observed by our firm that many of the shift supervisors are already time-restrained during their regular shifts because of their scene response, shift oversight, and other operational responsibilities. As such, actual supervisor QA/QI activities are more sporadic than they are consistent and reliable, as this also varies (more or less) depending upon the individual supervisor. Current supervisor responsibilities are ideally designed to complete at least 12 ePCR chart reviews per shift. These reviews include calls involving patient refusals of care and other high-acuity medical or trauma calls. As indicated, however, this does not seem to be a reliable or enforced practice among all of the supervisors, as was expressed in different stakeholder interviews.

As a result, the significant majority of QA/QI responsibilities are defaulted to the Coordinator. This also includes protocol development, data management, maintaining a peer review process, and providing crew feedback for various high-acuity or high-profile calls (i.e., cardiac arrest, heart attack/STEMI, stroke). Since there is not a reliable or consistent flow of information sharing from the primary hospitals that OCEMS transports patients to, much of the overall feedback process is performed manually by the Coordinator and, therefore, very time consuming.

In an ideal setting, 100% of OCEMS's dispatched calls would flow through a QA/QI process, from cancellations and refusals through high-acuity transports and alert criteria patients. This process would incorporate more than one individual and would involve both supervisors, dedicated QA/QI staff, the Medical Director, and potentially even FTOs. Considering this ideal setting, OCEMS's sole full-time QA/QI resource is not enough to keep up with the Agency's growing call volume. Future consideration, nevertheless, should be placed in increasing dedicated and shared staff members for the QA/QI section (potentially partnering more with the Training section and its FTOs) as a part of a combined professional standards section.

9.4 – Consultant's Findings and Recommendations

9.4.1 – Consultant's Findings

- Both the EMS Training and Quality Assurance offices or bureaus are under-staffed, under-resourced, and under-funded.
- There are inadequate training resources and available space due to reported insufficient funding, thus, resulting in the complete reliance on Durham Technical College for respective space and equipment needs.
- Continued education and in-service training are predominantly performed off-duty, which increases overtime expenses significantly on a monthly basis as a result.
- The Medical Director is only contracted to provide services for 20 hours/month.

9.4.2 – Consultant's Recommendations

- Future dedicated funding should be allocated toward improving the equipment and resources available to OCEMS training staff, including dedicated training space.
- Consider the separation of the Medical Director from affiliation and oversight by OCEMS and under the direct oversight of the Emergency Services Director, or transfer under the daily and budgetary oversight of the Administrative Services Division, in order to provide better system functionality and appropriate separation between EMS operations and clinical compliance. This should also correspond to additionally budgeted hours for medical director services.
- The physician response unit seems unnecessary and should be reconsidered, or at least re-evaluated for efficacy and actual need.

SECTION 10 – OCEMS COMMUNITY PARAMEDICINE AND RISK REDUCTION PROGRAM

10.1 – Community Paramedicine Program

OCEMS's Community Paramedic (CP) program began in 2013 as a project initiative focusing on falls prevention primarily within the elder population within the County. Initially, the program was staffed by selected qualified field paramedics that would provide post-call follow-up to falls patients during off-duty days, being paid with overtime wages. In 2019, this program expanded to incorporate two full-time CPs who would primarily fulfill these responsibilities.

This program expansion also led to an addition of its focus to include opioid/drug overdose preventative actions, such as needle exchange/drop-off programs and naloxone (Narcan) medication distribution for patients who experienced an opioid overdose. Much of this effort was associated with the County's Coordinated Opioid Reduction Effort (CORES) program, which was primarily associated with the Sheriff's Department. Additional focus has been placed in reducing the use and system impact of frequent or repeat EMS system utilizers for lower acuity calls, which is also associated with the County's Familiar Faces program. CPs are prompted by the ePCR system utilized by OCEMS to initiate follow-up actions and/or visits to these patients.

During the 2020 COVID-19 pandemic, CP operations were initially halted as immediate active EMS operational needs took precedence over the CP program's follow-up and preventative care needs. The role of the program's CPs, thus, shifted toward some single-resource scene response with a QRV (quick response vehicle) to manage low-priority calls that historically did not result in the need for ambulance transport. Operations after the initial surge impact of the pandemic shifted toward COVID Task Force/Strike Team activities geared toward addressing COVID testing of residents and patients in skilled nursing facilities. Additional mask fit testing and pandemic compliance spot checks were also performed by the CPs. Later operations also transitioned to include providing vaccinations throughout the local communities, particularly within areas where limited access to other vaccine resources was experienced.

Currently, there are two CPs functioning within this program, whose focus is geared toward falls prevention and follow-up, prescription medication reviews, and some other acute and chronic illness/injury supportive care and follow-up patient populations. Training for CP providers consists of no formal education through either an established CP program or an identified curriculum. While there is a goal for the CP providers to become appropriately credentialed, no current CPs have obtained this status. The only current training requirement for the CPs is to obtain basic Crisis Intervention Team (CIT) training and CPR (cardiopulmonary resuscitation) instructor credentialing.

Regarding actual patient outreach, one finding noted was that the CP program does not have a dedicated vehicle for its operations. As such, CPs intending to perform in-home outreach must also compete with other administrative staff within the Agency for vehicle use.

Documentation for the program is performed within the same ePCR software platform as the 9-1-1 ambulance crews, which does create an issue related to longitudinal or relational care of patients, as ePCR platforms are more designed for transactional patient care. As such, the long-term – or repeat – tracking of patient care plans and/or progress is not possible through the Agency's current documentation platform. Most patient tracking, as a result, is performed manually via spreadsheet or other creative software means.

Respective to tracked data and performance measures, little data can be provided to show the efficacy or success of the program because of its documentation and tracking limitations. There is no easy means to track patient recidivism (repeat system use or ambulance transport), no easy means to track longitudinal

patient interactions, and no means at all to communicate with or incorporate other patient care teams that may be involved in their overall health care.

Prior to the COVID-19 pandemic, this program had documented interactions with 26 unique patients during a six-month period before its transition toward COVID response operations. Today, this number is smaller as the program is, essentially, trying to rebuild to pre-COVID activity and strength.

Respective to funding, the CP program currently remains funded directly via general budget support. It has no active grant funding and no current revenue streams identified. Many CP programs throughout the country operate on this same type of funding model, however, some have successfully coordinated with major payors within the health care insurance industry to receive direct funds beyond grants to reduce hospital readmissions (recidivism) amongst certain patient populations (illness/injury types). Programs like these, moreover, are widely uncommon within the MIH/CP and EMS industries and are more commonly found in larger EMS systems. Nationally, there is a piloted Emergency Triage, Treatment, and Transport (ET3) initiative program underway that is sponsored by the Centers for Medicare and Medicaid Services (CMS). OCEMS is not currently participating in this active study, which involved an application process and has been underway well before the beginning of this Study. Nearby Wake County EMS is involved in this program. Funding models and overall financial sustainability for many – if not all (or nearly all) – CP programs throughout the U.S. remains an uncertainty for the future, especially for those that rely on general budget support for their maintenance.

Future goals for the program include:

- Expanded harm and injury reduction initiatives geared toward reducing call volume impact and repeat patients
- Providing more direct patient navigation toward existing County and local health care resources
- Direct CP dispatching to scenes involving program-related patients
- Improved documentation opportunities and data management tracking
- Response to active scenes involving potential opioid/overdose situations
- Further development of the CP provider scope of practice and autonomy to function as both a surge 9-1-1 system resource and focused chronic care resource for its patients

What's difficult to compare to and enhance within this realm of proactive and preventative patient care is how various CP programs are defined and developed throughout the country, and even within each state. Quite frankly, there are so many different models of CP programs in existence within the U.S. with no standardized or recognized national curriculum, oversight body, credentialing process, or scope of practice, that CP programs that exist even within the same county can greatly vary from one to another. Some offer an advanced scope of care that incorporate licensed clinical social workers, dieticians, case managers, and/or consulting pharmacists into their programs, while others (such as OCEMS's program) utilize minimally trained paramedics to primarily provide directed navigation to other local functioning and funded programs. Overall, the future progress of CP programs (or mobile integrated healthcare – MIH – programs) remains uncertain because of these wide operational variances, coupled by no formalized or even readily replicated funding models. OCEMS's CP program seems to fit this description.

10.2 – Community Risk Reduction Program

For decades now, the fire service has grown their own fire prevention programs (including code enforcement) all in an effort to reduce both the actual incidents of structure fires as well as the risk of overall fire related injury/death within the civilian populations that they serve. Within the recent decade, a growing trend has emerged within the fire service to transition such program titles and foci toward a more holistic approach of community risk reduction (CRR), rather than simply fire prevention and code enforcement. Such programs have historically already been budget-supported and seen as an active benefit within the community. Prior programs within the EMS industry have been largely non-existent until the advent of MIH/CP programs. The wide variance of what is considered "community paramedicine," moreover, can create more confusion than cohesion. OCEMS's example of "community paramedicine" coincides with this observation.

Considering the past activities of OCEMS's CPs and its program, in general, their program seems to better align with what fits the mold of community risk reduction, as opposed to mobile integrated healthcare. The current CP program does not provide direct patient care referrals to existing primary care resources, it does not incorporate external clinicians into its repertoire of patient wellness or management needs, and it doesn't provide any long-term program enrollment to its patients in an effort to function as a supplement to their primary care. OCEMS's CP program isn't integrated with any external health care resources outside of the supplemental care programs that the County offers. OCEMS's CP program is internal-focused, it is community-focused, focused on risk reduction rather than longitudinal care relationships, and this is all okay.

OCEMS's CP program, in fact, better aligns with EMS's version of a CRR program. It is an immediate, high-impact outreach, wellness, and navigation program designed to target select patient populations (based on illness/injury) on a more transactional basis in the hopes that it will have a long-term and lasting (longitudinal) impact, but it does not have the means to support longitudinal, integrated, or advanced patient care. This, again, is all okay. This, in fact, is the reality of many CP programs; they are more CRR than they are CP, however, the term "CP" seems to be used more widely than CRR within the EMS industry.

One national EMS publication online source, *EMS1.com*, has outlined this very concept in an article titled "Community paramedicine as EMS's CRR program." This article compares the initiatives of fire department CRR programs with the efforts presented in CP programs and presents a common ground where both can cohesively exist, collaborate, or combine their efforts within fire-based and standalone EMS systems. "CP programs aren't designed to be someone's primary care. Rather, they're designed to support someone's primary care and to function as a resource between such appointments and other healthcare provider visits. They're designed to reduce one's risk of illness exacerbation and the need for emergency transport to a hospital. They're designed as a component of community risk reduction." "As CP fits into the context of CRR, it's possible to structure and operate a CRR program without necessarily having to have a formal CP program." [37]

What may cause a potential point of contention with the use of the term "CP," or "Community Paramedic," is if/when the State begins to license or credential providers at this care level. With such regulation there is typically associated additional training that is required, all while there is no consistent or reliable, current funding and reimbursement model available to supplement such efforts. Keeping a program more local, granular, and basic – focused on community risk reduction (no different than educating on fire extinguisher use, CPR training, bleeding/hemorrhage control, and other community outreach activities) – is where OCEMS's actual CRR program can continue to exist and succeed without the likely risk of having to comply with additional future training and/or regulatory restraints. If there is no addition to an EMT's or paramedic's scope of practice, there may be no need to formally become a recognized future "community paramedicine" program, if this comes into existence. Instead, OCEMS can focus its efforts on community risk reduction and without the need for extensive additional training or clinical or operational oversight.

Community risk reduction is what OCEMS's current CP program is doing, and it should consider rebranding to title itself as such. Community risk reduction programs within the fire service have the availability for increased federal funding dollars to promote fire prevention and burn injury reduction, smoke/carbon monoxide exposure reduction, and home escape plan education and implementation; CP programs have not traditionally been eligible for or have not traditionally considered such funding dollars. While these topics are traditionally considered as firefighter topics of interest, in all reality, it is EMS providers who are caring for the patients that fall victims to a lack of such risk reduction efforts. By potentially rebranding and even partnering with local fire departments, the future OCEMS CRR program may open the door to potential funding opportunities that have otherwise been overlooked by EMS agencies because of their swayed focus. Combined with falls prevention, opioid risk management, car seat education, CPR/AED training, community outreach, bleeding control training, and other community-focused (rather than only individual patient-focused) risk reduction outreach, it can be argued that there may be a greater population benefit seen through these efforts, rather than through targeted health care continuum efforts which already have many programs in existence.

Rebranding to a CRR model as opposed to a CP model may open the door of opportunity for OCEMS to set a positive local example of large-scale community outreach, wellness, and appropriate patient navigation, all without the growing pressure to become a self-sustaining health care model that focuses on individual patient-directed care or navigation (which is common with many practicing MIH/CP programs), as these programs often require access to more advanced clinical providers than what EMS agencies can afford, such as licensed clinical social workers, consultant pharmacists, dieticians, case managers, and midlevel practitioners. Instead, this new CRR model could completely function with in-house-trained EMTs and paramedics, requiring minimal additional training, in partnership with fire department CRR staff members and other County patient and resident resource programs. Under this model, funding would still need to come from general budget support, but the focus of the program's care would be broader and more holistic in nature, rather than independent-patient-focused or isolated-illness/injury-focused with an arguably lower total outreach and impact factor. Seeing how OCEMS resides under the same Department as the Fire Marshall Division, this seems like a perfect potential opportunity for future grant funding collaboration.

10.3 – Consultant's Findings and Recommendations

10.3.1 – Consultant's Findings

- The CP program's approach of trying to utilize its current 9-1-1 based (transactional) ePCR documentation platform to meet the ambitions of its longitudinal-focused program seems to create more limitations than opportunities because the ePCR software is not designed for relational patient care interactions or coordinated, continuum of care documentation.
- The CPs do not have their own dedicated vehicle for follow-up, outreach, or response operations and need to compete for vehicle use with other OCEMS staff members, such as training.
- The CP program has ambitions to provide longitudinal (relational) patient care and follow-up services, but currently seems to provide more immediate-impact and transactional care and follow-up activities. Coinciding with this finding, the program does not appear prepared to appropriately document longitudinal patient care or relationships, it does not appear to have a strong health care integration network in place with resources outside of current County (basic resource offering) programs, and it appears to have more of a general community risk reduction focus than a more aggressive mobile integrated healthcare focus.
- The CPs appear unaware of the County's *2019 Community Health Assessment* document and do not appear to be a part of the document's research, creation, or collaborating focus.
- The CP program appears to have lofty patient care/relationship ambitions that align with the aspirations of many other CP programs, but (also like them) does not have a strong plan in place to fund a program growth. Upgrades identified to grow the program include incorporating integrated documentation and information sharing with other care providers – particularly with those that provide care for traditionally underserved patient populations or "common" MIH/CP patient populations. The program, also, does not seem to have the direct support from any local health care resources such as Federally Qualified Health Centers (FQHC), local primary care physician resources, local healthcare systems, or other uninsured/underinsured patient care resources to help facilitate program growth or defray necessary costs.

10.3.2 – Consultant's Recommendations

- If the CP program intends to increase its individual patient and integrated, continuum of care focus, it should highly consider transitioning toward a documentation software better aligned with repeat interaction care planning and coordinated external care provider access.
- There should be dedicated vehicle assignment and access for the CP providers to perform appropriate follow-up, outreach, and response operations.
- Future involvement should be pursued with appropriate County entities and local stakeholders in the development of the County's next Community Health Assessment.
- If the CP program intends to continue its ambition to become more involved in supplement-to-primary patient care activities – such as post-discharge follow-up, preventative heart failure/hypertension patient care activities, or supplemental care for underserved populations – it needs to gain stronger alignment with local FQHC resources, health care networks and hospital systems, and primary care resources that are willing to coordinate longitudinal care efforts with their program and its (EMS clinician) providers.
- It may be better suited for the CP program to focus less on mobile integrated healthcare (MIH) ambitions and more on community risk reduction (CRR) ambitions, which are more large-scale and holistically driven than individual patient care (supplemental care) driven. This may bode better for

OCEMS if the State develops licensure/credentialing restrictions around community paramedic or other advanced care clinician roles, and potentially open opportunities for greater EMT involvement, fire department collaboration, and different funding sources that have not traditionally been considered by EMS (non-fire department) agencies. Partnering with the Emergency Services Department's Fire Marshall Division may greatly increase the opportunities for further CRR-related funding.

- Whatever the goals become or continue as for the CP program, its focus should remain on providing patient outreach, wellness, and navigation toward more appropriate long-term (chronic care) resources, as the program should remain dedicated and respective of being a supplemental approach, rather than a replacement approach to primary or specialty care.
- The CP program should remain aware of existing specialty care, chronic care, and other wellness programs within the region so that it does not potentially duplicate a resource that already exists and has allocated funds to support it. Instead, appropriate navigation should be initiated to enroll patients into these programs while OCEMS CPs function as a strong referral source, rather than a potentially competing source, to such efforts. Examples of such existing programs where CPs can appropriately refer rather than compete include crisis intervention teams (CIT), home health services, access to food programs, and other in-home patient care services.

SECTION 11 – EMPLOYEE, STAKEHOLDER, AND COMMUNITY FEEDBACK

11.1 – Employee Operational Survey Overview

11.1.1 – General Overview

An employee engagement survey was developed by the consulting firm with question recommendations and approval provided by the Study Team, and electronically dispersed by the consultants to each OCEMS employee (86 in total). The survey was designed to provide anonymous results and received 70 responses. 80% of these responses were from full-time employees, while 20% identified as part-time. Single-choice, multiple-choice, Likert scale, 0-10 rating, and free text options were available for each participant in the survey.

Disclaimer: There was the possibility of duplicate/inaccurate responses. One of the participants stated issues completing the survey, and resubmitted it, possibly resulting in one survey with mostly omitted responses. There may have been additional instances of similar scenarios. To keep the anonymity of the responses intact, our firm did not isolate these responses or delete them from the datasets. As a result, there is a possibility (strong likelihood) that there were only 69 participants, as opposed to the tracked 70. Because of this, all results/percentages represented may have a margin of error that could result in a 0-2% increase/decrease from their posted values.

It should also be noted that this survey was completed during period of compensation adjustment by the County and several local agencies. As such, results relating to compensation may be represented in a different fashion if the survey were to be completed again. Time constraints have prevented the firm from reissuing the survey to employees to gauge their current satisfaction levels.

A larger than majority section of employees was surveyed, and basic demographics revealed that the employees are:

- 51% male, 35% female, and 14% either preferred not to answer or identified as non-binary
- 75% white, 9% Black or African American, 3% Asian, and 13% preferred not to answer

When compared with the data found in a 2020 national assessment of EMS agencies, OCEMS appears to have a more diverse service than average, but their demographics match that of their community comparatively. [38] [3]

Out of the responses received, 57% of respondents are Paramedics, 40% EMTs, and 3% Advanced-EMTs. Given the current operational model of OCEMS (discussed in other sections) this breakdown appears appropriate. In a profession which typically sees a transient workforce and higher-than-average turnover, OCEMS has strength in their tenured workforce. Greater than 50% of their staff has been with the organization for 5+ years and a third has been with OCEMS for more than 10 years. This leads to stability and gives management a core of knowledge that should be relied on for improvements. A little over a third of the employees have less than three years with OCEMS, which likely is due to their proximity to the major colleges and their self-proclaimed practice of hiring in SORS volunteers, who are more likely than not to be college students.

Broken down into more detailed sections below, working conditions, outside agency relations, organizational culture, recruitment and retention, and operational issues were all examined with the Survey. Some of the key findings were as follows:

- 24-hour shifts are valued by the employees, though 12-hour shifts are possible
- Relations with fire departments/first responder agencies are strained for myriad reasons
- Employees feel supported by each other, but not as much by their supervisors or management
- There is a significant issue perceived by employees with stress, burnout, and lack of appreciation
- Promotional processes need clarity and transparency to increase intraorganizational trust
- While stating concerns about the culture, it is the reason many employees stay with OCEMS
- Short term retention plans appear reasonable, long-term shows >50% leaving OCEMS
- Concerns of understaffing and lack for operational direction from the appropriate sources

For easier and direct correlation, direct employee quotes and survey data citations are referenced by listing the survey question's number in brackets (e.g., [Q1]). Further information related to the employee engagement survey can be found in **APPENDIX A** *of this report.*

11.1.2 – Working Conditions

The working condition section focused on two specific areas: first the shift length and rotations, and second, the compensation package employees receive. When various shifts were listed for the employees to prioritize [Q14], 37% of employees listed 12-hour shifts as their top priority, 53% of employees had 12-hour shifts listed in their top 2, and 73% of employees had 24-hour shifts in their top 2. An overwhelming percent (94%) of the employees surveyed who are currently working 24-hour shifts stated that they wanted to remain on 24-hour shifts [Q13]. This result was similar with the personnel working 12-hour shifts (93%). Each group had roughly 5-6% of respondents who wanted to swap from their current rotation. Of note, 42% of employees stated that, even with adequate data presented, they would consider leaving OCEMS if they were forced to swap to a 10-12-hour shift. Greater than 50% of employees would be willing to swap, or at least would stay with OCEMS if the change did occur.

Shift bidding and staffing assignments were also covered in this portion of the Survey. Shift bidding was preferred across multiple different options with "Once per year in the winter" being the most popular with 46% of responses. Most employees, 75%, listed the proximity of their assignment to their home as being their number 1 or 2 priority [Q17]. This preference was echoed in the follow-up question regarding the "sister station rotation process." Otherwise, the sister stations have a varied impact on shift bidding overall. The employees were roughly split on their desire to be stationed with fire department personnel versus in EMS-only stations [Q20].

As noted earlier in this report, there have been changes to compensation for many of the surrounding EMS agencies, specifically originating in Wake County. OCEMS is also undergoing compensation changes, which will take effect July 1, but at the time of this survey, those changes had not been fully communicated yet. The employees rated their satisfaction with their base wages and wages with overtime as low overall [Q19]. 55% employees were not satisfied with their base wages, with only 4% of employees responding as "very satisfied". Almost 70% of employees were either "not satisfied" or "somewhat satisfied" with their wages when overtime was added. When compared to other local agencies, their satisfaction levels were recorded as 51% "not satisfied" and 23% "somewhat satisfied". Completing this survey again, or even a portion of the survey dedicated to compensation, should have different results.

Employees responded favorably when questioned about the quality of their equipment [Q52]. Topics covered included cardiac monitors, ambulances and supervisor vehicles, various pieces of medical equipment, etc. Responses generally fell in the area of decent or high.

Most employees appeared to be satisfied, or very satisfied, with their health insurance packages, as well as with their retirement and pensions. Dictated by the state benefits plan, the organization likely does not

have a lot of influence on those specific items. Fringe benefits, including tuition reimbursement, has a disbursed level of satisfaction within the responses. Potentially due to differing definitions of "fringe benefits" or lack of communicating what those benefits are, there is a definite opportunity for improvement on this topic.

11.1.3 – Outside Agencies Relations

With approximately 50% of employees working out of stations that are fire/rescue based [Q21], the ability to work seamlessly with outside agencies is critical to the satisfaction of the employees and the delivery of an elevated level of service to the community. Across several aspects of "fire station living" [Q22], most respondents rated their level of satisfaction as "satisfied" or "very satisfied". Scene working relationships, station life and interactions, bay space, kitchen space, and restrooms were all rated highly among the employees. Day room/living space and dorm space were areas where the respondents' satisfaction levels dropped with 34% and 46%, respectively, responding at levels of "not satisfied" or "somewhat satisfied". While most of the employees were still "satisfied" or "very satisfied," those two categories were the only ones which offered meaningful room for improvement.

These feelings were consistent for Question 23 as respondents were asked about whether OCEMS has a "positive living relationship" with the five shared spaces. Most of the departments had a greater than 80% response that either they "get along well" or that the relationship is positive but some "stations/crews are better than others". It is also worth pointing out that the few responses rating the "living relationship" as "very damaged" came from the same few individuals. It was rare that an employee rated a relationship as poor with one department, and positive with another, suggesting that there may be some specific personality conflicts versus a systemic issue. Overall, the employees did not recommend any new colocations, but several employees [Q25] did recommend ending this practice stating that they did not believe that the stations are located appropriately. One employee noted that part of the issue is that "… most of the departments don't have full-time crews."

When questioned about the working relationships with outside fire departments and EMS agencies, there was a variety of responses. The relationship with SORS was rated at 6.5 out of 10 overall by the respondents [Q26] with the general issue being that employees wish to see more respect between the two organizations. This sentiment was reinforced during the on-site interviews when crewmembers stated that they enjoyed working with some outside agencies, but the relationships with others suffered. There seemed to be a correlation between the staffing model for the fire departments (career versus volunteer) and the level of satisfaction that employees expressed during the survey and interviews. There is also a perception that the fire departments do not have a desire to respond to medical calls (rating 4.9/10). Employees also stated concerns with fire department response times and the fact that some departments "have no interest in responding to or helping their community [based on] their actions, or lack thereof" [Q27].

11.1.4 – Hospital Relations

The hospitals associated with the OCEMS system received similar scores across the responses. Alamance Regional, Duke Regional, Duke University, UNC-Hillsborough, UNC-Main, and the Durham VA Hospitals were all evaluated on topics including "EMS crew reception and attention," "Direct-to-Intervention Care Post-EMS Arrival," and "Patient Care Follow-up/Feedback" [Q66]. The UNC system hospitals received higher ratings on average across the board (their scores ranged from 7.4-7.8) versus the other hospitals utilized by OCEMS (the other hospitals ranged from 2.2-6.6 on average). A common theme found was that employees perceive that all the hospitals, except for the UNC facilities, score poorly on the feedback they receive on the patient care (an average of 2.8/10 for those facilities).

11.1.5 – Organizational Culture

Organizational culture is important for any agency. The survey presented to employees included topics like how supported employees feel by other members of the organization and levels of stress within the

agency/employees. Questions 47 through 60 dealt primarily with issues related to organizational culture. The initial first few questions asked the respondents to consider how supported they felt by various groups. No specific definitions were provided to the respondents for each grouping, but the titles of management, supervisors, and their colleagues were used. Overall, the respondents rated the emotional and professional support they felt from their management as not supportive, with 31 of 70 respondents feeling "not supported" emotionally [Q28] and 33 of 71 respondents feeling "not supported" professionally [Q29]. the ratings provided improved markedly when employees were asked about how supportive they felt by their supervisors and their colleagues. They responded that their supervisors supported them emotionally, and somewhat supported them professionally, while their colleagues were mostly supportive or very supportive across those topics [Q28,29]. The employees do not feel as though they are supported by management when they do a good job, with 53% responding that they receive not enough support, or no support at all [Q30].

Stress in the workplace may have something to do with these ratings. Employees gave an average rating of 5/10 for their stress at the beginning of their shift with an overall rating of stress, or burnout, from working for OCEMS at 6/10 [Q31,32]. The employees identified the primary reasons for their stress to be issues with compensation and "highly emotional" call responses, with 69% of the respondents estimating that "five or more colleagues are burned out" [Q34]. Overall, respondents rated the "work culture" with an average rating of 5/10 [Q36].

11.1.6 – Recruitment and Retention

Work culture can be a substantial tool utilized to increase recruitment and retention of employees. In an area like Orange County, there are multiple services within a short distance that employees could work for if desired. The responses received for the "organizational culture" questions were echoed in many of the recruitment and retention questions. Employees were nearly split with only 58% responding that they feel OCEMS "fairly and equitably recruits job candidates" [Q38]. Some major concerns were that "OCEMS seems to only recruit heavily from SORS" and that "OCEMS needs to expand their outreach." The responses regarding hiring were similar to the responses regarding recruitment. While most employees said that OCEMS hires "fairly and equitably" there were still concerns that the "process is super subjective" and that "… employees do not agree with the promised benefits given to recruits during the process."

When asked about promotional opportunities, most staff felt that the process was not fair [Q40]. Employee responses made it clear that the process needs to be adjusted, or at least more transparent. There was also concern that there is not enough upward mobility or professional growth available to OCEMS employees, with the majority saying there is not and only 5% of respondents expressing that there is "ample" opportunity for advancement [Q43].

Several staff took the time to provide additional information such as:

- In reference to a promotion: "It was announced to everyone, then it got taken away after someone complained"
- "… Interview process has little to nothing to do with job performance…"
- "… There is absolutely favoritism and those employees who spend time acting as an echo chamber for admin get promoted above others …"

OCEMS employees have several reasons they were initially inspired to work for the organization including the location, the 9-1-1 system, and perceived professional growth opportunities. A discrepancy seen in the responses was that while work culture was seemingly identified as a major issue in earlier questioning, more than a third of the respondents answered that "work culture" is the reason they continue to work for OCEMS [Q45] with the number one reason being location of the service.

OCEMS potentially has a couple of years to work on some of these recruitment and retention issues as many employees responded that their short-term goals (1-3 years) were to stay working for OCEMS in the

same position or move upward in the organization [Q46]. Those numbers drop drastically at the 3–5-year mark with as many as 61% of employees planning to leave OCEMS to pursue higher education, retire, or leave completely [Q47]. With 77% of staff believing that OCEMS is currently understaffed [Q54], additional personnel leaving could result in a continued retention issue. The respondent stated that some possible recruitment solutions involved expanding outreach to the high schools, job fairs, and community colleges, as well as increased advertising, and a better social media presence.

11.1.7 – Operational Issues

A sizable portion of the survey sent to employees dealt directly with operational issues, or perceived operational issues. The operation section covered topics including responses to calls and "move-ups," dispatching issues, scope of practice concerns, QA/training issues, and medical direction.

On average, most employees "felt safe" working for OCEMS [Q52], but suggested improvements including monthly meetings about department improvements and better equipment and training for safety. The general perception of response times is that most employees, 52%, feel that OCEMS responds within an appropriate timeframe for calls in urban areas but not in rural areas [Q57]. A significant area for potential liability is noted that 51% of employees believe that "EMD codes/recommendations are not very accurate, helpful, or followed", while 90% of employees responded that they upgrade or downgrade their responses based on dispatch information received. There should be set protocols to avoid confusion and/or discretion, most of the time, to keep both the providers and the organization safe from potential liability.

Unit "move-ups" were a point of contention noted in the survey responses. Several requests to improve the practice included [Q62]:

- "Earlier alerts"
- Correct/useful locations
- Not using parking lots as standby locations
- Not shifting to other counties for standby/move-ups

The employees rated the overall dispatch/communications services as a 6/10, on average, and recommended improving the technology and increasing staffing as needed [Q61,63]. An issue noted during the interviews and system overview, it was also recommended that BLS agencies and transports be utilized more efficiently and appropriately [Q63]. Further stressing the system, 72% of employees reported that there are issues with hospitals diverting transports and/or wait times at the hospitals [Q64]. It is perceived by one employee that "… we require a more diverse system. Medic 1, 2, and 3 should be moved to 12-hour shifts. We need BLS trucks..." [Q65].

When compared with other agencies, employees mentioned Durham County EMS, Onslow County EMS, New Hanover (Novant) EMS, and Guilford/Mecklenburg County EMS as model agencies for advanced skills, dispositions, and logistics. They stressed that they should be able to "… use the same standards of care as other EMS systems …" and function to the full scope of their abilities and certifications.

11.1.8 – Quality Assurance/Quality Improvement and Training

Most of the respondents felt that the QA/QI process is fair for OCEMS [Q69]. Consistent with most EMS training programs, OCEMS was rated as "effective" in all of the continuing education topics required by state and national guidelines except for pediatric care and mass casualty care or incident management where the majority of respondents recorded that the education was only "somewhat effective" [Q70]. Most employees noted that virtual lectures, whether they are live or recorded, were only "somewhat effective" versus in-person hands-on training was "effective" or "very effective" [Q71]. Some of the following comments were provided by employees in reference to the current QA/QI program [Q72]:

- "I would like to see EMTs have more hands-on training, rather than just training to be the paramedic's assistant. While this is a part of the job, it is too easy to become comfortable with the 'medic safety net'"
- "Hands-on training (such as the new skills section taught earlier this year) is absolutely the most effective"
- "Would like to see the QA person actually perform QA and not just present data from our PCR software"

11.1.9 – Medical Direction

The respondents' views on medical direction were the final questions asked in the survey [Q73-74]. The employees were asked to rate several levels of satisfaction including their satisfaction with the primary medical director, their satisfaction with the fellowship physicians, their ability to receive online medical direction, and their ability to receive a consistent message from the multiple MD sources. Overall, the scores ranged from 5.6-6.8/10, on average, with their ability to receive online medical direction (the most important score) being the highest. When asked to provide additional comments that might relate to medical direction, the employees repeatedly mentioned issues with the primary medical director and their scope of practice. Respondents answered with statements such as "our medical director is too conservative with our protocols," "the current medical director does not appear to have any trust or respect in a large majority of the field staff," the "medical director does not trust his ALS providers or hold them accountable," and a call to find a "medical director who believes in what their providers are doing and trusts their provider" [Q74]. A large portion of the answers can be summarized as the employees feeling as though their protocols are too conservative and that they feel as though they are not allowed to function to their full scope of practice [Q74].

11.1.10 – Summary

This survey covered an extensive amount of information and asked the employees to answer approximately 74 questions, with some questions having additional sections based on previous answers. Due to the anonymity associated with the survey, it is challenging to clarify responses or complete in-depth analysis on some of the more involved topics. This survey was only one tool utilized in the comprehensive system evaluation and should be used in conjunction with the other data presented. The survey questions, in their entirety, as well as some basic analysis for each question, are present in **APPENDIX A** in greater detail.

11.2 – Stakeholder Interview Overview

Primary and secondary stakeholder interviews were conducted with various OCEMS staff members and external resources – such as local fire chiefs – throughout the course of this Study. Overwhelmingly, positive accolades were given to the Agency for its clinical care and provider acumen but notes of criticism were provided regarding the Agency's follow-through with crew complaint items, citing that issues do not seem to escalate or be mitigated appropriately. Other feedback related to fire department and EMS co-location stations/practices presented an opportunity for continued collaboration, but also a fair hesitation as fire and EMS organizational structures, perceived crew work ethics, and an overall difference in agency call volumes posed a challenge for such relationships. This was particularly noted when the topic of potential 12-hour (AM and PM) EMS units was discussed, as some stakeholders thought it may make co-location working relationships more difficult to manage considering that the PM half of the staffing schedule would be expected to be an awake 12-hour shift, rather than one that is intended for overnight sleeping.

Discussing EMS provider levels of care, a nearly universal sentiment was expressed related to how the Division potentially requiring all fire departments within the County to respond at the EMT level (rather than allowing the EMR level) would be seen as a significant hardship for the fire departments. This hardship was largely perceived because of issues surrounding equipment replenishment costs and an unevenly experienced system of disposable goods exchange practices between OCEMS crews and fire department crews. Related to the topic of OCEMS staffing BLS ambulances, many of the fire chiefs were unaware that OCEMS already occasionally downgrades its current units to operate at the BLS level when staffing shortages are noted. Regarding the integration of new BLS units into the system matrix, all fire chiefs expressed an understanding of such a move and only anticipated concerns arising if the use of BLS units would create longer unit response delays due to the need for more appropriate ALS or BLS unit having to bypass one another to respond to calls that fit their EMD code level better.

11.3 – Community Engagement Survey Overview

11.3.1 – General Overview

A community survey was conducted as a part of this Study which focused on gaining public input on various OCEMS and community risk reduction related topics. The questions for the survey were created by the Study team and were reviewed by OCES staff prior to disbursing the survey electronically. The survey started with basic demographic questions to help assess whether a representative portion of the community responded, then progressed into questions relating to whether the community members had ever called 9-1-1 or had any known issues with the service provided. The survey concluded with questions relating to community risk reduction topics and allowed respondents to document their level of interest or concern regarding various topics. In total, there were 96 individual responses to the survey. Two of the responses were noted to have only answered one or two questions, but there was no duplication observed otherwise. Single-choice, multiple-choice, Likert scale, 0-10 rating, and free text options were available for each participant in the survey.

Disclaimer: Due to the online nature of this survey, there was no way to control for participants that did not originate in the community. The survey was available for approximately three weeks and was disbursed by OCES staff. To keep the anonymity of the responses intact, our firm did not isolate any responses or delete them from the datasets. There were no obviously duplicated responses noted.

Some of the key findings of the survey were as follows:

- Approximately 50% of participating community members responded that they have called 9-1-1 to request an ambulance
- There are some respondents who self-identified as high EMS utilizers
- OCEMS was rated as providing a median “level of service” of 9.5 out of 10 by the community
- There were some community concerns expressed, but it is unknown how many of these are directly related to crews from OCEMS versus with crews from SORS (as some comments were clearly related to SORS crews, not OCEMS crews)
- There are ample opportunities for community education based on the provided feedback, including: when/why to call 9-1-1, what EMS providers can do in an emergent situation, and EMS use of lights and sirens
- 98% of respondents stated they would be willing to help a stranger in need of medical attention
- 43% of respondents indicated a need or desire for community CPR training
- 98% of respondents valued the availability of an ambulance as being “very important”
- Most of the respondents (83%) believe an “online” presence is important for OCEMS
- The most common comment was that OCEMS should strive to provide “excellent pay” and “appropriate staffing” for their agency

For easier and direct correlation, direct community quotes and survey data citations are referenced by listing the survey question’s number in brackets (e.g., [Q1]). Further information related to the community engagement survey can be found in **APPENDIX B** *of this report.*

11.3.2 – Demographics and Community Representation

In a community of over 140,000 residents, it was assumed that receiving a statistically significant, or highly representative sample of such a diverse community would present as a challenge to the Study Team. The 96 responses received were noted to primarily originate from the Chapel Hill and Hillsborough zip codes (68% of responses) and appeared to match the U.S. Census data for the County reasonably well [Q1-Q5]. A key observation was that 81% of respondents identified as being heterosexual. This should provide the Department with an opportunity to implement, increase, or otherwise consider, the amount of diversity training presented to the staff. It was a positive sign to see how closely the demographic scores for the community were to the demographic scores for the employee survey. These results suggest that in most fields, other than gender identification, the workforce is well representative of the community.

11.3.3 – Ambulance Operations

The generalized purpose of Question 7, and its sub questions, was to determine the overall perception the community has of the ambulance services received. Approximately 50% of respondents stated that they had called 9-1-1 in the past, with the majority (79%) answering that they had only called 1-2 times [Q7a]. There were nine responses that indicated higher call volumes of three to more than ten times in that same span. The public opinion of the County's PSAP was very positive, with 100% of respondents feeling their calls were answered quickly, and 96% noting the call takers were "professional, polite, and compassionate." A possible area for concern was the public's perception of the responding crews, as only 78% stated that the crews appeared professional, and only 80% believed that the crews treated them with compassion and respect. It should be noted that later responses in the survey suggest that there are some issues with responses originating from calls involving SORS crews, specifically, not OCEMS crews [Q7g]. The survey did not specify or separate OCEMS responses from SORS responses, and it appears that the community does not have the specific knowledge to differentiate the agencies either.

Overall, the community appears to have an incredibly positive view of EMS crews in Orange County. The respondents rated the "level of service received from EMS crews in Orange County" as a median of 9.5/10 and with a mode of 10. Those values speak incredibly highly of the service provided by the field operations crews. 28% of the 47 respondents who have called an ambulance in Orange County answered that they have had a negative experience with an EMS crew [Q7d]. This is a significant percent that could require future investigation. More importantly, administrative staff should ensure that there is a process in place to handle any complaints that is well publicized and easily accessible. This helps ensure that issues can be addressed early and effectively, versus waiting for larger incidents to occur. Questions 7e and 7f reinforce these sentiments as there should be efforts to ensure that the process of dealing with complaints or concerns is transparent to the community. Likewise, there should be a process in place to ensure that accommodations and awards are transparent to the community.

When asked if their concerns were handled in a satisfactory manner, responses received included:

- "Crews were too young, inexperienced, and said they were from SORS"
- "Delayed response and inexperienced crew"

Question 8 revealed that the majority (85%) of people who had never called 9-1-1 for an ambulance before had not done so because they believed that their concern did not need an ambulance. This is a strength of the community and should be leaned on by administrators, who should consider developing and sharing outreach education about when and why to call 9-1-1 for an ambulance to help reinforce these beliefs. Unfortunately, 11% of respondents stated that they did not call 9-1-1 because they believed they could drive to the hospital faster. With education outreach, there should be an effort to educate the population on what EMS providers can do and why calling 9-1-1 may be beneficial in certain circumstances. Part of this education may focus on the nuances of different hospital capabilities and EMS crews' abilities to determine the appropriateness of each local hospital facility during different emergencies.

Three of the survey respondents identified themselves as workers in facilities that utilize EMS "frequently." Due to the small sample size, there is likely little statistical significance to their responses, but it is pleasant to note that their responses were mostly positive [Q9a-9b]. Lastly, 74% of the community appeared to have a realistic view on the use of lights and sirens for EMS [Q10]. The diversity of the responses noted offers an opportunity for additional community education.

11.3.4 – Community Risk Reduction and Outreach

Questions 11 through 15 asked about community risk reduction and training opportunities. 98% of the respondents stated that they would be willing to help a stranger in need of medical attention. Additionally, 98% of respondents answered that they either would be willing to, or may be willing to, perform CPR if the 9-1-1 call taker could walk them through the steps involved [Q14]. This is highly indicative of a resilient community, and one that is receptive to training opportunities. Roughly 43% of respondents stated that they would either like a CPR refresher or have never had the class and would like to learn [Q12]. These numbers were similar when respondents answered about their familiarity with AED use [Q13] and "Stop the Bleed" training [Q15].

Community members were asked to rank the importance of several different topics for Question 16. Ranging from availability of ambulances (98% identified this as very important) to wages and in-home visits, the responses were varied. The respondents did not respond as favorably to the community risk reduction questions, with only 40% believing free classes are "Very Important", 52% responding that public information is "Very Important", 36% answering that in-home visits were "Very Important" and only 27% responding that after-response contact was "Very Important". It was important to note that some of the measures used to reduce risk/injury can be incredibly specific to certain risk groups/demographics. The responses provided may not accurately reflect the amount of impact these programs could have.

Community outreach and information was addressed in the following question. Asking about the importance of a website and/or a social media presence, 83% of respondents believe one or both to have some level of importance. The 17% who believed that neither have any value may have not seen any value in previously posted materials or information. There should be an effort to ensure that information is communicated in a timely, useful, and accessible manner. The low participation noted in this survey is a reasonable indication that the community is not being communicated with in an effective manner.

The survey was concluded with a question regarding any "additional comments or questions." Approximately 25% of respondents answered "No" or in a similar fashion. The only other repeated answer revolved around providing "excellent pay" and "appropriate staffing" for OCEMS. The rest of the comments were very specific and involved generalized concerns about how the community is communicated with.

11.3.5 – Summary

Covering multiple topics across a diverse community, the survey results were hard to predict. The community responded very favorably to most of the questions and seemed to have a reasonable representation of the more populated areas. The study team would be remiss to say that the sample of 96 respondents is a statistically significant representation of the county's population, but the responses received bode well for the relationship that OCEMS has with their service area. Efforts should be made to capitalize on these favorable relationships by increasing community risk reduction efforts and attempts to educate the community on the services provided. This will help OCEMS further their mission, while maintaining critical communication pathways with key stakeholders in the community. Consider future surveys with more advertising and increased accessibility for the more rural portions of the county.

11.4 – Consultant's Findings and Recommendations

11.4.1 – Consultant's Findings

- (Noted within each respective subsection)

11.4.2 – Consultant's Recommendations

- Create employee-driven committees designed to improve Agency communications and to promote employee investment in guideline/policy development.
- Create more promotional process transparency through developing defined career advancement pathways, including position requirements, promotional process details, and established rubrics for determining future promoted employee selection.
- Update current Agency guidelines and policies and involve operational crews in their development process.
- Consider using the frustration with the current "move-up" policy to help establish support for 12-hour shift schedules.
- Work to improve the peer review/quality assurance process by involving FTO staff and other interested crew members as on-shift peer reviewers.
- Immediate efforts should be undertaken to correct the perceived relationship with the Medical Director. A committee should be created to work with the Medical Director to address clinical performance grievances and to increase trust. If these efforts fail, the process of establishing a new medical director for the agency should be considered.
- Consider transitioning away from fire department co-location practices.
- Incorporate efforts to ensure that the process of dealing with community complaints or concerns is transparent to the community, including the steps that residents/patients should take to file a complaint.
- Develop a process to ensure that resident/bystander accommodations and awards are transparent to the community.

SECTION 12 – EMS AGENCY COMPARISONS AND FACTORS IMPACTING IMMEDIATE CHANGES

12.1 – EMS Agency Comparisons

For reference within this subsection, Orange County has a population of approximately 149,000 residents spanning over approximately 398 sq. mi. OCEMS responds to approximately 12,000 calls per year and has a total staff of 86 employees.

12.1.1 – In-State Comparisons

12.1.1.1 – Wilkes County EMS (NC)

West of Orange County toward the Tennessee border is Wilkes County EMS (WCEMS), who also operates as a county-operated (municipal/3rd service) ALS EMS agency. Wilkes County has a population of approximately 70,000 residents (which is less than half of Orange County) and spans approximately 756 sq. mi. (which is nearly double that of Orange County). WCEMS responds to approximately 12,000 calls per year with three full-time ambulances and one supervisor unit. Its total staffing consists of 58 full-time employees and 26 part-time employees who typically work a 12-hour shift, not a 24-hour shift. This difference is likely because of the higher unit workload for each of its ambulances.

Because the agency only staffs three units to cover its large geography and higher call volume (in perspective), it likely faces a significant risk for long response times and higher employee fatigue due to its stretched workload (AVG 4000 calls per ambulance per year, UHU of approximately 0.46 without accounting for total call duration). This agency, as a result, appears significantly understaffed and under-resourced (with regards to stations and units) given these dynamics. [39]

12.1.1.2 – Rowan County EMS (NC)

Northeast of Charlotte is Rowan County EMS (RCEMS), who also operates as a county-operated (municipal/3rd service) ALS EMS agency. Rowan County has a population of approximately 148,000 residents spanning over approximately 511 sq. mi. [40] RCEMS does not have updated response data on its website but does indicate that it responded to approximately 13,000 calls in 2010. Considering that its population around this time was approximately 138,000 residents, it is estimated that its updated call volume is approximately 15,000 calls per year. This agency operates from seven stations located throughout its county and employs 65 full-time and 52 part-time EMTs and paramedics.

Its organizational structure is similar to that of OCEMS, as RCEMS also resides under its County Emergency Services Department as a division. RCEMS is overseen by an EMS Division Chief and has subordinate Battalion Chiefs, Captains, and Lieutenants within its structure. [41]

Operating within its County EMS system is also Rowan County Rescue Squad, a non-profit corporation that is not affiliated with the County government. This BLS agency provides response support to RCEMS in addition to various specialty rescue services. [42]

12.1.2 – Out-of-State Comparisons

12.1.2.1 – Delaware County EMS (OH)

Delaware County EMS (DCEMS) is located in Delaware, Ohio, which is located just north of the state's capital, Columbus. DCEMS is a county-operated (municipal/3rd service) EMS agency and serves a population of approximately 211,000 residents spanning over 443 sq. mi. (covering 459 sq. mi. of total service area). [43]

DCEMS provides ALS ambulance coverage with EMT and Paramedic crews staffing 11 ambulances through 10 stations. Of the 10 stations, eight are standalone EMS stations, while two are co-located with local fire departments. The agency provides only 9-1-1 response throughout its county and is strategically located to provide regular response coverage within four to eight minutes for any high-acuity calls. DCEMS responds to over 6,000 calls per year, which is half of the call volume of OCEMS, even though they cover a 42% higher population. The focus of this agency, nevertheless, is to prioritize adequate geographic system coverage to its residents over unit workload.

Its EMS crews work a 24-hour shift under a three-platoon system, averaging a 56-hour workweek (compared to OCEMS's 4-platoon system and 42-hour workweek), maintaining approximately 120 full-time employees. Its organizational structure is similar to OCEMS's, having an EMS Chief (Director) oversee two Assistant Chiefs. One of the Assistant Chiefs of Operations oversees six Captains (supervisors; two for each of its three shifts). Each Captain oversees individual ambulance crews who have a Lieutenant (typically the Paramedic) assigned to them (except for one of the 11 units, which does not have a Lieutenant assigned to it). [44]

12.1.2.2 – Jefferson County EMS (TN)

Jefferson County EMS (JCEMS) is located in New Market, Tennessee, which is northeast of Knoxville and approximately 100 miles west of Asheville (NC). JCEMS is a county-operated (municipal/3rd service) EMS agency and serves a population of approximately 54,000 residents spanning over approximately 314 sq. mi. JCEMS responds to approximately 12,000 calls per year and staffs four stations with a total of seven ambulances operating within its system. Uniquely, this agency mentions that it operates under a dynamic deployment (system status management) operating system whereby it also rotates units into uncovered or higher call volume areas to maintain adequate countywide coverage.

The agency is overseen by an EMS Director and four Deputy Directors. Within its different divisions, JCEMS oversees the emergency management functions for its county, and has one of these Deputy Directors assigned to this function, who is also a Paramedic. Additional areas of oversight for these positions include emergency operations, planning, training, and administration. JCEMS also employs 45 full-time paramedics and 30 part-time EMTs/paramedics who staff its ambulance units. [45]

12.2 – Factors Impacting Immediate Changes

One of the largest local factors impacting the need for immediate changes for OCEMS and the local EMS system is employee pay. Affectionately referred to as the "Wake Effect," a March 2022 announcement by Wake County EMS touted a 10-15% increase in all baseline EMT and Paramedic wages throughout their agency. This caused an immediate sense of panic for all local EMS agencies as the risk of rapidly losing many of its current employees became a quick reality, since this pay increase was seen as a significant increase above their own base wages (for some, greater than 15%). This resulting move by Wake County, nevertheless, also equates to nearly $5.7 million budget increases as it rolls out this salary raise to over 320 employees, which only accounts for approximately 84% of its total staff.

At that time, this pay raise caused a significant gap between wages locally, as EMT and Paramedic salaries were as follows (approximately):

- Wake County EMS (New): EMT - $44,000 / Paramedic - $62,000
- Durham County EMS (Prior): EMT - $38,000 / Paramedic - $45,000
- Orange County EMS (Prior): EMT - $36,000 / Paramedic - $41,000

Before the raises were implemented, local wages were fairly comparable. Adding to this impact was the incorporation of a wage compression study by Wake County to analyze how impacting starting wages affected existing, tenured employees. In the end, these employees, too, will be seeing wage increases. [46]

The resulting actions because of Wake's wage increases have caused both Durham and Orange to follow suit. New EMT wages for OCEMS range from $43,000 - $57,000 and Paramedic wages range from $50,000 - $67,000. The following shows a new approximate comparison of the increased OCEMS wages:

- Wake County EMS (New): EMT - $44,000 / Paramedic - $62,000
- Orange County EMS (New, Median): EMT - $50,000 / Paramedic - $59,000

The wage increases at the bottom of the organizational chart, however, are now creeping even more into competition with those at the top of the chart, as Supervisors and other administrative staff see less of a gap in their compared wage to those working in ambulances. This narrowed gap – especially when additional overtime is added to EMT and Paramedic wages – becomes even more narrowed when factoring in the exempt status of positions like the Training Coordinator and QA Coordinator, who are salaried (not eligible for overtime) and have a pay range of $46,000 - $80,000. Their added responsibilities and managerial or coordinator roles become less attractive working 40 hours per week over the span of five days, compared to a field Paramedic working 42 hours per week over the course of two days. ***Table 12.1*** shows an expanded wage/salary range for each of OCEMS's positions. [47]

Position	Wage/Salary Range (Approximate)	Mid-Range Wage/Salary (Approximate)
EMS (Division) Chief	$59,000 - $103,000	$81,000
Deputy EMS Chief	$51,000 - $87,000	$69,000
QA Coordinator	$46,000 - $80,000	$63,000
Training Coordinator	$46,000 - $80,000	$63,000
Community Paramedic Coordinator	$53,000 - $70,000	$62,000
EMS Supervisor	$48,000 - $83,000	$66,000
Field Training Officer/Paramedic	$42,000 - $73,000	$56,000
Paramedic	$50,000 - $67,000	$59,000
EMT	$43,000 - $57,000	$50,000

Table 12.1 – OCEMS Updated Wage/Salary Range per Position

As a matter of local comparison – and still placing emphasis on the need to increase administrative staff wages in addition to field staff wages – the salary range for the Chief Paramedic (EMS Division Chief equivalent) in Durham County is $83,000 - $149,000. Comparing the median salaries of this position to that within OCEMS ($116,000 compared to $81,000, respectively), there is a $35,000 median salary different between these two positions within neighboring counties. [48] Granted, Durham County's population, call volume, and agency size is larger than Orange County's, so a pay difference like this makes it enticing for OCEMS administrative staff to view their current positions as steppingstones to something more. As a result, it is recommended that OCEMS administrative positions also receive a respective salary increase in order to not only remain locally competitive, but to also be viewed as a true promotion within the Agency, rather than a role change with more responsibilities and a capped salary without overtime opportunities.

12.3 – Consultant's Findings and Recommendations

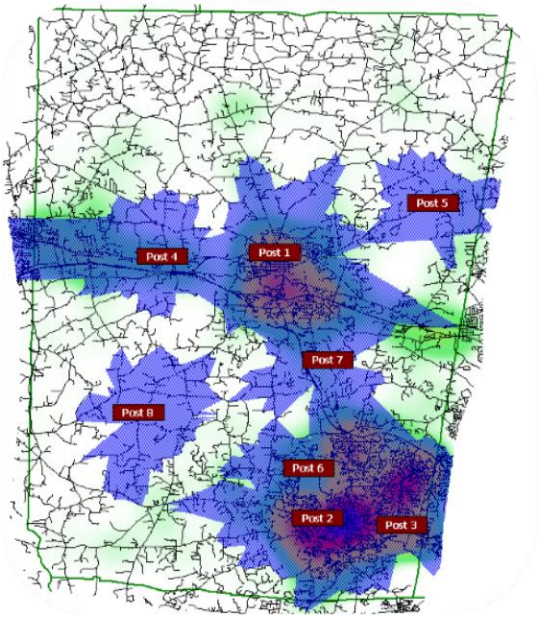
12.3.1 – Consultant's Findings

- Less units can cover greater areas and have higher workloads, but typically at the expense of overall response times and system coverage strength
- Less facilities with more roaming or rotating options can be an option within the OCEMS system
- Narrowed pay gap between field EMS, supervisors, and management

12.3.2 – Consultant's Recommendations

- There is a need to assure that administrative staff members have a reflective wage increase that is not only locally competitive, but also respectively increased enough to create an enticing gap between OCEMS administrative and operational/response staff.

PHASE 2: DEPLOYMENT AND EMS LOCATION STUDY



SECTION 13 – OPERATIONAL AND MASTER PLAN

13.1 – Phase 1 Overview

13.1.1 – Key Findings

Outlined below are some of the key findings from **PHASE 1** of this Report that impact this segment:

- The administrative organizational structure appears to be too lean for the Agency
- Total response time averages for each unit range from 7:50 to 10:55 (mm:ss)
- Most current unit locations do not appear to be directly in call volume centers
- Large rural geographic, low call volume areas of the County are largely uncovered with preferred emergency response times (< 10 minutes)
- Unit workload based on UHU is moderately low (below average-to-average for most units)
- Unit service level downgrades and total brownouts have become more common in recent years

13.1.2 – Setting the Stage for Phase 2

Three focal areas have been identified throughout this Study that largely impact its future development or potential re-design:

- Organizational Structure
- Coverage System (Deployment System)
- Response System

Each of the forthcoming subsections within this Report will identify future operational and administrative recommendations for OCEMS and the overall Orange County EMS system. Within the coverage system and response system recommendations are two primary options for the County to consider regarding future growth and respective needs. As a precursor to system design recommendations is the EMS systems (primarily OCEMS's) organizational structure, which is a recommended structure in both presented system designs, therefore, it is not individually repeated within each option presentation. Each focal area, moreover, is divided or expanded into how its changes will impact both the public and the County's employees, as each option varies slightly in its designed focus.

13.2 – Future Organizational Structure

13.2.1 – Emergency Services Department Organizational Structure and Medical Direction

Coinciding with recommendations outlined earlier in this Report, it is still recommended that the County explore the idea of essentially separating the Medical Director's Office from direct OCEMS oversight and structurally align it within another division, such as Administration. The Administrative Division is recommended as this division could also take on any required compliance issues that must be met at the state or national level and its focus could be to also oversee Franchise Agreements and respective fire department or first responder relationships, which incorporates countywide EMS system oversight (not necessarily operations), medical direction, quality assurance, and medicolegal compliance. If alignment under the Administrative Division is not desired, then direct reporting to the Emergency Services Director in more of an administrative contracting role may be more palatable. Separation from direct OCEMS oversight allows for a fairer environment in overseeing Franchise Agreements and allows for the Medical Director and/or team to play a larger role in system-related compliance without any direct bias toward one individual EMS agency, such as OCEMS. Future growth within this office, which is used as a structurally subordinate group to a division, could also include collaboration with countywide public health initiatives, community risk reduction, provider training, system research and publication development, and overall quality assurance. An example of an office like this currently exists in Austin, TX, whereby its Office of the Chief Medical Officer serves in the systemwide role, not just agencywide. [49]

13.2.2 – OCEMS Organizational Structure

In both of the forthcoming system design options, it is recommended that OCEMS increase its administrative presence and reflective organizational chart to decrease the workload stress and burden on its current administrative staff and also develop and promote a working environment that affords professional internal growth. Without appropriate administrative workload delegation, inappropriate overloading, ineffective multi-tasking, and overwhelming burnout become common experiences of EMS administrators including directors, managers, and supervisors.

Speaking directly from professional experience, each of our firm's subject matter experts has seen and personally experienced the burden of administrative responsibilities. Unlike the EMTs and Paramedics working in ambulances (in the field – where there are certainly their own forms of workload and environmental stressors), the 24/7 stressors of being an EMS administrator can easily overflow into personal lives as project work gets taken home for late night or weekend completion, carrying a second cellphone for all hours communications and notifications adds a sense of constantly being on-call, and the weight of overseeing an emergency service system – including the lives and personal safety of your crews, patients, and the community – can become heavier after a tragic event is experienced. Additionally, the exempt (salaried) status of many EMS administrative staff can be seen as a workload/financial negative, as overtime hours cannot be obtained even despite the argued 50+ hour workweek that many administrators experience. As a result, administrative and organizational chart expansion is necessary.

Noted in the Department's FY 2023 operational budget and personnel request document, OCEMS administrative staff are documented as providing over 200 hours of field or response support to ambulance crews in an effort to supplement system operations. In response to this, OCEMS, quite simply, is large enough of an EMS agency that its core management staff should not be responding to calls or providing 9-1-1 scene responses except for when there is a high profile or long duration event. Only its supervisory staff should be regularly responding to calls. Regular director- or management-level response to incidents should be seen as a sign of a system fault or failure, rather than a necessity. OCEMS needs to first build an appropriate system that appropriately defines and supports this, then build an operational culture that understands and utilizes it. Building a system like this will also improve the growth potential for staff within the Agency, as there will be more career progression and retention potential with more opportunities

available. Without such a structure, staff with personal ambitions of career growth will look outside of the Agency.

As a result, our firm recommends that OCEMS begins building its organizational chart to include expanded administrative oversight, the integration of dedicated FTE logistics employees, the integration of dedicated FTE fleet services staff, and expansion of its daily operations and supervision team. Additionally, position title adjustments and respective rank insignia assignments should be incorporated to better align the Agency with its fire service colleagues. The transition of the Agency's current Community Paramedic nomenclature to a more holistic Community Risk Reduction association is also a recommendation for consideration. ***Figure 13.1*** on the following page shows an updated/recommended organizational chart for the Agency and ***Table 13.1*** expands upon this chart to provide brief details into each position's primary responsibilities and rank insignia.

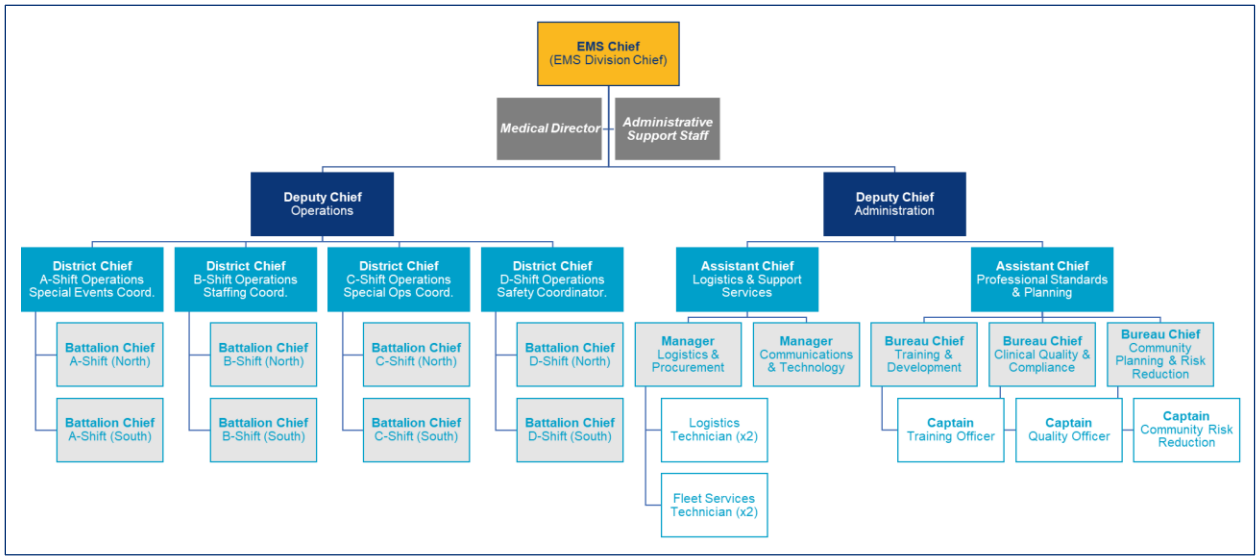


Figure 13.1 – Proposed OCEMS Future Organizational Chart

Position	Role (Status)	Primary Responsibilities	Insignia
EMS (Division) Chief	Executive, Director (Exempt)	Division administrator, finance/budget administrator	
Deputy Chief, Operations	Director (Exempt)	Agency liaison, hospital/emergency department liaison, fire department liaison, dispatch & 9-1-1/communications liaison, system operations	
District Chief, Shift Operations	Manager, Coordinator (Non-Exempt)	Daily system operational oversight, system status management, additional assigned responsibilities (special events coordination, staffing coordination, special operations coordination, safety coordination and exposure/infection control)	
Battalion Chief, Shift Operations	Supervisor (Non-Exempt)	Daily shift operational oversight, direct crew supervision, crew resource management	
Deputy Chief, Administration	Director (Exempt)	Agency compliance, policy development, new employee relations, employee relations	
Assistant Chief, Professional Standards and Planning	Manager, Coordinator (Exempt)	Professional development, data management, privacy/compliance management, performance improvement plan management, clinical officer, medical director coordination	
Bureau Chief, Training and Development	Manager (Exempt)	Training/continued education program management, content development/delivery, FTO relations oversight, employee onboarding, clinical training coordination	
Captain, Training Officer	Coordinator (Exempt)	Training/continued education content development/delivery	
Bureau Chief, Clinical Quality and Compliance	Manager (Exempt)	Quality assurance program management, data management, PCR/peer review process coordination, protocol development	
Captain, Quality Officer	Coordinator (Exempt)	Quality assurance and PCR/peer review process involvement	
Bureau Chief, Community Planning and Risk Reduction	Manager (Exempt)	Emergency preparedness, community outreach, public health coordination, community risk reduction, public information officer	
Captain, Community Risk Reduction	Coordinator (Exempt)	Emergency pre-planning, community risk reduction, community outreach, MIH/CP activities	
Assistant Chief, Logistics and Support Services	Manager, Coordinator (Exempt)	Agency master planning, apparatus supply compliance, asset management	

Manager, Logistics and Procurement	Manager (Exempt)	Supply chain management, procurement, vendor relations, fleet, and facilities oversight	(None)
Logistics Technician	Technician (Non-Exempt)	Supply operations and ordering, light equipment and facilities maintenance, supply delivery and ordering	(None)
Fleet Services Technician	Technician (Non-Exempt)	Vehicle/fleet maintenance and repair	(None)
Manager, Communications and Technology	Manager (Exempt)	Information technology and security manager, technology software/hardware manager, radio/communications logistics	(None)

Table 13.1 – Proposed OCEMS Future Positions and Responsibilities

Key additions or revisions to the organizational chart and overall operational structure include:

- A Department of Emergency Services, Division (of EMS), Section, Branch/District, and Bureau/Battalion organizational approach toward Agency structure
- The division of the EMS organizational structure into two sections: Operations and Administration
- The addition of one District Chief for each shift to provide system oversight and management, while Battalion Chiefs (Supervisors) provide incident management and crew oversight
- Expansion of logistics services within the Division
- Upgrading of the current QA Coordinator and Training Coordinator positions to chief officer ranks, plus the addition of one FTE (Captain rank) for each bureau
- Transition of the Division's current Community Paramedic program into a more holistic Community Risk Reduction (CRR) program/bureau

13.2.2.1 – Supervision and System Oversight

As a result of the dynamic workload expansion and 24/7 nature of EMS coverage and response, it has been identified that the current EMS Supervisors are often, themselves, overworked with regards to daily responsibilities, primarily scene responses, supervision duties, mentorship opportunities, primary ePCR/chart review, and logistics/supply distribution. Focus, therefore, is directed less toward the collective system's operations and more on what needs to happen right now, and crew operations, which is where a supervisor should focus their attention. The gap created in this result, moreover, is one at the higher system level, not crew level. Because of this, it is recommended that a new daily shift position (District Chief) be incorporated that focuses on system oversight and operations, which would then allow the Supervisors (Battalion Chiefs) to focus on crew oversight and operations, including incident management, scene safety, and real-time quality assurance.

During periods of system influx or "surge," Battalion Chiefs could remain in an active response role within the system to provide rural geographic coverage or support to BLS units without having to focus their attention on the larger system's needs; this is where the District Chief position would come into play. The District Chief would be more of a shift manager than a shift supervisor, moving units around to provide greater coverage, navigating on-duty shift coverage for sick call outs, and handling some assigned administrative tasks that the overseeing Deputy Chief of Operations delegates.

Coinciding with this 24/7 approach and need for more direct crew oversight is also a need for supervisor availability. Currently, Supervisors work a 24-hour shift which allows them the ability to sleep during the

overnight hours, during periods of downtime. These sleeping moments essentially leave no one behind the wheel to manage the system or even be cognizant of which crews are operating on calls and might need additional support or supervision besides the communications dispatchers. As a result of the growing system needs and on-duty resources – even during the statistically slower overnight hours – it is recommended that all Supervisors (including the recommended Battalion Chief and District Chief positions) be transitioned to a 12-hour shift as soon as possible. This shift would not currently create the need for position increases or pay adjustments, as both 24-hour and 12-hour Division employees work an average 42-hour workweek already. Transitioning to a 12-hour awake shift affords greater system continuity of operations and eliminates the risk of Supervisors potentially having to be awake for the entirety of their 24-hour shift, which is simply a dangerous risk.

13.2.2.2 – Field Training Officers

Additional position responsibilities such as Field Training Officer (FTO) should also remain in existence with the possibility of expanding involvement to include EMT employees, not just Paramedic employees. It is recommended that the FTO designator be classified as an additional EMT or Paramedic function, as opposed to an entirely different position, because it affords the Division the opportunity to more clearly and definitively outline its direct responder needs without having to make additional budget requests for more promoted positions. As a non-promoted position, this may also help the Division to avoid any potential nepotism policy language that might prohibit workplace relationships to exist where there is a potential for staff members to be in a relationship with any supervisors, which, an FTO could be argued as being a supervisor if it is a promoted position.

In its additional designation capacity, FTOs would be paid at their appropriate EMT or Paramedic wage but would also receive a regular paycheck stipend for accepting and performing their additional FTO duties. This stipend would not be counted toward overtime rate accruals and would only be effective during the pay periods that the employee would be designated as an approved FTO. Having this as a designation rather than a position also would allow for greater flexibility for the employees to avoid any shift trading or unit bidding conflicts. In addition, it may also open the opportunity for the Division to recruit and obtain more FTOs than it presently has now. From a job safety perspective, punitive actions taken against an FTO may only result in that employee losing their FTO designation, as opposed to them risking their employment if no subordinate positions are presently available to fill. On a daily basis and as employees (particularly new employees) are assigned to work with an FTO, this could be performed on any unit to which an FTO is assigned or to designated units where one must be a designated FTO in order to bid for permanent placement on it (i.e., MED1 may be designated as an FTO unit where one must be an EMT/FTO or Paramedic/FTO in order to bid onto it).

13.2.3 – Public and Employee Impact

13.2.3.1 – Public Impact

- Increased Division accountability through appropriate staffing and delegation
- Increased focus on holistic community risk reduction practices and greater stakeholder relationships/collaboration
- Promotes a Division with internal growth and, therefore, increased retention which results in more experienced EMS providers within the County

13.2.3.2 – Employee Impact

- Provides a clear organizational hierarchy, chain of command, and better aligns its positions and titles with local fire service colleagues

- Promotes internal development and employee retention through more career pathway options, thus, also increasing agency recruitment potential
- Lessens the burdens and stressors on current administrative staff by offering more opportunities for workload distribution, targeted project productivity, and overall agency accountability
- Safer working environment for Supervisors affording greater crew oversight and system oversight opportunities

13.3 – Future System Coverage and Response

13.3.1 – Current and Future System Expansion Plans

As outlined in the **EXECUTIVE SUMMARY** of this Report, the Orange County EMS system and its primary OCEMS (Agency) are currently faced with somewhat of a confused or even conflicted coverage and response design model; one with no clear outline of support to address both its geographic coverage gaps and higher-volume and population center response needs. Coverage gaps are further exacerbated by regular unit move-ups and response gaps are created as many current units are not located in ideal places to meet the call volume needs. As an example, MED8 is located in a geographic coverage area designed to provide rural system coverage to the southwest portion of the County, but only during 12 hours of the day and only when the unit is actually located in its assigned station. Regular move-ups and unit brownouts result in more frequent coverage gaps to this portion of the County which, statistically and historically, has a lower call volume to begin with. The conundrum created here relates to the need for the County to decide which factors are more important: system coverage, system response, or both. Forthcoming recommendations will be directed toward addressing both of these factors.

13.3.1.1 – Coverage System

Current system coverage – focusing on geographic coverage – is displayed in the relative maps shown in ***Figure 13.2***, which displays current unit and station locations and their respective 10-minute response coverage areas.

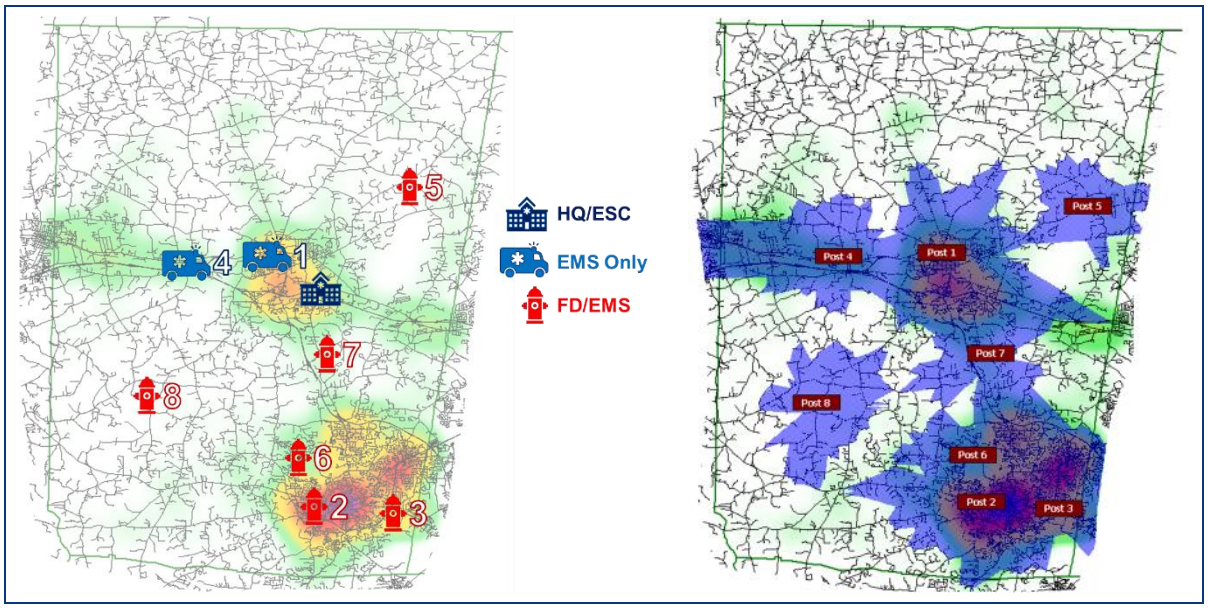


Figure 13.2 – Current OCEMS Station Locations and 10-Minute Response Coverage Maps

As outlined previously in this Report, current geographic coverage leaves significant rural area response gaps within a reasonable 10-minute emergency response timeframe. If greater response times are acceptable to the County's residents, then overall system coverage (~80-90%) can be achieved in approximately 20 minutes from each unit location, but again, this presumes that each unit is in-service and available from its assigned location and it also presumes that upwards of a 20-minute response is acceptable to the County's residents.

Future plans are underway to address some station and unit movement and improved rural coverage (particularly in the northern portion of the County), as is displayed in ***Figure 13.3***.

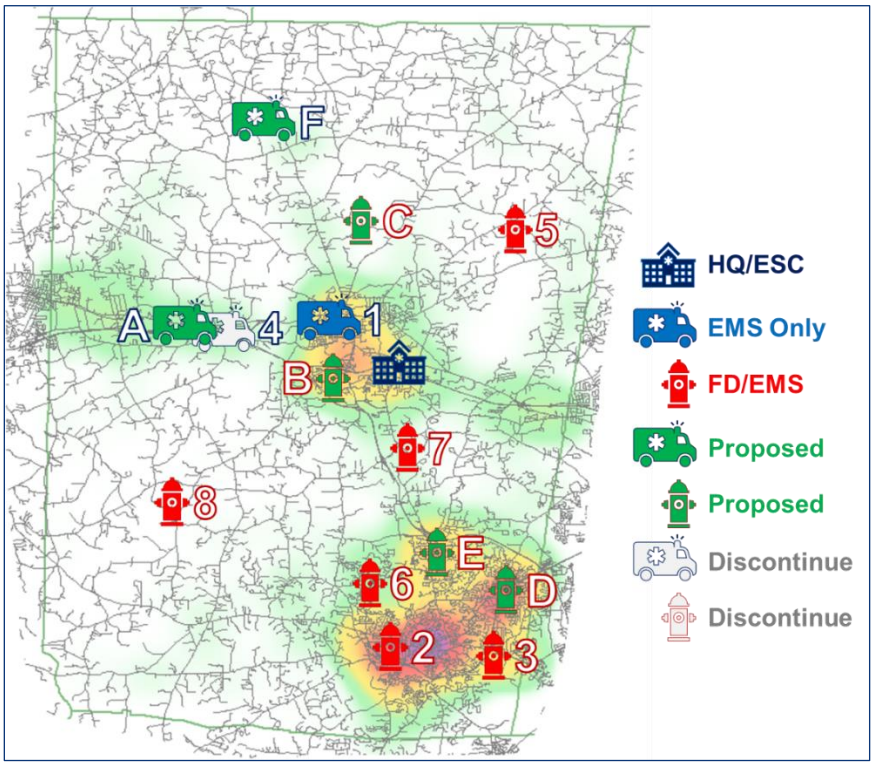


Figure 13.3 – Currently Proposed (Future) EMS Station Expansion and Re-location

Displayed on this map are current EMS stations and proposed new stations and station re-locations. Outlined below is an individual breakdown of each location displayed on this map:

- HQ/ESC – Current EMS Headquarters and Emergency Services Center; no current future changes proposed
- Station 1 – MED1 proposed to be to be moved to Location B in 2023, which will be a jointly-constructed Fire/EMS station with Orange Rural Fire Department (305 College Park Dr., Hillsborough); potentially keeping the current Station 1 location as a new BLS unit station
- Station 2 – No current future changes proposed
- Station 3 – No current future changes proposed
- Station 4 – New Station 4 (Location A) anticipated for building west of the current location (3800 US Hwy 20, Efland); current facility to be discontinued upon new facility completion
- Station 5 – No current future changes proposed
- Station 6 – No current future changes proposed
- Station 7 – No current future changes proposed
- Station 8 – No current future changes proposed

- Location A – Anticipated to replace Station 4 in 2022-2023 (3800 US Hwy 20, Efland) and to be co-located with the County Morgue (***Figure 13.4***) [50]
- Location B – New Orange Rural FD station anticipated to become the new Station 1 (MED1) (305 College Park Dr., Hillsborough) in 2023
- Location C – Potential co-location opportunity with Chapel Hill FD (~2025)
- Location D – Potential new location, possibly co-located with Chapel Hill FD (~2027)
- Location E – Potential new location (~2029)
- EMS 10 (Not Listed) – EMS10/Supervisor co-location with Orange Rural FD; potential movement of EMS10 to new Location B or new Station 4

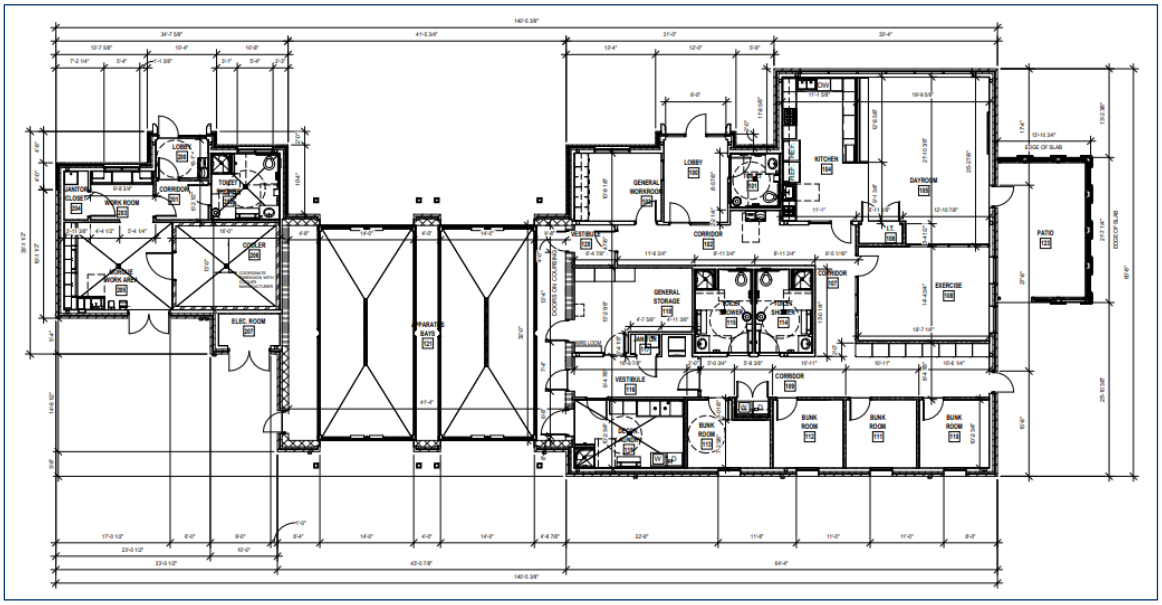


Figure 13.4 – Future EMS Station 4 Interior Design

Respective to future station locations and Agency growth, the forthcoming subsections will outline recommended station location plans that best accommodate the needs of their designed system. Overall, it is still recommended that future focus be emphasized in building County-owned EMS stations that are separate from fire department association.

13.3.1.2 – Response System

The current EMS response system within Orange County appears to be a hybrid attempt at providing both geographic coverage and call volume coverage focused mostly on co-locating with resources that already exist, such as fire departments. This model, however, has proven itself to result in longer response times even in the higher call volume centers, significant geographic coverage gaps when units like MED5 and MED8 are not in their stations, and common unit move-ups in order to provide regular coverage back-fill as daily call volumes peak. The underlying intent of the current model is practical; however, its current execution is not successful. Forthcoming recommendations are designed to address this.

13.3.2 – Recommended Option A – Current System Revision

Option A is designed as a current system continuation but with respective revisions in order to provide some course re-direction toward providing better unit coverage and response, improved public impact, and improved employee workload.

13.3.2.1 – Coverage System

Keeping the hybrid approach of providing adequate geographic and call volume unit coverage, Option A incorporates OCEMS's current plan of integrating two BLS (12-hour) units into the system while also planning for additional future growth. A repeat of ***Table 7.4*** is included as a full and minimum staffing reference based on OCEMS's current system needs. Upgrading to meet these staffing levels should be requested in the next available budget cycle, which also accounts for the staffing recommendations outlined in Option B. Additional ambulance and vehicle resources should also be requested to appropriately correspond to this increased unit presence. ***Table 13.2*** compares the current OCEMS operational units with the recommended OCEMS operational units under the prior recommended organizational chart update. ***Table 13.3*** outlines an updated operational staffing plan to accommodate for this new design structure.

		FULL STAFFING MATRIX			*MINIMUM STAFFING MATRIX*			
Time Period	**Adjusted Units Needed** (High End)	**24-Hr. ALS Units**	**12-Hr. ALS Units**	**12-Hr. BLS Units**	***24-Hr. ALS Units***	***12-Hr. ALS Units***	***12-Hr. BLS Units***	***Allowed Brownout***
Daytime	12	6	4	2	*6*	*2*	*1*	*3*
Overnight	8	6	2	0	*6*	*1*	*0*	*1*

Table 7.4 – Example OCEMS Minimum Unit Staffing, Unit Downgrade, and Unit Brownout Matrix

Unit Type	Current Units (Coverage)	Recommended Units (Coverage)
ALS Ambulance	MED1 (24-hour) MED2 (24-hour) MED3 (24-hour) MED4 (24-hour) MED5 (24-hour) MED6 (24-hour) MED 7 (12-hour, AM) MED8 (12-hour, AM) ----- -----	MED1 (24-hour) MED2 (24-hour) MED3 (24-hour) MED4 (24-hour) MED5 (24-hour) MED6 (24-hour) MED7 (12-hour, AM/PM) MED8 (12-hour, AM/PM) MED9 (12-hour, AM) MED10 (12-hour, AM)
BLS Ambulance	----- -----	BLS21 (12-hour/AM) BLS22 (12-hour/AM)
Supervisor	EMS10 EMS11 -----	BC12 BC11 DC10

Table 13.2 – Option A, Recommended OCEMS Operational Units

Unit	Coverage	Minimum Staff	Overage Staff	Total FTE
MED1	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED2	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED3	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED4	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED5	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED6	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED7	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED8	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED9	12-hour	EMT:2 Paramedic: 2	EMT: 0.25 Paramedic: 0.5	EMT: 2.25 Paramedic: 2.5
MED10	12-hour	EMT:2 Paramedic: 2	EMT: 0.25 Paramedic: 0.5	EMT: 2.25 Paramedic: 2.5
BLS21	12-hour	EMT: 4	EMT: 1	EMT: 5
BLS22	12-hour	EMT: 4	EMT: 1	EMT: 5
TOTAL FTE				**EMT: 51 (50.5)** **Paramedic: 43**
Impact from Current Operational Staffing *(excluding supervisory/administrative staff)*				***+22 FTE***

Table 13.3 – Option A, Operational Staffing Plan

An upgraded staffing matrix essentially adds three full-time units into the existing staffing matrix for OCEMS, with additional minimum staffing coverage requirements, as referenced in ***Table 7.4***. The updated staffing matrix (***Table 13.2***) updates MED7 and MED8 to provide full-time coverage by adding a complementary 12-hour PM shift primarily due to their facility restrictions. Two additional 12-hour (AM) ALS units are added into the total daily staffing, in addition to the two additional 12-hour (AM) BLS units. These six AM units (four PM units) are primarily designed to be system relief units for the purposes of intentional overstaffing, first-unit brownouts, and to provide geographic coverage of areas when the nearby 24-hour units are dispatched to calls. Integrating these units into the system should drastically reduce – if not eliminate – the need for regular 24-hour unit move-ups. The addition of these daytime units will also help to reduce the instances of system "surge", which, again, need to be tracked in more detail.

MED9 and MED10 should primarily be assigned to the new Stations 1 and 4, along with BLS21 and BLS22, as these facilities will have better crew accommodations and available parking, compared to other existing or co-located EMS stations. Noticed within the numbering system is a break from the sequential order of BLS21 and BLS22, as they're not listed as MED11 and MED12, respectively. This different designation (the "20 series") is designed to provide a differentiation between ALS units and BLS units. Additionally, the new District Chief position could be identified as DC10, while the two supervisor units (Battalion Chiefs) would follow numerically with BC11 and BC12.

In an ideal setting, and as referenced in Option B, the OCEMS numbering system would be completely revamped to correlate MED units and BLS units to their respective Battalion. For instance, MED21 and BLS29 would fall under the oversight of BC20. More opportunities respective to an alternative numbering system could also correlate to a countywide fire/EMS department and unit numbering system which also

incorporates respective administrative chiefs or positions into the numbering format (i.e., CH1, CH2, DC1, BC10, BC20).

Considering the existing geographic coverage gaps in the County's northern and southwestern portions, future station positioning should be focused around the area south of the current Station 8, as well as one station north of Station 4 and northwest of Station 5. Additional focus should be placed on eastern expansion toward the Durham County border and in the northeast portion of Chapel Hill. Future station additions, as outlined, would allow for the current Station 7 to likely be discontinued from Agency operations. ***Figure 13.5*** shows this future proposed station map with intended primary coverage areas. Not included on this map is the current Emergency Services Center (ESC) and EMS Headquarters location which, ideally, should be separated from one another with the construction of a new EMS Headquarters and station. This facility would be recommended to coincide with a new station in the northeast portion of the Chapel Hill coverage area.

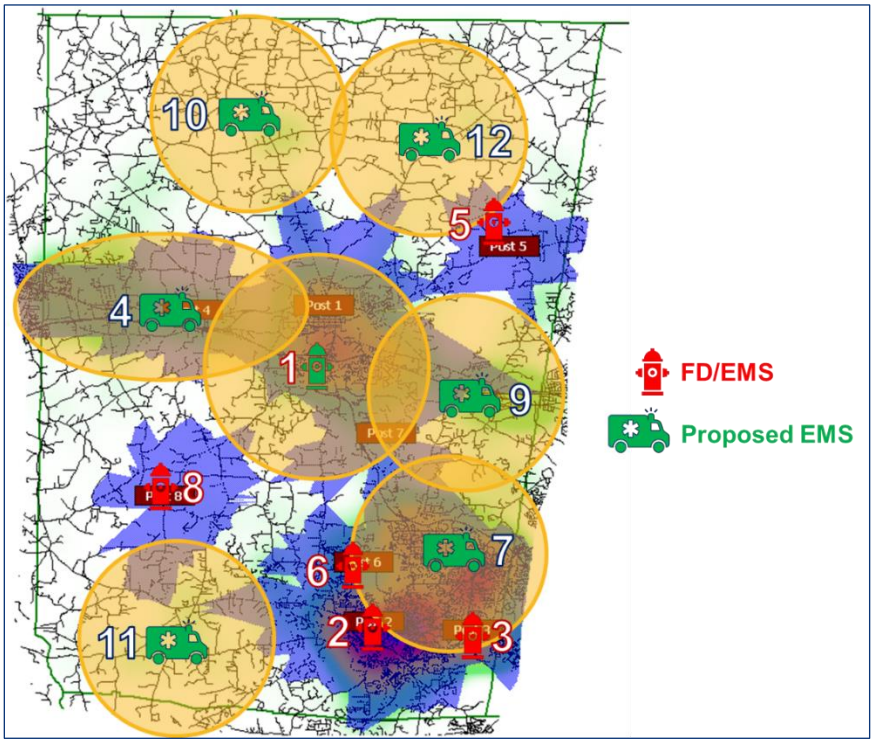


Figure 13.5 – Option A, Proposed Future OCEMS Station and Coverage Map

In this expanded coverage model, the currently utilized 24-hour and 12-hour unit combination would require some further shifting, which will be discussed in the forthcoming subsection. Future station construction is recommended on the following timetable (this is further expanded upon in **APPENDIX C**):

- Station 1 – Actively planned for construction (2023)
- Station 2 – Current station
- Station 3 – Current station
- Station 4 – Actively planned for construction (2022-2023)
- Station 5 – Current station

- Station 6 – Current station
- Station 7 – Recommended new EMS/HQ station build in the northeast Chapel Hill area; discontinue current Station 7 operations once new Station 7 and new Station 9 are completed (2023-2024 construction)
- Station 8 – Current station
- Station 9 – Recommended new EMS station (2024-2025 construction)
- Station 10 – Recommended new EMS station (2024-2025 construction)
- Station 11 – Recommended new EMS station (2025-2027 construction)
- Station 12 – Recommended new EMS station (2025-2027 construction)

As a result of transitioning away from fire department co-locations, it is recommended that future EMS stations (with the exception of a larger headquarters location) are constructed to a size that best fits 1-2 units and 2-5 personnel.

13.3.2.2 – Response System

In this current system expansion model, the initial focus should be placed on the addition of 12-hour units, as well as the consideration of busier current 24-hour units (e.g., MED1, MED2, MED3) to become 12-hour units that provide complementing AM/PM shift coverage. New BLS units are also integrated into the system with the intent of primary low-acuity call response within the Hillsborough and Carrboro/Chapel Hill population centers. Regular unit move-ups should be restricted as much as possible for 24-hour units and should be directed toward 12-hour units, instead.

Corresponding with the additional 12-hour units, it is recommended that these units are dually located in stations that are capable of facilitating their storage. At the current time, this is limited to potentially Station 6, however, the new Stations 1 and 4 will be able to accommodate additional unit staging. As peak call volume times occur, it should be acceptable for these units to be strategically located in roaming areas within Hillsborough and Carrboro/Chapel Hill. While a station-based deployment model is preferred, it is not immediately practical for all hours of the proposed new units during their on-duty timeframe.

13.3.2.3 – Public and Employee Impact

13.3.2.3.1 – Public Impact

- Improved geographic coverage to rural areas within the County
- Expanded coverage and system back-fill coverage in higher call volume population centers

13.3.2.3.2 – Employee Impact

- Less 24-hour unit move-ups
- Increased daily and overnight staffing with more 12-hour shift opportunities

13.3.3 – Recommendation Option B – Re-designed System

Option B incorporates a complete revision to OCEMS's current operational practices primarily by placing all crews on a 12-hour schedule: ideally, 2-on/2-off and fixed to only AM or only PM staffing. Respective coverage and response operations are outlined in the forthcoming subsections.

13.3.3.1 – Coverage System

Short- and long-term geographic unit deployment can take place under the prior outlined station locations and additions but should ideally incorporate the full transition away from fire department co-locating as a result of an OCEMS complete shift toward 12-hour shift rotations. Within this model, units would ideally be housed at one of two geographic EMS stations, and they would subsequently be dispersed to various smaller EMS substations throughout the County. Considering the active plans to construct a new Station 4, this location could serve as a northern "hub" location while a new recommended headquarters location should be constructed in the northeast area of Chapel Hill.

Both of these "hub" locations would serve as the starting point for each 12-hour shift, which would be on a staggered hourly schedule, and as the sole location for crew parking and supply replenishment. Once briefed at the beginning of their shift, units and crews would disperse to existing or new substations, which may include current co-located fire stations but would ideally be separate EMS standalone facilities in the long-term future. Units would also be re-numbered to coincide with their respective Zone to which they are under the direct supervision of. For instance, units assigned to BC10 (Battalion Chief 10) are assigned to Battalion/Zone 1 oversight, while those assigned to BC20 are assigned to Battalion/Zone 2 oversight and are numbered as MED11, MED12, BLS 19, etc., and MED21, MED22, BLS29, etc., respectively (ALS units start with lower numbers and move upward while BLS units start with higher numbers and move downward). Units assigned to Battalion Zone 1 would utilize the new Station 4 as their "hub" location while those assigned to Battalion/Zone 2 would utilize the future Station 7 as their "hub" location. Corresponding with the map provided in ***Figure 13.5***, ***Figure 13.6*** shows the same map but with updated Option B station numbers (station titles in yellow indicate 24-hour coverage). ***Table 13.4*** outlines the new unit designations, shift assignments, and primary station locations for their shift for the following transition. ***Table 13.5*** outlines an updated operational staffing plan to accommodate for this new design structure.

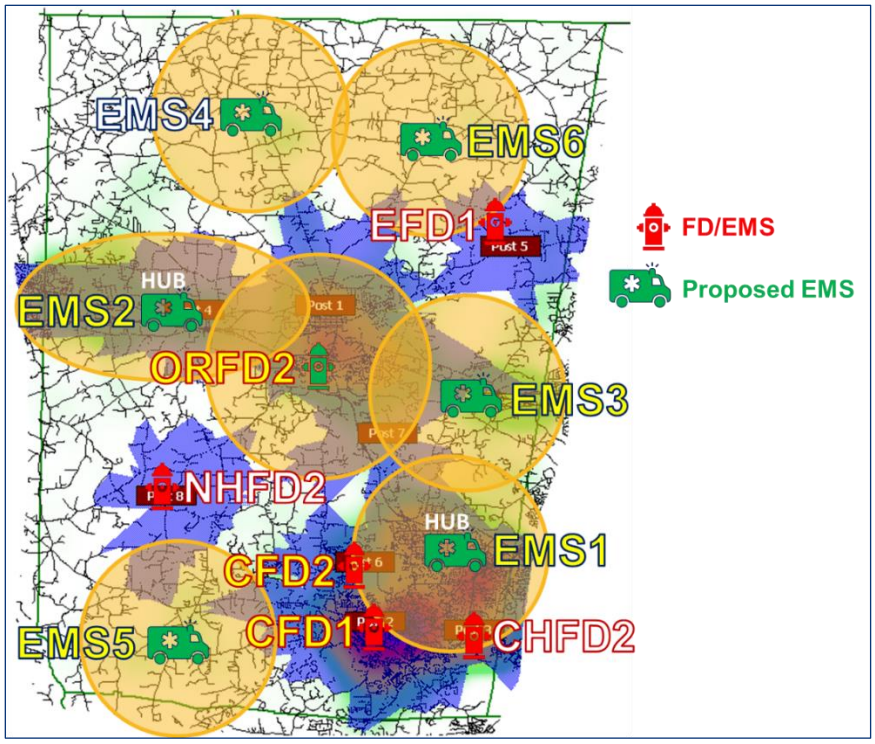


Figure 13.6 – Option B, Proposed Future OCEMS Station and Coverage Map

Unit	12-Hour Shift Assignment	Primary Station Coverage
DC1	07:00-19:00 / 1900-07:00	Emergency Services Center
BC10	07:00-19:00 / 1900-07:00	EMS1 (HQ)
MED11	07:00-19:00 / 1900-07:00	EMS1 (HQ)
MED12	07:00-19:00 / 1900-07:00	EMS5
MED13	08:00-20:00 / 20:00-08:00	CFD2
MED14	09:00-21:00 / 21:00-09:00	CFD1
MED15	09:00-21:00	NHFD2
BLS19	10:00-22:00	CHFD2
BC20	07:00-19:00 / 1900-07:00	EMS2
MED21	07:00-19:00 / 1900-07:00	EMS2
MED22	07:00-19:00 / 1900-07:00	EMS6
MED23	08:00-20:00 / 20:00-08:00	ORFD2
MED24	09:00-21:00 / 21:00-09:00	EMS3
MED25	09:00-21:00	EMS4
BLS29	10:00-22:00	EFD1

Table 13.4 – Option B, Proposed Units, Shift Assignments, and Primary Station Locations

Unit	Coverage	Minimum Staff	Overage Staff	Total FTE
MED11	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED12	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED13	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED14	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED21	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED22	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED23	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED24	24-hour	EMT:4 Paramedic: 4	EMT: 0.5 Paramedic: 0.75	EMT: 4.5 Paramedic: 4.75
MED15	12-hour	EMT:2 Paramedic: 2	EMT: 0.25 Paramedic: 0.5	EMT: 2.25 Paramedic: 2.5
MED25	12-hour	EMT:2 Paramedic: 2	EMT: 0.25 Paramedic: 0.5	EMT: 2.25 Paramedic: 2.5
BLS19	12-hour	EMT: 4	EMT: 1	EMT: 5
BLS29	12-hour	EMT: 4	EMT: 1	EMT: 5
TOTAL FTE				**EMT: 51 (50.5) Paramedic: 43**
Impact from Current Operational Staffing *(excluding supervisory/administrative staff)*				***+22 FTE***

Table 13.5 – Option B, Operational Staffing Plan

Staggered shifts allow for unit movement from their assigned stations to their "hub" location for appropriate crew turnover, while still providing appropriate system coverage during these transition times.

The focus within this coverage model is to provide consistent geographic coverage using stations as static positioning locations, all while incorporating dynamic unit movement and response throughout the shift as call volumes increase or decrease. Unlike traditional system status management (SSM) models that are notorious for having units park on street corners, in commercial parking lots, or stage at hospital emergency department break rooms, essentially making one's ambulance their "home" for the duration of their shift, this model would promote the existence of dedicated facilities for crews to recover, restock, and deploy as needed. Throughout a 12-hour shift, for example, it would be the goal of the overseeing District Chief to assure that units and crews that have met a predetermined call volume are rotated to a traditionally slower station for the duration of their shift, while those that have been outlying are pulled inward toward the higher call volume to provide some reprieve for the already-stressed crews. Appropriate breaks should also be afforded to crews whenever possible such that at least four hours of their total 12-hour shift should be maintained in an in-station recovering capacity.

Under a complete 12-hour shift schedule, crew working hours should be capped at 16 continuous hours with a mandatory 8-hour time-off period afforded after this on-duty time.

13.3.3.2 – Response System

Primary daytime and overnight coverage remain heavily focused on historical call volume and population centers, but expand during the day, compared to current OCEMS staffing, to provide additional rural coverage support. Additionally, the complete transition of OCEMS crews from 24-hour shifts to 12-hour shifts affords the Agency and system the ability to provide necessary unit movement without as many

negative personnel impacts to sleeping habits, as overnight shifts will be designed as awake shifts. This transition should improve unit turnout times and decrease overall fatigue, which is currently increased as a result of overnight unit move-ups. Under this new system, units would be primarily assigned a coverage station, but have the ability to be moved by the District Chief in order to provide better response and geographic coverage as call volumes increase in particular areas.

In the event of unit brownouts, the following daytime and overnight station order is recommended:

- Daytime: First – EFD1, Second – NHFD2, Third – EMS4
- Overnight: Only – EMS3

13.3.3.3 – Public and Employee Impact

13.3.3.3.1 – Public Impact

- Continuous ready-to-respond units
- Less overnight fatigued crews responding to calls

13.3.3.3.2 – Employee Impact

- Less fatigue risk from being awake for up to 24 hours
- Staggered 12-hour shift option with a later start time available
- Fixed 12-hour shift assignments (AM only or PM only)

SECTION 14 – FUTURE PARTNERSHIPS AND OPPORTUNITIES

14.1 – Fire Department Partnership Opportunities

Many current and future anticipated EMS stations are co-located with local fire departments in a joint effort to promote space economy, increase fire/EMS crew collaboration, and position EMS units in more (and in some cases, better) geographic response locations. While this understanding is respected, our firm has come to the conclusion and recommendation that the future focus of OCEMS and the County should transition away from its ideals of fire department co-location and toward a model of developing and owning its EMS stations or co-locating with other County resources, such as the Station 4/Morgue co-location project. Ideally these future co-location or standalone facilities would be constructed on existing County land, but it is also important to remain focused on the current and likely remaining future call volume centers within the County, as these locations require more unit presence and better response times.

Reasons for transitioning away from fire department co-locations and toward standalone or County co-location stations include the following:

- Visually within each station, OCEMS's presence appears to be more of a "tenant" or "user" of the fire department facilities rather than a co-owner or partner, as there are no obvious exterior signs or interior agency representations of presence beyond bunk room labels indicating an "EMS Crew" is present
- EMS and fire crew dynamics seem to be a common issue (not always, and not amongst all crews, however) that causes strife between the two organizations; many fire departments feel as though the station life, work ethic, and level of investment between fire and EMS crews is different (less for EMS). Relationships are arguably less improved than intended in the fire department co-location model; current OCEMS employees feel as though most living relationships are positive, but over half would prefer to be in an EMS-only station
- Fire department locations are often focused on geographic unit placement intended to create shorter response times while EMS station locations should be located not only for geographic and response purposes, but arguably primarily for call volume coverage
- Fire station needs are often far larger than EMS station needs, requiring amenities for 24-hour living, larger crew configurations, and larger apparatus, while EMS station needs may not require the same living amenities if its crews work 12-hour shifts and do not include overnight sleeping abilities
- Current fire department station agreements only facilitate the ability for one ambulance/crew to be located at the station based on sleeping quarters and apparatus bay space (with the exception of EMS Station 6, which also has a supervisor); this is a limiting factor in OCEMS operations
- Standalone or County co-located EMS stations (disassociated with a fire department) afford the County and OCEMS to show respective Agency growth through associated capital growth
- Standalone or County co-located EMS stations afford OCEMS the ability to brand their stations in a way that vibrantly displays an EMS and ambulance presence and the ability to construct stations that can serve as logistics and zone hubs, accommodate training needs, and better meet the dynamic and smaller needs of the Agency, all while having complete oversight and control over the decisions made in their design and purpose

14.2 – Additional Public Partnership Opportunities

Much like the planned new EMS Station 4, our firm's recommendation for the County would be to seek opportunities for increased intra-County co-location opportunities, such as Sheriff's Office sub-stations, regional street and highway equipment locations, shared park and pavilion space, and other expanded efforts with growing County departments and offices.

Additional collaborative efforts, as outlined earlier in this Report, provide opportunities for OCEMS's Community Paramedic (Community Risk Reduction) program to further collaborate with County public health and aging resources in initiatives to improve factors contributing to residents' social determinants of health.

14.3 – Public-Private Partnership Opportunities

The most effective area identified within this Study to strengthen OCEMS public-private partnerships comes in the form of community outreach and risk reduction. As a tax-funded resource, OCEMS is strengthened by a supportive tax base and, therefore, has a vested interest in showing their appreciation for such support through public recognition of private organizations doing good within the community or even making private donations to fund Agency-eligible items. This financial support may come in the form of a healthcare system supporting the printing of patient information flyers outlining "when to call 9-1-1," or major commercial employers supporting a local community event where OCEMS crews are providing free CPR training to the community.

Within the Community Paramedic (CP) space, opportunities do exist to engage in private hospital and healthcare system space to provide agreed-upon in-home health care, however, such agreements are not always common or viewed by the healthcare entities as necessary as of yet. Future opportunities by the Centers for Medicare and Medicaid Services (CMS) and their Emergency Triage, Treatment, and Transport (ET3) initiative may provide some future hope for increased funding modalities, but there is not much anticipated action to take place within this arena until at least 2025. Turning to private insurance payors, however, is showing to be the most promising financial partnership option within the CP arena; however, such partnerships are difficult to accomplish and are not always cost-effective in long term.

Other creative, private fund-raising options may exist which incorporate corporate sponsorships and advertisements of support displayed on funded apparatus or equipment but are very uncommon in the public EMS model setting. Collaboration, of course, with local private EMS vendors to obtain mutual aid agreements and offers for collaborative staffing support for special event coverage are also available options but are not as creative as the prior option. Receiving private funds in the form of donations or engaging in any public-private contract partnerships, moreover, should always be performed in accordance with applicable ordinance and legal oversight.

CLOSING

SECTION 15 - SUMMARY

15.1 – Closing Summary

Orange County, North Carolina, has experienced a steady population growth over the past decade and anticipates seeing this trend continue into its 10-year future. The EMS system within Orange County, particularly Orange County EMS (the Agency), however, has not experienced this proportionate growth over the past decade, nor has it seemingly addressed the rural coverage needs of the County as a result. Between 2010 to 2020, the County's population increased by approximately 20,000 residents and the equivalent of only one full-time ambulance unit was added to the EMS coverage system. This additional ambulance equivalent coverage, however, is only fulfilled within the County approximately 67% of the year, therefore, leaving OCEMS not much better staffed than it was in 2010.

Geographically, large rural coverage gaps in the County's north and southwest remain largely uncovered by units, leaving response times of 20 minutes or greater a reality for a large area, but small population volume of the County. Future station and unit growth, however, needs to address these coverage gaps in an effort to narrow the response time gaps that residents within rural environments experience compared to population centers. While call volume data alone does not suggest the need for increased rural staffing, the existing coverage gaps and affective impact of long response times during true emergencies does.

Moving into the future, a strengthened administrative organizational chart, expanded and targeted station locations, and an increased unit staffing model will help the County to remain in a state of readiness, all while providing for adequate system call volume fluctuations. Combined with defined minimum staffing requirements and a fully transitioned 12-hour shift model system, OCEMS will be poised as a strong competitor within the local EMS market and a located-to-respond agency for its County residents.

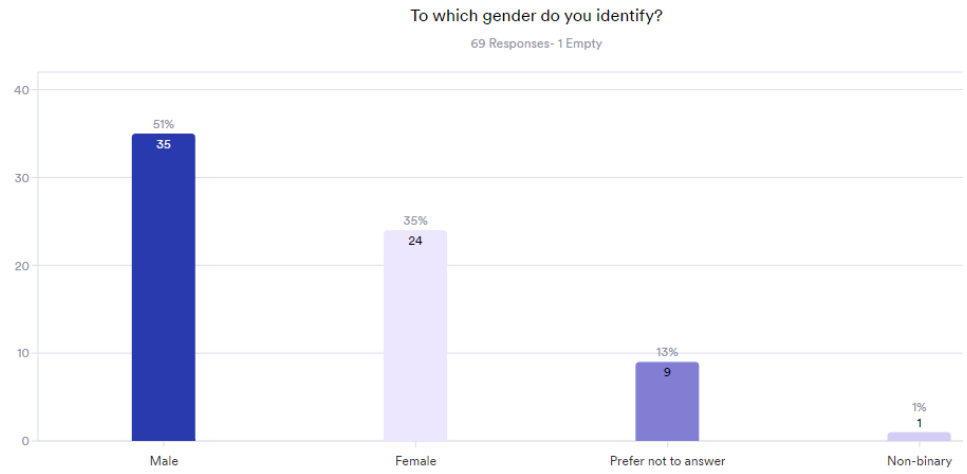
APPENDIX

APPENDIX A – EMPLOYEE OPERATIONAL SURVEY

An employee engagement survey was developed by PCG with question recommendations and approval provided by the Study Team, and electronically dispersed by the consultants to each OCEMS employee (86 budgeted positions in total). The survey was designed to provide anonymous results and received 70 responses.

Disclaimer: There was the possibility of duplicate/inaccurate responses. There may have been additional instances of similar scenarios. To keep the anonymity of the responses intact, our firm did not isolate these responses or delete them from the datasets. As a result, there is a possibility (strong likelihood) that there were only 69 participants, as opposed to the tracked 70. Because of this, all results/percentages represented may have a margin of error that could result in a 0-2% increase/decrease from their posted values. It is also worth noting that the questions were not numbered on the survey sent to employees, the numbering was added for simplicity/ease of analysis after the results were collected.

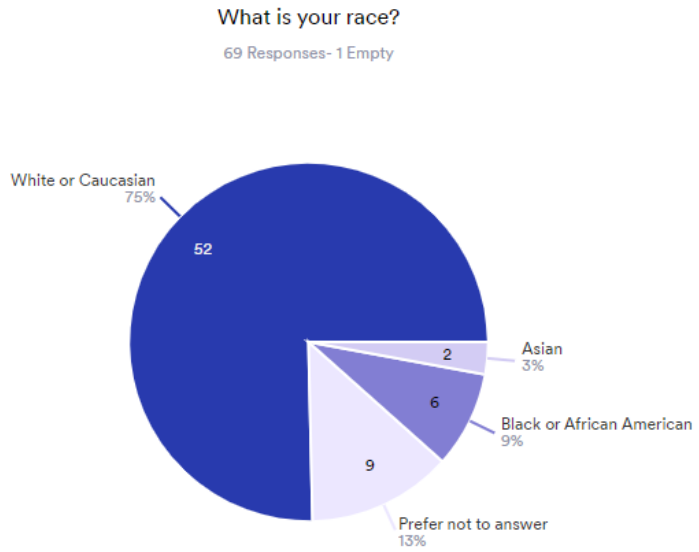
1.



Observations and Details:

- 51% of respondents were male, 35% female, and 14% either binary or prefer not to answer
- The high percent of personnel preferring not to answer suggests that there is a possible training opportunity

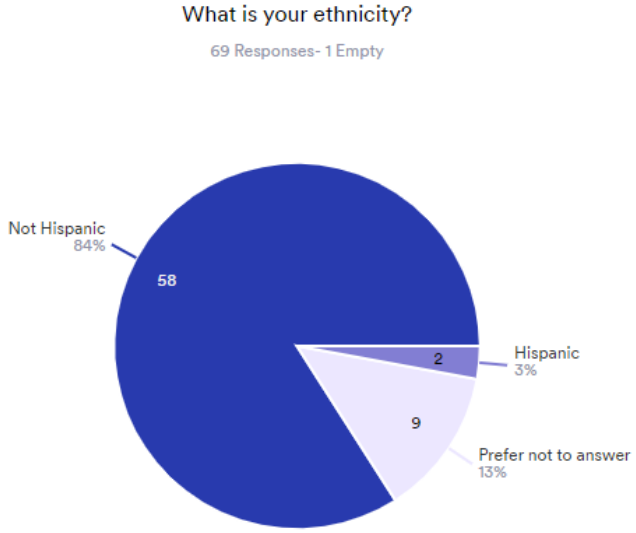
2.



Observations and Details:

- The OCEMS staff is more diverse than the typical EMS agency surveyed by the NASEMSO in 2020, they are similarly diverse when compared with their community

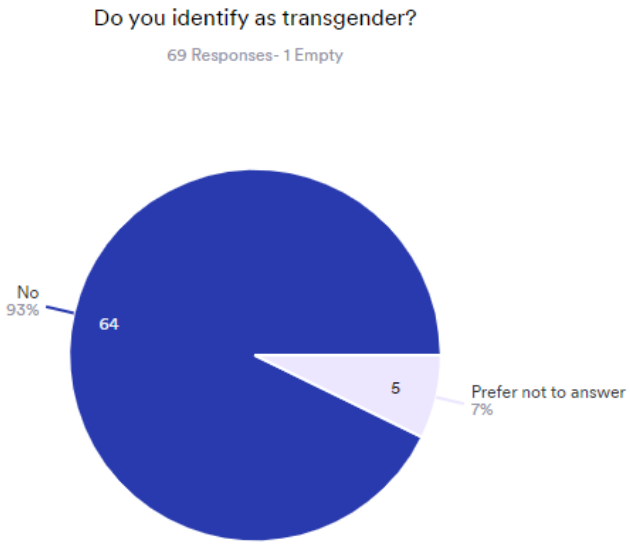
3.



Observations and Details:

- The OCEMS staff identifies as less ethnic than their community

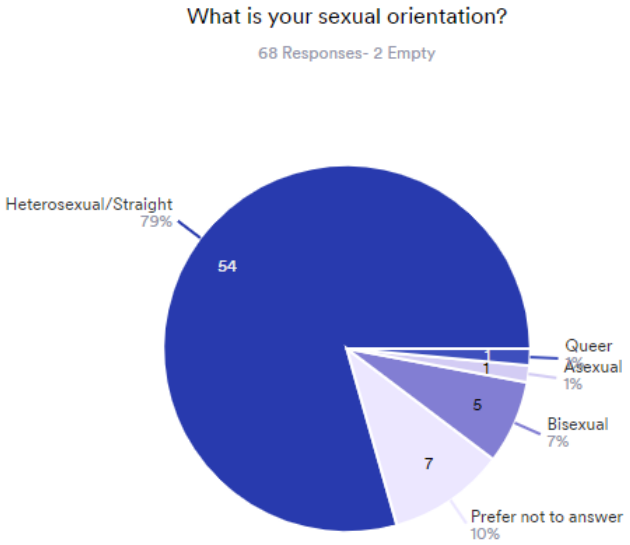
4.



Observations and Details:

- 7% preferring not to answer suggests that there is an opportunity for education/training present.

5.



Observations and Details:

- Continue to consider diversity training where deemed necessary or helpful. Ensure that resources are present to employees that match their self-reported demographics.

6. What languages do you speak other than English?

Observations and Details:

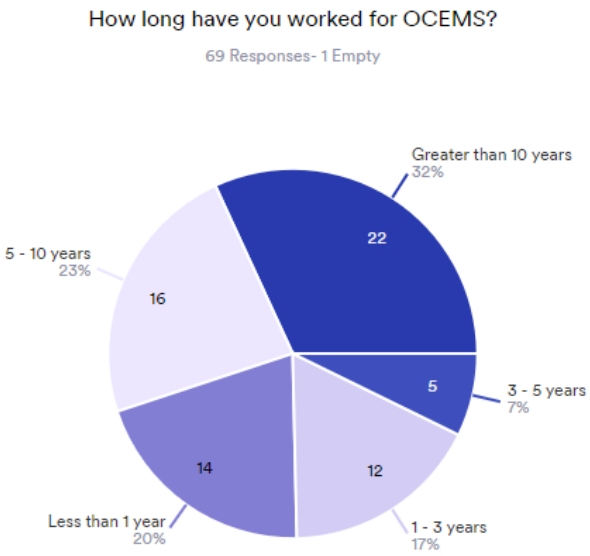
- Roughly 25% of the 23 respondents reported speaking Spanish. There was 1 respondent for each of the following languages: Mandarin, ASL, Igbo, Pidgin, French, Portuguese, Dutch, and Turkish
- Consider harnessing these skills for cultural training and basic language courses

7. What is your employment status?

Observations and Details:

- 80% of respondents were full-time, 20% part-time

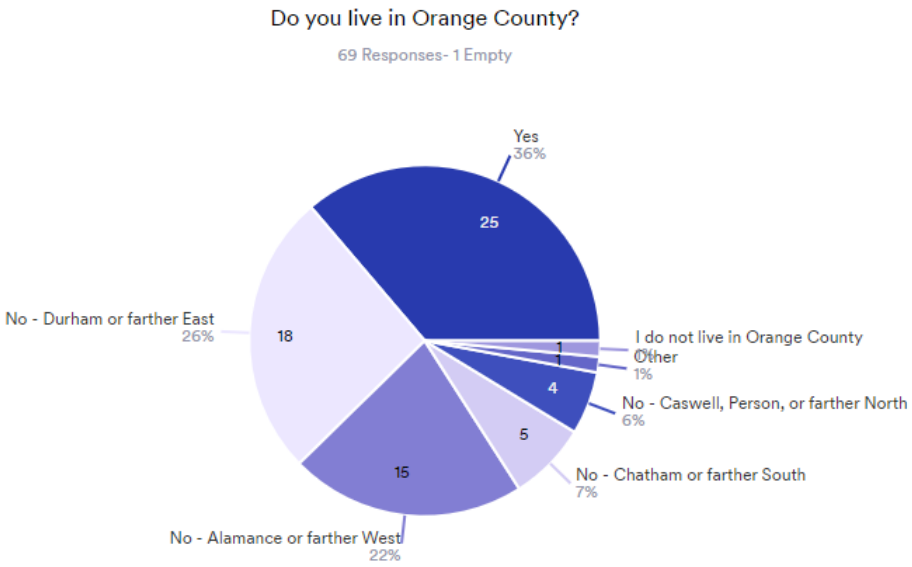
8.



Observations and Details:

- The longevity of OCEMS appears to be a strength
- Efforts should be made to increase retention in the 0–3-year range; rapid turnover can lead to increased turmoil and decreased job satisfaction
- With >50% of employees with >5 years of experience with OCEMS, staffing arrangements should allow for more experienced providers to be with less experienced providers; this provides benefits of field experience to the newer provider, while giving more experienced employees up-to-date knowledge

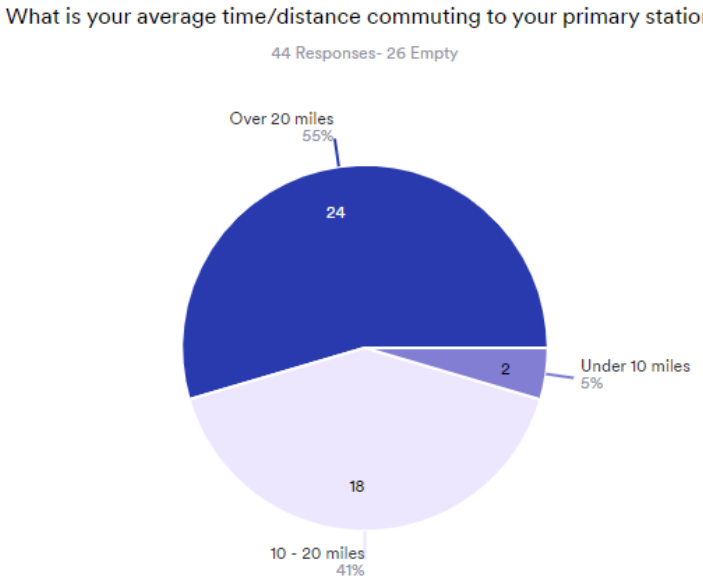
9.



Observations and Details:

- OCEMS staff live in various areas. Consider staffing employees at stations near their homes, when available, to increase employee satisfaction
- Very little gain "forced rotating stations" when the deployment model is so fluid; typically, systems may encourage "working throughout the system" for familiarity, but with the call volume OCEMS has, personnel are likely to respond throughout the county regardless of their assigned station

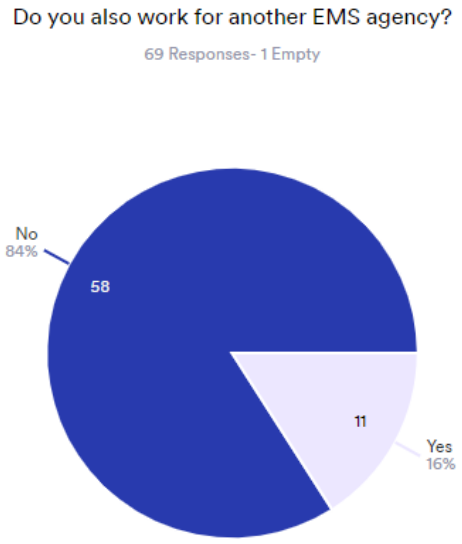
10.



Observations and Details:

- Echoing concerns from the previous question, closer assignments allow for decreased commutes and decreased vehicle costs
- With 24-hour shifts, a shorter drive home could equate to increased commuting safety

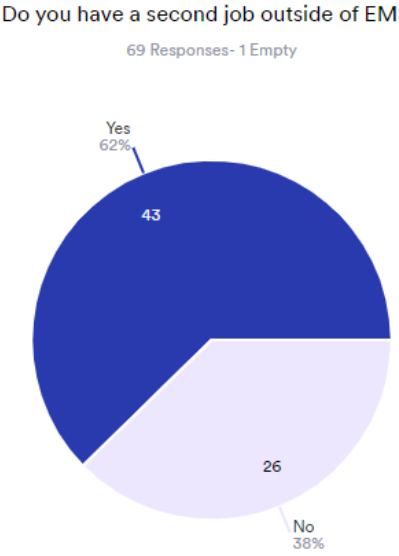
11.



Observations and Details:

- Potentially due to the understaffing/availability of overtime present within OCEMS
- Further investigation would be needed to provide substantial analysis

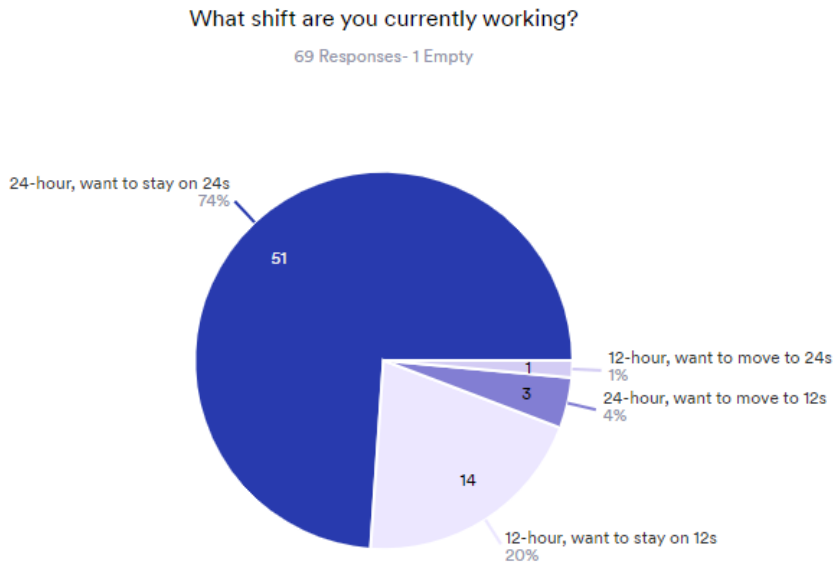
12.



Observations and Details:

- Not uncommon in the fire and EMS profession, especially in the setting of 24-hour shifts
- Consider "secondary employment" requirements/approvals to prevent possible conflicts of interest

13.



Observations and Details:

- Employees are generally content with the shifts they work (likely secondary to lifestyle choices)
- Safety and system issues may necessitate change regardless

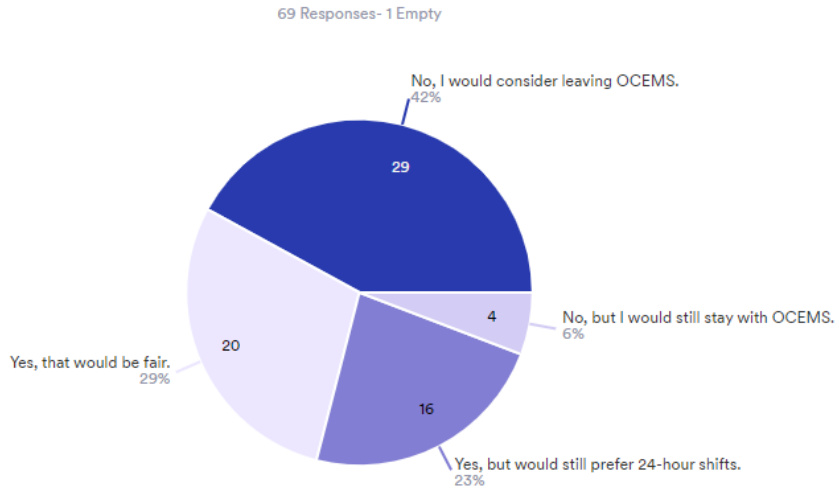
14. What work schedules do you prefer?

Observations and Details:

- Employees were given choices including fixed and rotating schedules of 12- or 24-hour shifts, and they had to rank them in order of preference
- The most popular combination had fixed 12s as the first preference and rotating 12s second
- The second most popular had fixed 24's followed by fixed 12s
- 37% of employees listed 12-hour shifts as their top priority and 53% of employees had 12-hour shifts listed in their top two preferences
- 73% of employees had 24-hour shifts in their top two preferences

15.

If adequate call volume data was presented to you, would you be open to working a 10- or 12-hour shift instead of a 24-hour shift?

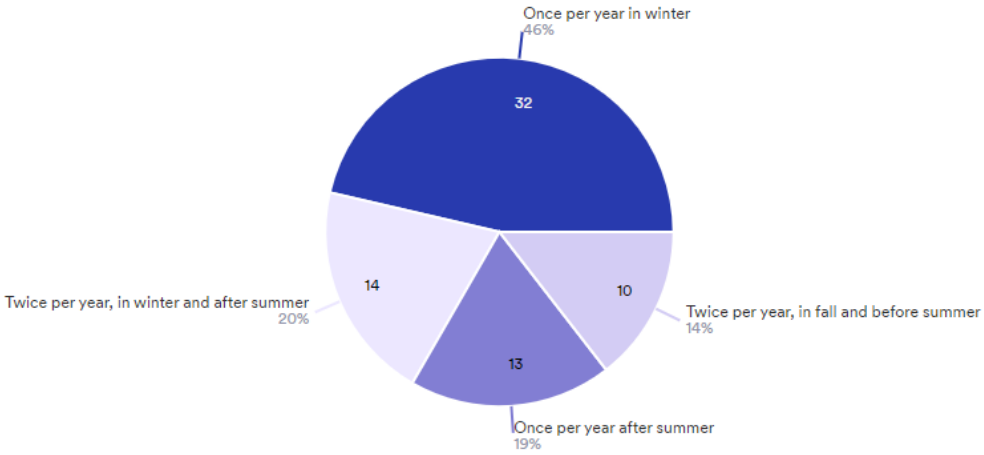


Observations and Details:

- 42% state they would consider leaving OCEMS, but locally, there are no agencies that have OCEMS' call volume and shift schedules
- Substantial portion would be willing to make the change, or would at least stay with OCEMS

16.

How often do you believe shift bidding should occur and when?



Observations and Details:

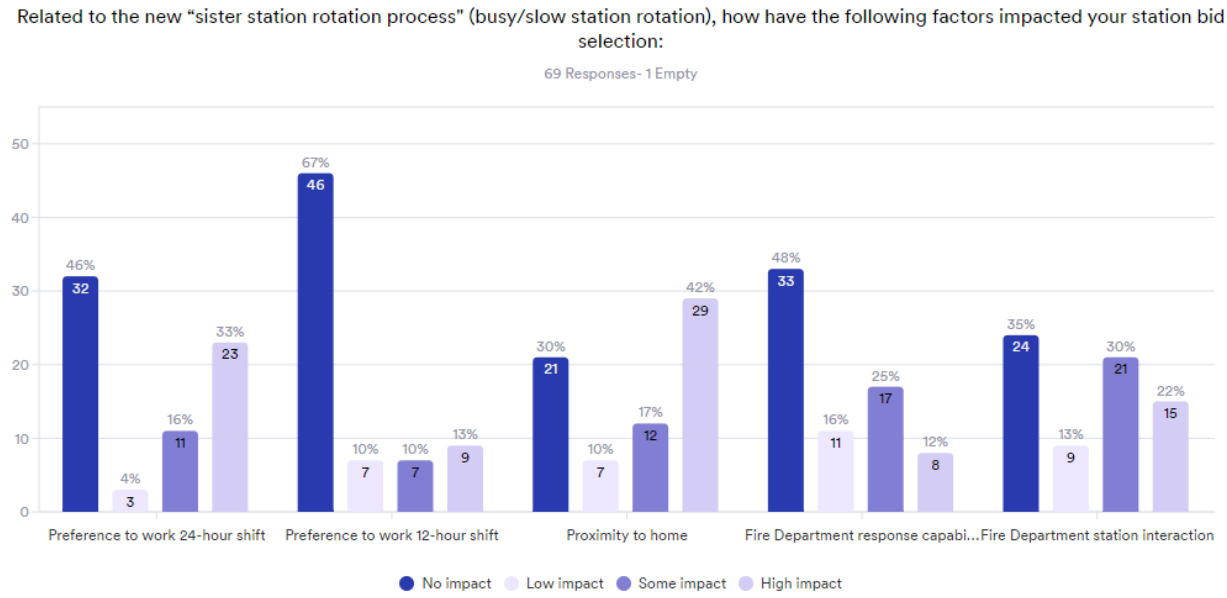
- Employees generally support a "once per year" system
- Consider implementing "shift change" requests to help alleviate the need for a "bidding system"

17. Please prioritize how each factor determines which station/ambulance you bid for during the bidding process by dragging each item into the desired order (1 being most important to 6 being least important).

Observations and Details:

- 75%, listed the proximity of their assignment to their home as being their number 1 or 2 priority
- The most chosen responses had "Station proximity to home" and "Busy call volume" within the top two preferences.

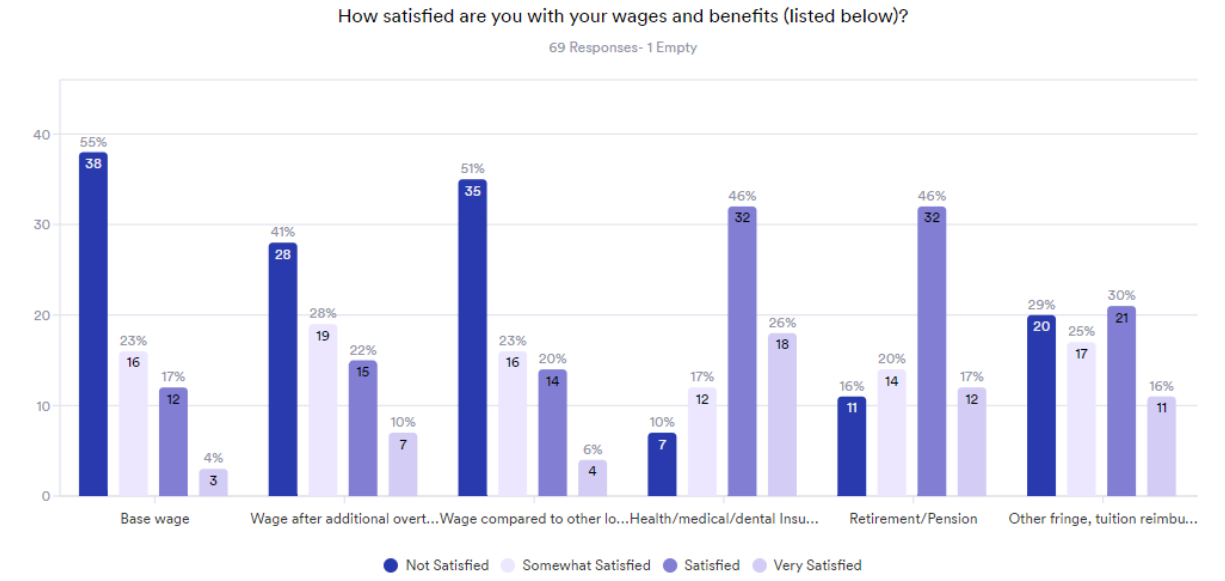
18.



Observations and Details:

- Varied impact overall, Station proximity to home and 24's are two highest impacting factors

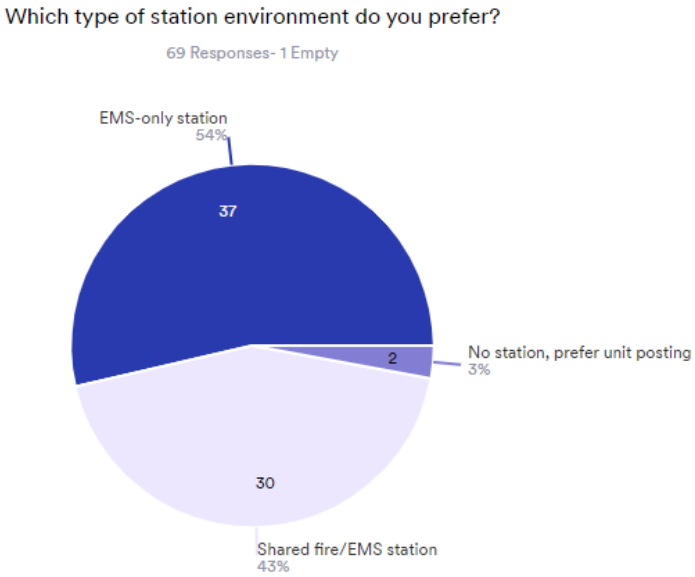
19.



Observations and Details:

- Noted earlier, this survey was completed prior to effective communication of the new compensation rates for employees
- Other than wage, employees are generally satisfied with their benefits.

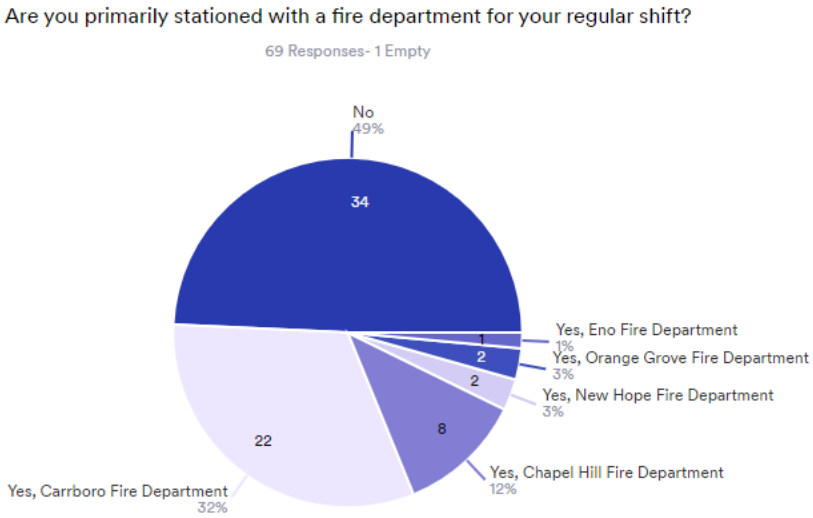
20.



Observations and Details:

- More than half of employees do not wish to share their space with fire departments

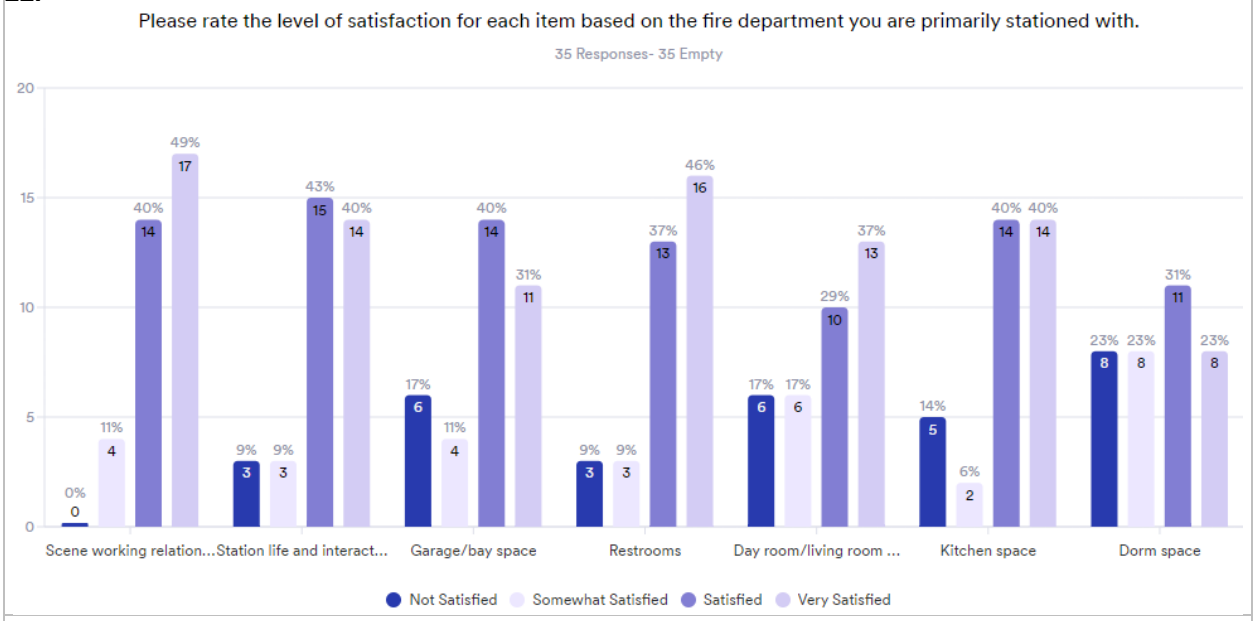
21.



Observations and Details:

- When combined with the previous question, it suggests strained living arrangements at the shared spaces

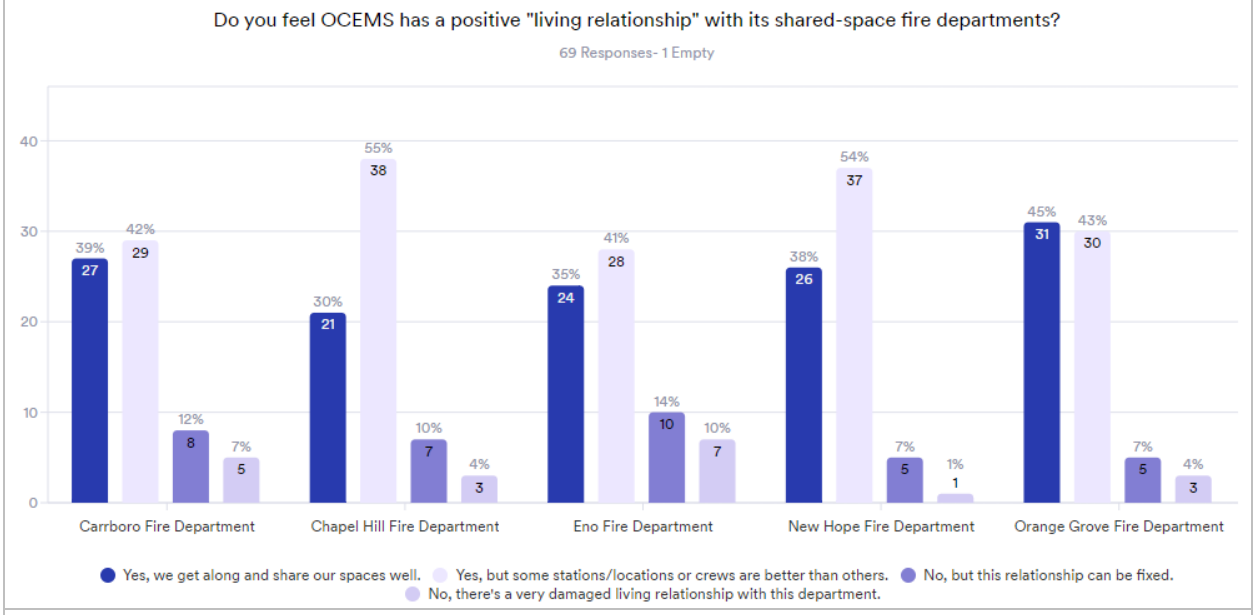
22.



Observations and Details:

- Primary points of contention are living space and dorm areas
- Ratings suggest a good "working" relationship with fire personnel when providing service to the community

23.



Observations and Details:

- It was rare that an employee rated a relationship as poor with one department, and positive with another, suggesting that there may be some specific personality conflicts versus a systemic issue
- Overall, positive ratings

24. Please provide any more detail you can regarding your answer to the above question.

Observations and Details:

- There were 0 responses to this question which suggests it failed to populate correctly in the survey

25. Do you think it would be valuable to co-locate with other Fire Departments that OCEMS currently does not co-locate with? If so, who?

Observations and Details:

- 71% of respondents answered “No” or “N/A”
- Caldwell and Cedar Grove were each mentioned by approximately 5 respondents

26. How would you rate the working relationship between South Orange Rescue Squad (SORS) and OCEMS?

Observations and Details:

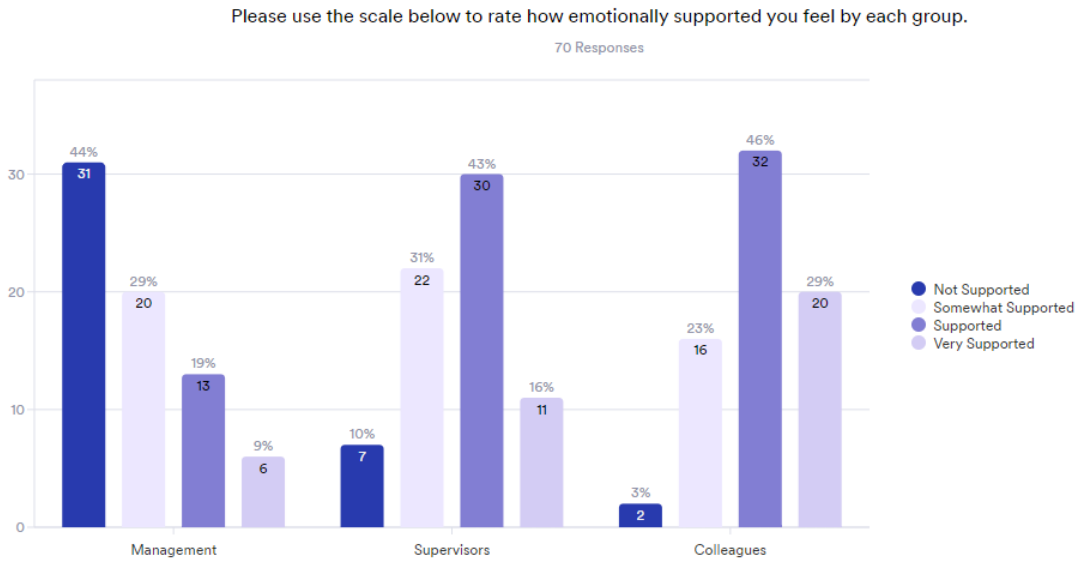
- Mean Response: 6.45 [High response of 10(2), low response of 1(2)]
- Median Response: 7
- Mode Response: 7
- Responses suggest that employees are generally satisfied with the relationship

27. Do you have any comments to add related to the working relationship between OCEMS and SORS?

Observations and Details:

- Common theme in responses was the need for greater respect between the agencies
- Multiple employees mentioned concerns of training continuity
- The variety of responses and concerns suggests a complicated, and poorly communicated, relationship

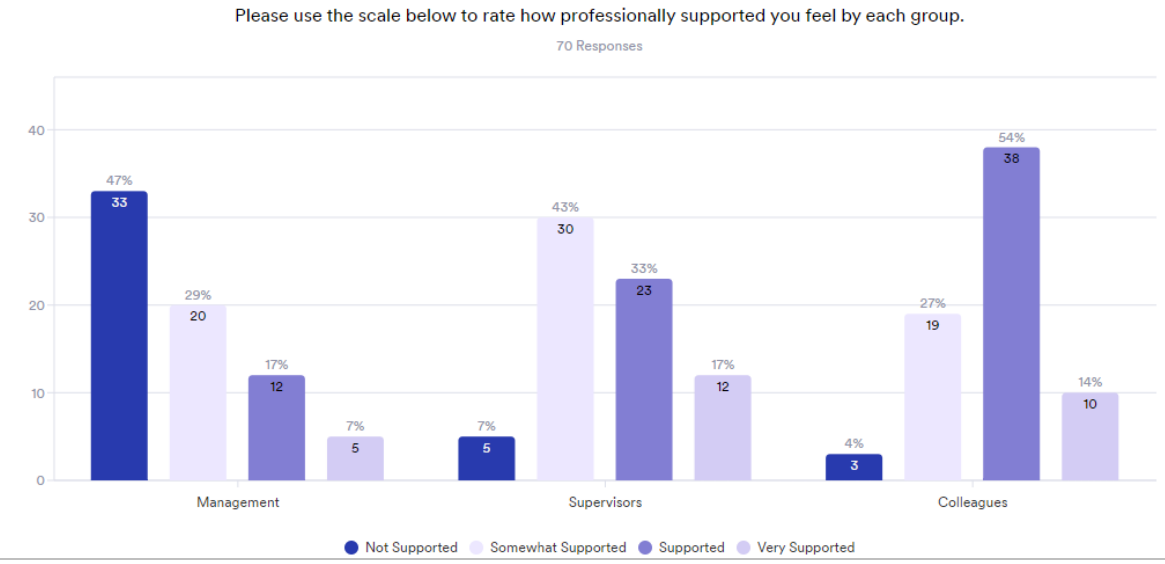
28.



Observations and Details:

- Significant work is needed to correct the management/operational barrier
- Employees feeling supported by their supervisors and colleagues is a significant strength

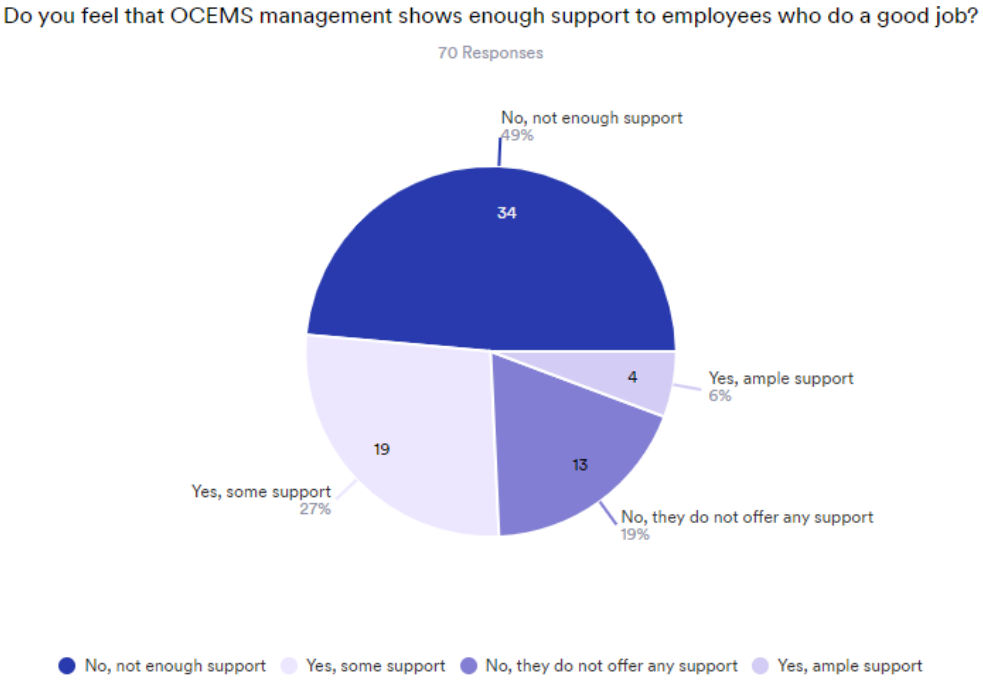
29.



Observations and Details:

- Like the emotional support, this suggests a deep disconnect between the management and operational staff. Simple, yet effective, communication may be enough to impact this significantly

30.



Observations and Details:

- 53% of employees stated no support, or not enough, from management when they do a good job
- Employees with no incentive to perform well, will be less likely to try and excel in their positions

31. What level of stress do you often feel at the beginning of your shift as an employee of OCEMS?

Observations and Details:

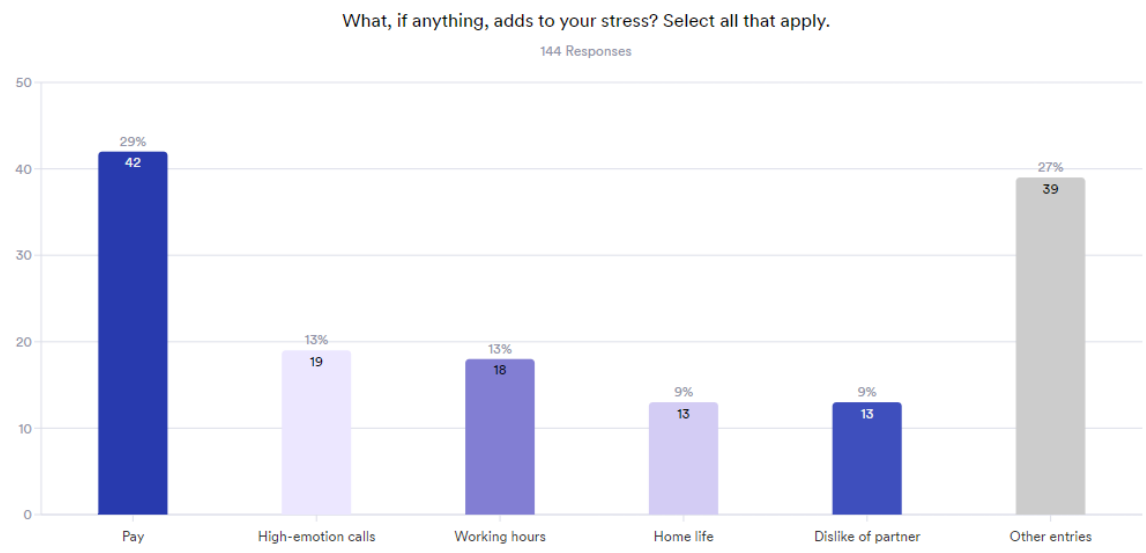
- Mean Response: 5.11
- Median Response: 5
- Mode Response: 5
- Responses suggest a moderate level of stress at the beginning of their shifts
- Frequent exposure to moderate levels of stress can greatly diminish performance and resilience

32. Overall, how would you rate your level of stress or burnout as a result of working for OCEMS?

Observations and Details:

- Mean Response: 6
- Median Response: 6
- Mode Response: 5
- High levels of self-reported stress or "burnout" will lead to decreased performance and culture issues
- Can also attribute to high turnover rates in new hires
- Staff report completing "multiple burnout surveys for no apparent reason because nothing changes"

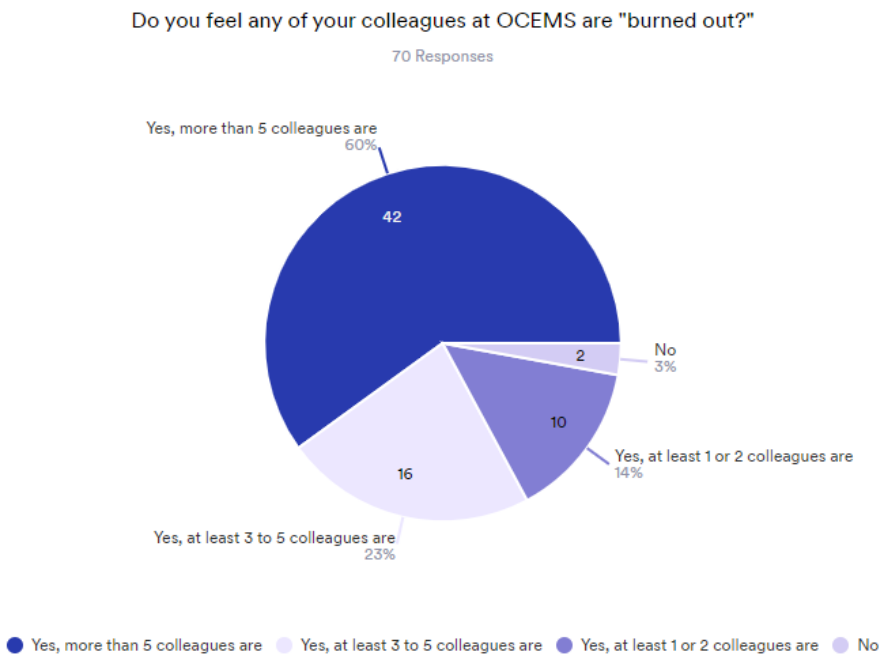
33.



Observations and Details:

- These ratings bode well for OCEMS as the compensation was increased as of July 1, 2022
- Other common responses were related to: lack of communication, disengaged management, lack of operational support/planning, poor unit utilization, poor accountability practices, failure of management to follow the "ETHOS" document

34.



Observations and Details:

- 83% of employees believing that 3 or more colleagues are "burned out" is a significant risk to patient care, employee satisfaction, and organizational stability
- The high level of perceived "burnout" suggests the need for additional resources for employees

35. How would you rate the overall work culture at OCEMS?

Observations and Details:

- Mean Response: **5.2**
- Median Response: **5**
- Mode Response: **5**
- A strong "work culture" can lead to more efficient communication and increased trust in the agency

36. Do you believe that OCEMS provides the same levels and standards of care for all members of our community (across all races, socio-economic statuses, gender identities, etc.)? If no, why not?

Observations and Details:

- Most common (82%) answer was "yes" in some form; this is an agency strength
- The most common answer otherwise revolved around frustration with repeat callers and was not secondary to truly discriminatory behaviors
- 14 participants left the field empty, it is unknown if that was meant to represent a positive answer or not, so those 14 were not included in the calculations for this question

37. Do you believe that patient outcomes are the same for all members of our community (across all races, socio-economic statuses, gender identities, etc.)? If no, why not?

Observations and Details:

- Similar ratings (78%) for respondents who answered "yes" in some form
- Those who answered "no" cited systemic healthcare problems that OCEMS has no control over; only one response suggested that OCEMS providers have any impact on the differences in outcomes
- 16 participants left the field empty, it is unknown if that was meant to represent a positive answer or not, so those 16 were not included in the calculations for this question

38. Do you feel that OCEMS fairly and equitably recruits job candidates? If no, why not?

Observations and Details:

- Approximately 58% of employees answered in the affirmative
- Common concerns included focusing recruitment "too much on SORS" and "not enough outreach"
- 16 participants left the field empty; it is unknown if that was meant to represent a positive answer or not, so those 16 were not included in the calculations for this question

39. Do you feel that OCEMS fairly and equitably hires job candidates? If no, why not?

Observations and Details:

- Most employees felt the hiring process is fair and equitable
- Common concerns included that the process is "super subjective" and that "employees do not agree with the promised benefits given to recruits during the process"
- 19 participants left the field empty, it is unknown if that was meant to represent a positive answer or not, so those 19 were not included in the calculations for this question

40. Do you feel that OCEMS fairly and equitably promotes staff? If no, why not?

Observations and Details:

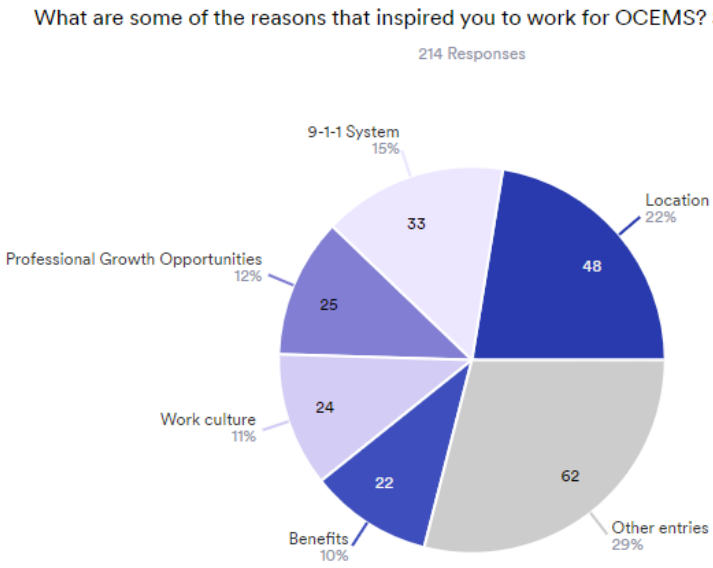
- Only 19% of staff answered in some form of yes
- Those who provided explanations cited concerns of personnel being offered a promotion to have it "stripped," lack of transparency of the process, lack of clear expectations, and heavy "favoritism"
- 12 participants left the field empty, it is unknown if that was meant to represent a positive answer or not, so those 12 were not included in the calculations for this question

41. How would you rate the level of appreciation and support that OCEMS receives from its residents?

Observations and Details:

- Mean Response: **5.8**
- Median Response: **6**
- Mode Response: **7**
- An interesting metric, usually directly linked to communicating what the agency is accomplishing with the community (i.e., more communication leads to more support/appreciation)

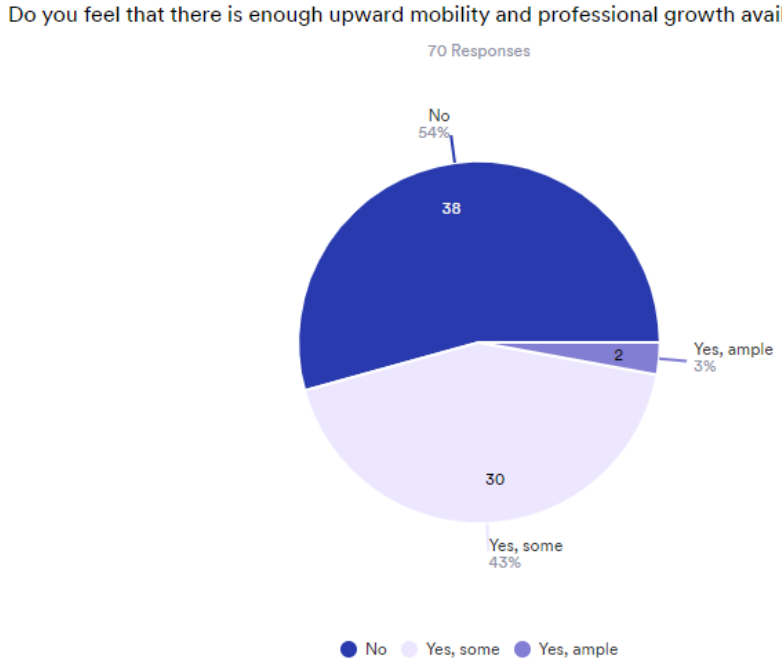
42.



Observations and Details:

- Suggests strong areas that can be capitalized on (9-1-1 System/Location) for recruitment
- Only other common answer was the 24/72-hour shift rotation

43.



Observations and Details:

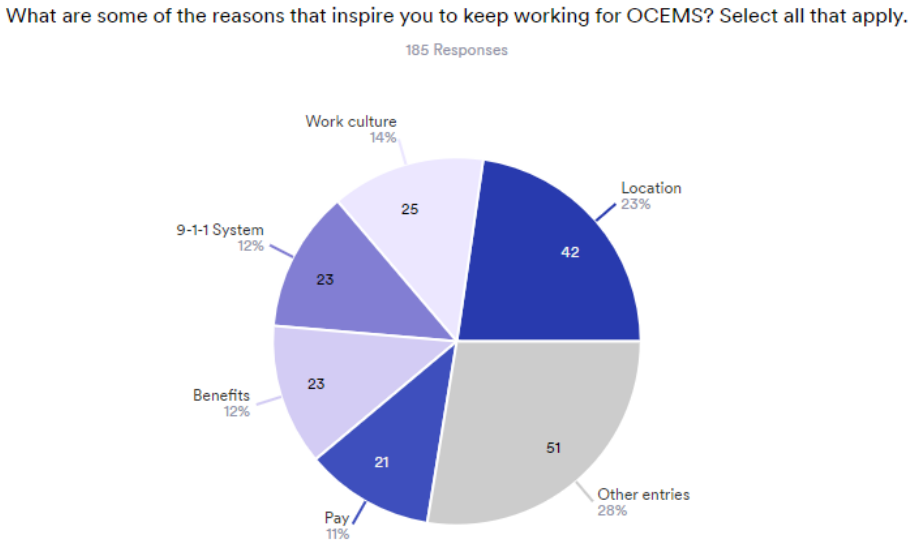
- Professional growth/career ladders are important recruitment and retention tools
- If these options are available, 54% of employees are unclear as to their path

44. How likely are you to recommend others to work for OCEMS?

Observations and Details:

- Mean Response: **5.8**
- Median Response: **6**
- Mode Response: **6**
- The close groupings of the mean/median/modes for the rated questions suggests that the employees share common feelings
- Ideally, this value is higher to allow for increased recruitment and a better work culture

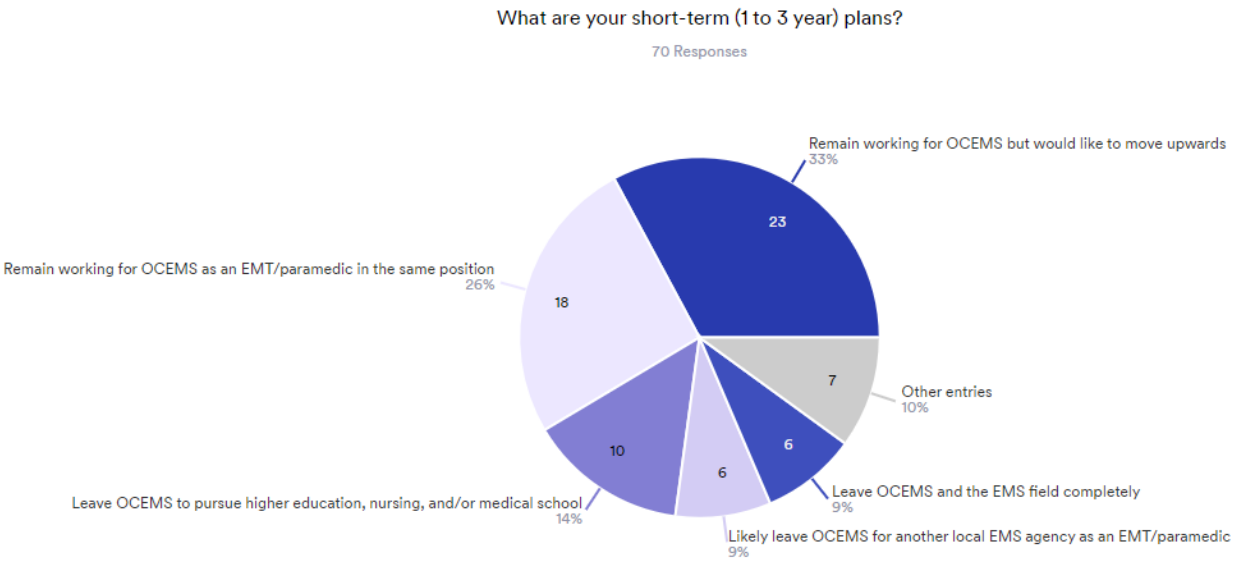
45.



Observations and Details:

- Location continues to be important to employees, allowing for assignments close to their primary residence can help OCEMS take advantage of this strength
- Other answers included “already vested” and “admin changes frequently, so that provides hope that there will be change soon”

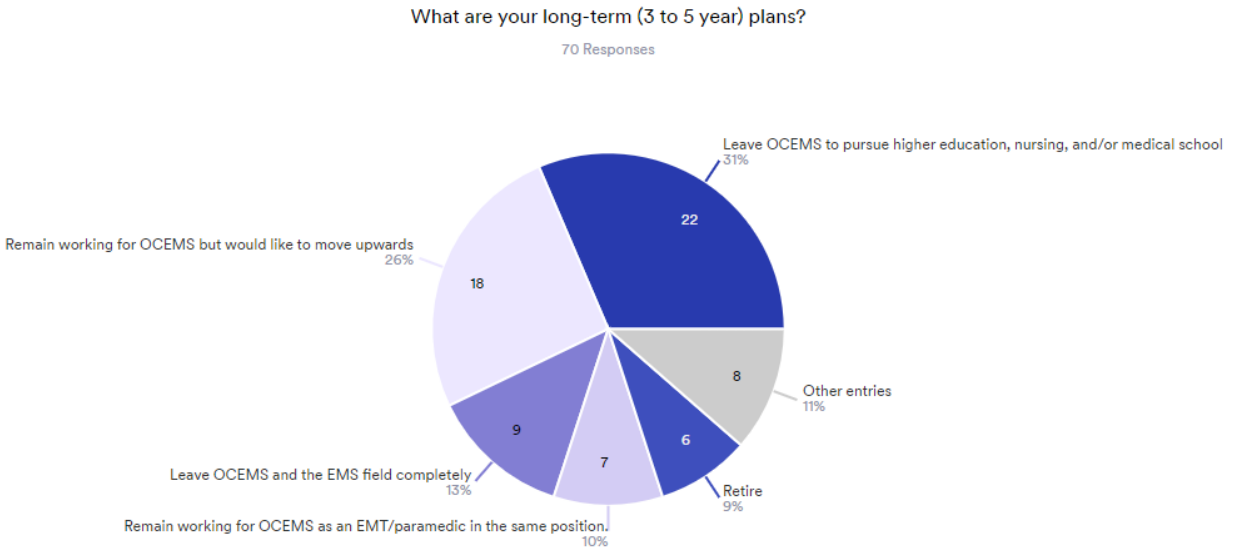
46.



Observations and Details:

- Majority of employees want to stay with OCEMS 1-3 years
- Most of the "Other" entries were related to retirement

47.



Observations and Details:

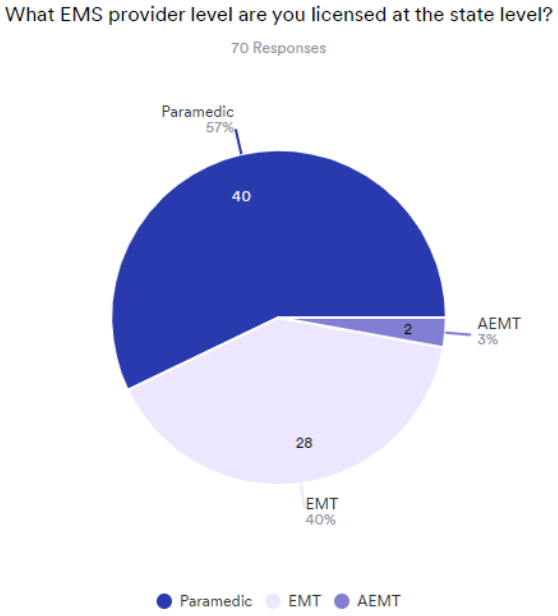
- "Long-term" outlook is not as positive as short-term.
- As many as 61% of employees plan to leave
- Strong organizations are built on reliability, and retention is required for that to occur
- Leveraging state pension benefits can help push employees to the 5+ year mark
- "Other" entries included leaving OCEMS for promotional opportunities and leaving OCEMS to work for a fire department

48. What suggestions do you have for OCEMS to recruit new employees?

Observations and Details:

- Most common responses included “better outreach” and “reach out to high schools”
- Other suggestions included “expanding recruitment efforts nationwide” and “more social media presence”

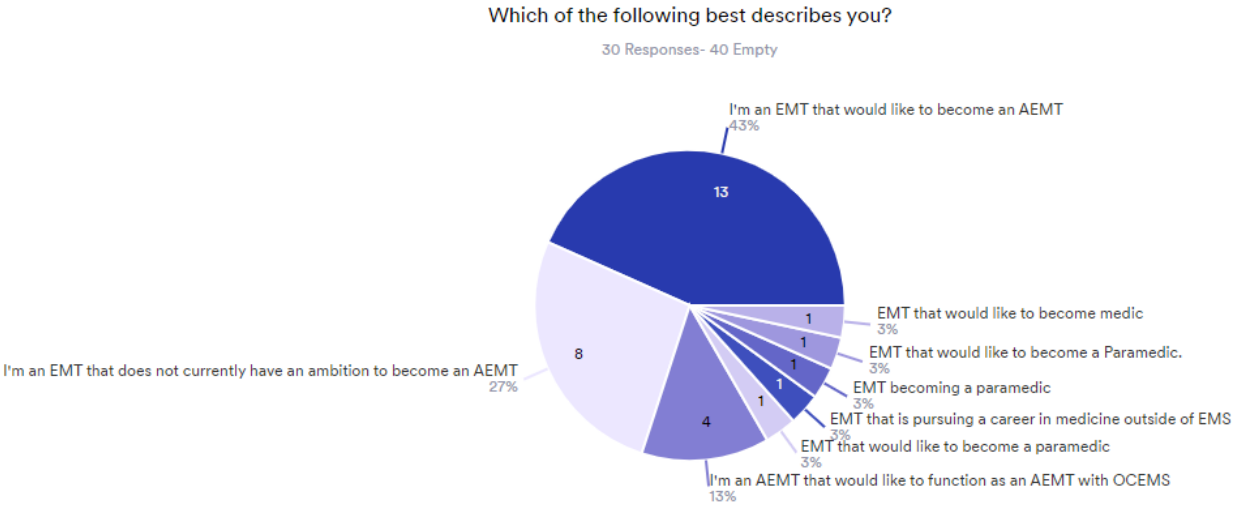
49.



Observations and Details:

- Consistent with the current staffing model

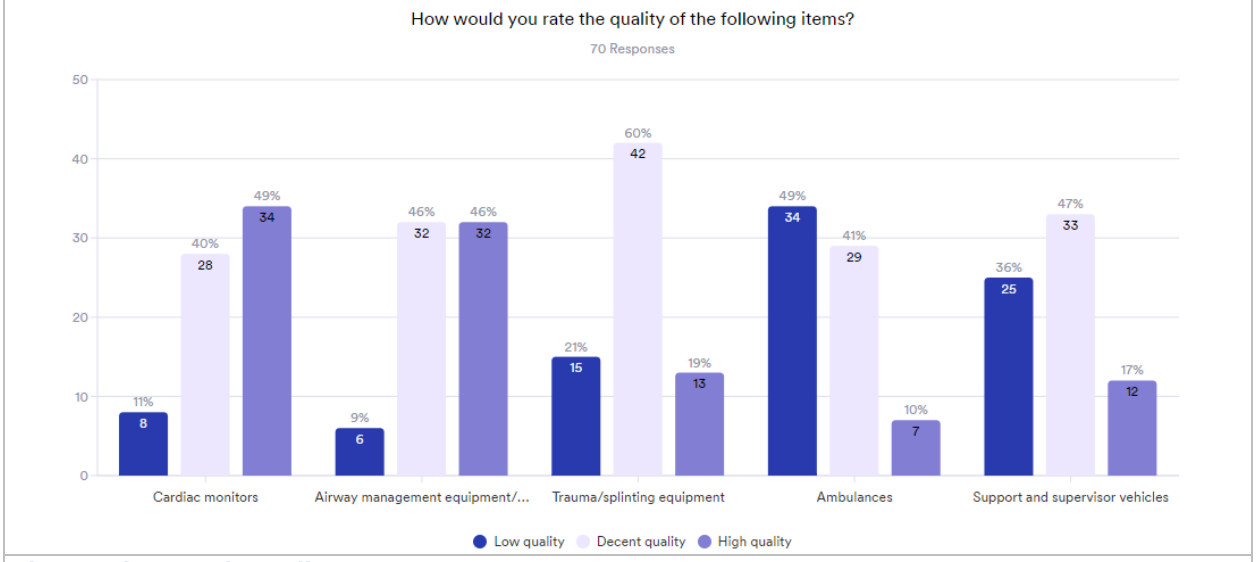
50.



Observations and Details:

- 60% of non-Paramedic providers are seeking to increase their certification levels
- Training current employees is usually going to be more cost effective than hiring newer employees with higher certification levels; this can also show management's dedication to their employees
- Paramedics can be harder to find than EMTs; training current EMTs to the Paramedic level can help with organizational stability

51.



Observations and Details:

- Equipment is rated well overall; vehicles are rated low-decent which is consistent with previously voiced concerns over maintenance

52. How safe do you feel working as an EMT or paramedic for OCEMS?

Observations and Details:

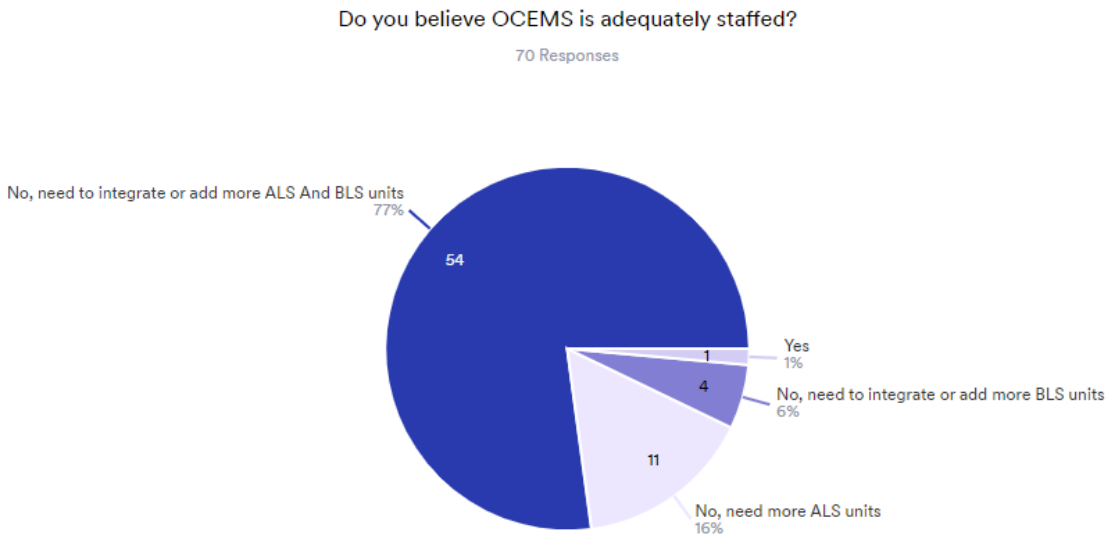
- Mean Response: **6.4**
- Median Response: **7**
- Mode Response: **8**
- Overall, positive responses

53. What suggestions do you have to make OCEMS a safer organization or place to work?

Observations and Details:

- "Safety" appeared to have many different definitions for the employees; some understood this to be a scene response issue, others an equipment issue, and some an organizational issue
- The most mentioned topic was ensuring appropriate maintenance was being completed on response apparatus by "taking that away" from the county mechanics
- Some other suggestions included: monthly meetings about possible department improvements, increased training and better equipment related to safety (specifically PPE for potentially violent scenes), better driver training for new employees, better monitoring for "tired" crews

54.



Observations and Details:

- Only 1% of employees believe that OCEMS is appropriately staffed

55. Overall, how would you rate the level of engagement and interest in responding to EMS calls by the local fire departments?

Observations and Details:

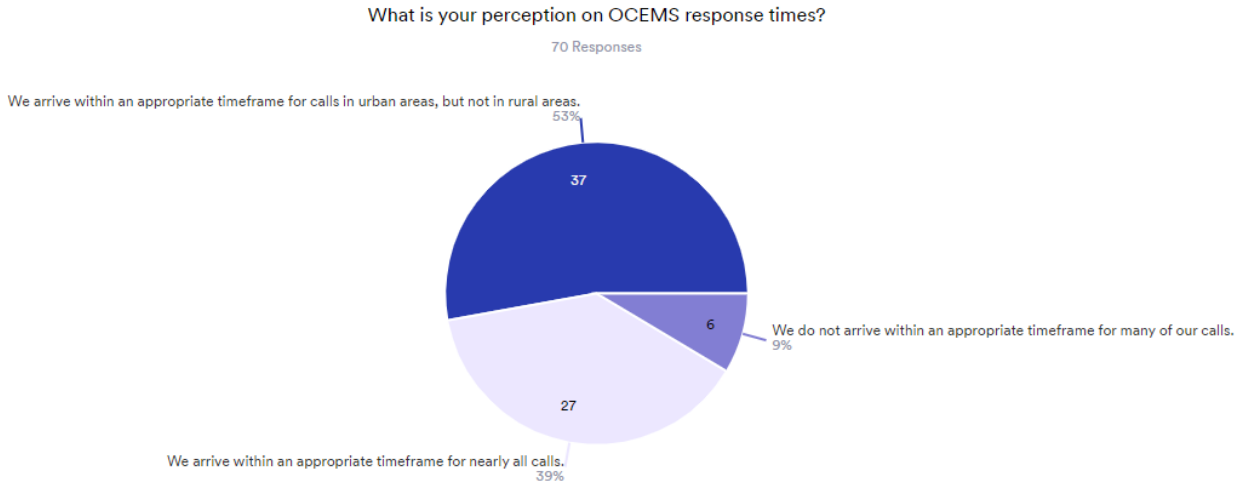
- Mean Response: **4.9**
- Median Response: **5**
- Mode Response: **5**
- Across the nation 80%+ of fire call volumes are usually EMS calls
- It the fire departments are not willing to respond to calls, the EMS division should be adequately staffed to handle that, and the budgets of the fire departments should reflect their hesitancy
- Given the standardized locations of fire departments across a county, they should be frontline responders and should be able to function seamlessly with their EMS counterparts

56. Do you have any comments to add related to your prior selection regarding overall fire department engagement and interest in responding to EMS calls?

Observations and Details:

- Varied responses, but Carrboro, White Cross, Caldwell, and Efland all appeared to be well ranked across respondents
- Consensus that "admin does a poor job of sticking up for our interests in meetings with the fire departments"
- Hillsborough Fire was consistently rated as "very poor" to work with and as lacking appropriate skills

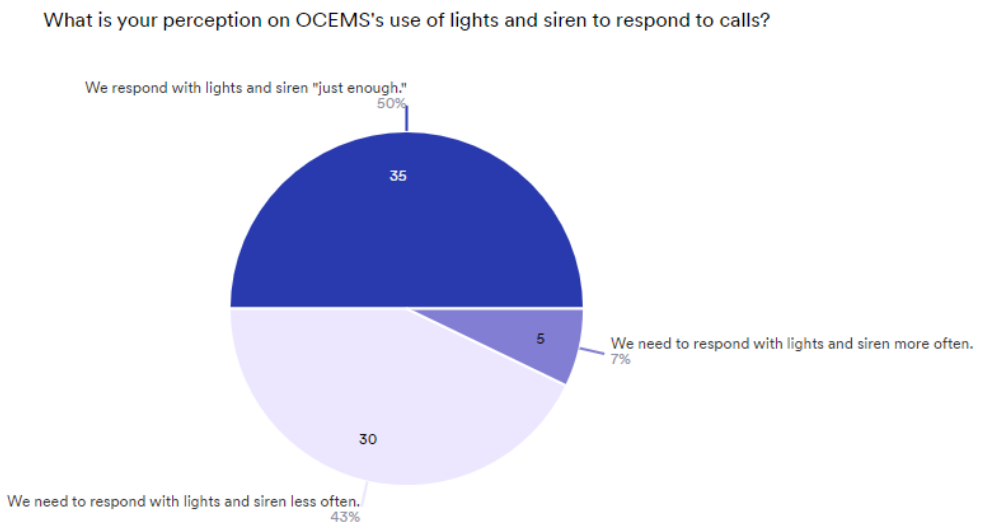
57.



Observations and Details:

- Urban areas appear well served, where rural are not
- OCEMS should strive for equal service levels where possible, as all residents are paying for the service

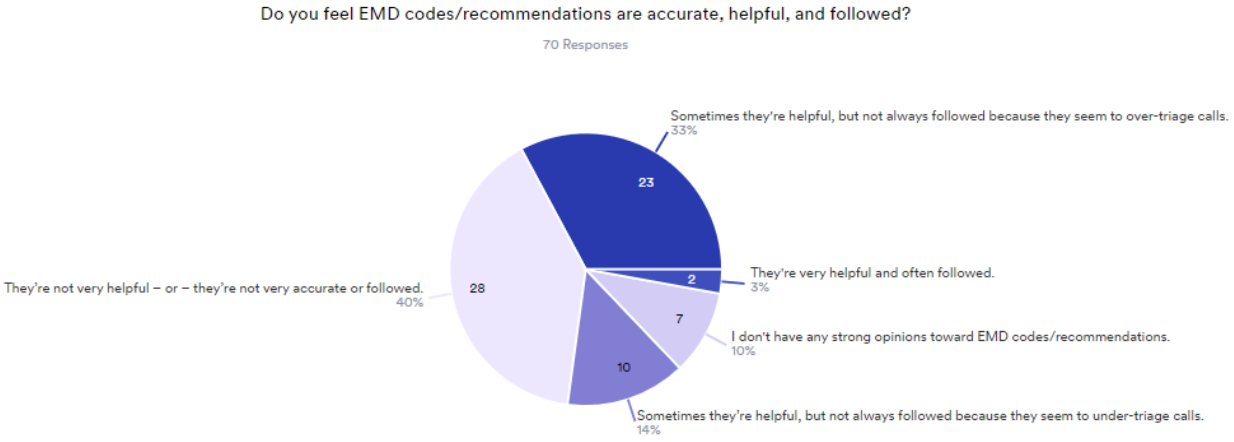
58.



Observations and Details:

- Employees are roughly split 50/50 on whether they use their lights/sirens appropriately or not
- EMD should dictate use of lights/sirens with the ability to upgrade, or downgrade under very specific criteria, as needed. This reduces liability on the personnel and the county

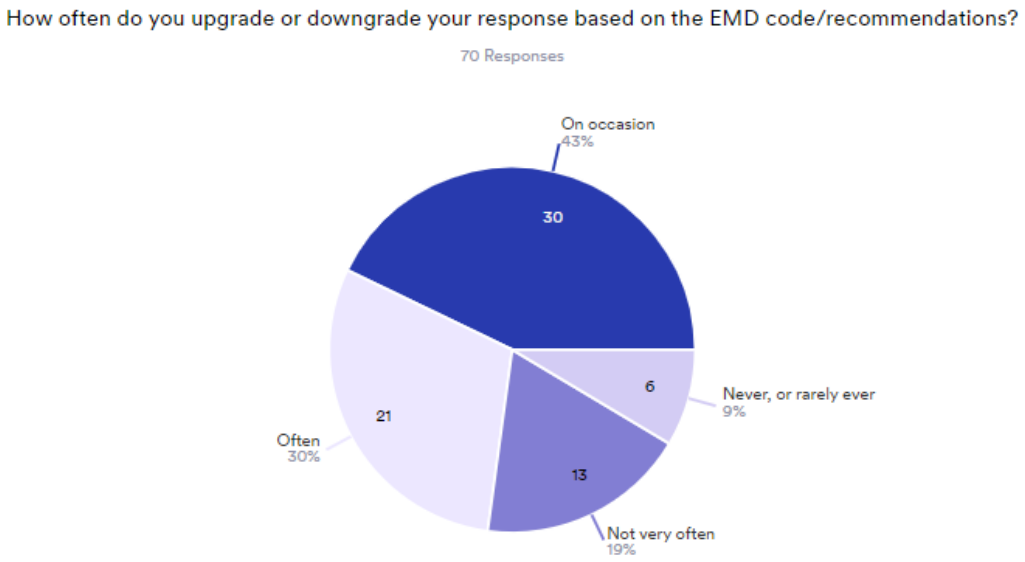
59.



Observations and Details:

- Only 3% of respondents see EMS as useful
- Suggests an opportunity to educate employees on the purpose and use of EMD, as well as a chance to evaluate the efficiency of dispatch utilizing the system

60.



Observations and Details:

- Employees should be following EMD response recommendations as a standard
- Deviations should be documented to ensure accountability
- Upgrading responses will typically result in less potential liability than downgrading responses

61. How would you rate the dispatching/communications services provided by the County?

Observations and Details:

- Mean Response: **6.0**
- Median Response: **6**
- Mode Response: **7**
- Respondents generally rated dispatch well

62. What suggestions, if any, do you have to improve unit move-up practice?

Observations and Details:

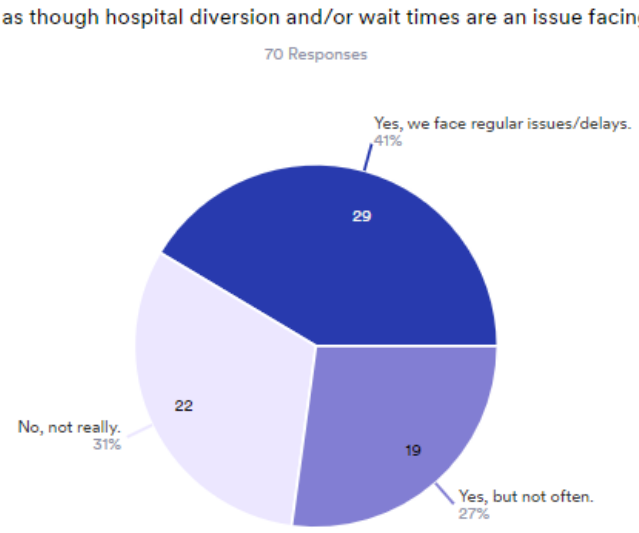
- Most repeated response was to have “enough units in the correct locations that move-ups decreased” significantly
- Common suggestions involved “earlier notifications” and “not forgetting about units on move-ups”
- Some employees recommended using “peak load trucks” as additional units in the high-volume areas only, keeping them on persistent move-ups versus being station-based

63. What other comments would you like to provide related to dispatching/communications services for OCEMS?

Observations and Details:

- Concerns regarding altering the EMD system were mentioned repeatedly; this suggests a potential educational opportunity to clarify what EMD is, and how it works, to response staff
- Appropriately implementing BLS response, though not a function of the dispatch/communications services, was also mentioned repeatedly
- Staff mention issues with dispatch staffing and recommend being able to “attach/remove” themselves to/from calls; this is a generally accepted practice in other agencies
- EMD all calls, including law enforcement and nursing home calls
- Respondents stated that fire/EMS share a main dispatch channel; that is not a common practice
- Multiple respondents suggested “ride-along” times for new dispatchers and vice versa to increase communication and understanding between the two divisions

64.



Observations and Details:

- This is a multi-faceted issue facing agencies across the nation
- Efforts should be made to ensure transparency in the communications between administrative staff and the hospitals with clear goals established

65. What words would you use to describe OCEMS overall?

Observations and Details:

- Multiple responses supporting the “employees” and “operational staff” with an equal amount of responses suggesting the immediate need for improvement at the “management” levels
- “Disorganized,” “lacking uniformity,” “inconsistent,” and “a lot of potential” were all mentioned repeatedly
- Majority of the respondents provided answers consistent with the idea that OCEMS has a strong past and the staff and ability to be one of the best agencies in the state, but they are “held back”

66. How would you rate each of the following primary receiving hospitals in the following areas? (1 being the worst and 10 being the best)

Observations and Details:

- Alamance
  - EMS Crew Reception and Handoff: **6.3**
  - Direct-to-Intervention Care: **5.5**
  - Patient Care Follow-up/Feedback: **3.9**
- Duke Regional
  - EMS Crew Reception and Handoff: **6.6**
  - Direct-to-Intervention Care: **6.1**
  - Patient Care Follow-up/Feedback: **2.7**
- Duke University
  - EMS Crew Reception and Handoff: **4.2**
  - Direct-to-Intervention Care: **4.6**
  - Patient Care Follow-up/Feedback: **2.2**
- UNC-Hillsborough
  - EMS Crew Reception and Handoff: **7.8**
  - Direct-to-Intervention Care: **7.4**
  - Patient Care Follow-up/Feedback: **7.6**
- UNC Main
  - EMS Crew Reception and Handoff: **7.8**
  - Direct-to-Intervention Care: **7.4**
  - Patient Care Follow-up/Feedback: **7.7**
- Durham VA
  - EMS Crew Reception and Handoff: **5.7**
  - Direct-to-Intervention Care: **5.4**
  - Patient Care Follow-up/Feedback: **2.4**
- While very little can be done to influence hospital staff and responses, transparent efforts and communications should be readily visible to employees
- Duke consistently underperformed while UNC was highly rated

67. How progressive or proactive would you rate OCEMS's clinical care and protocols?

Observations and Details:

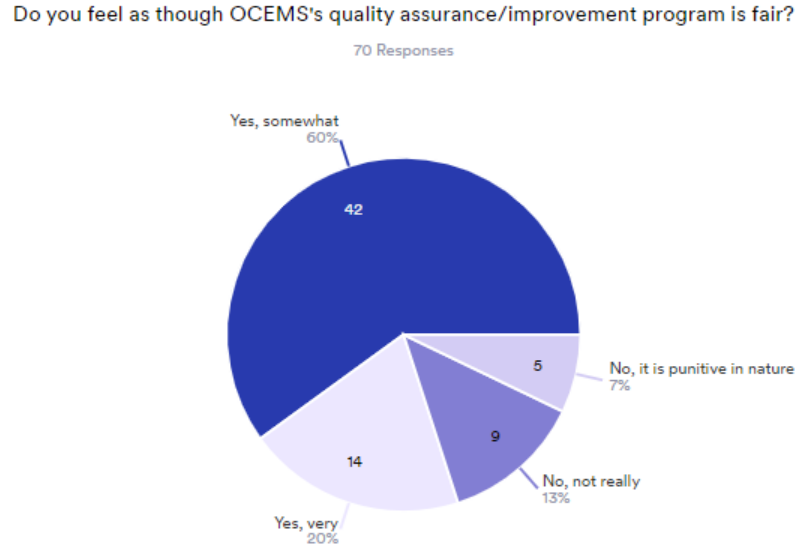
- Mean Response: **5.4**
- Median Response: **6**
- Mode Response: **6**
- North Carolina has traditionally had some of the most progressive/aggressive Paramedic protocols in the nation
- OCEMS has the benefit of close proximity with several major teaching hospitals; efforts to leverage this benefit should be considered
- Employees rate the protocols/proactiveness as more moderately than expected

68. Are there any other EMS agencies that you believe are "doing it right" or are known for providing "best practice" clinical care?

Observations and Details:

- Durham, Wake, New Hanover, Onslow, and Mecklenburg counties were all mentioned; high performing services, each with similar setups to OCEMS
- Multiple answers regarding “full scope of practice”

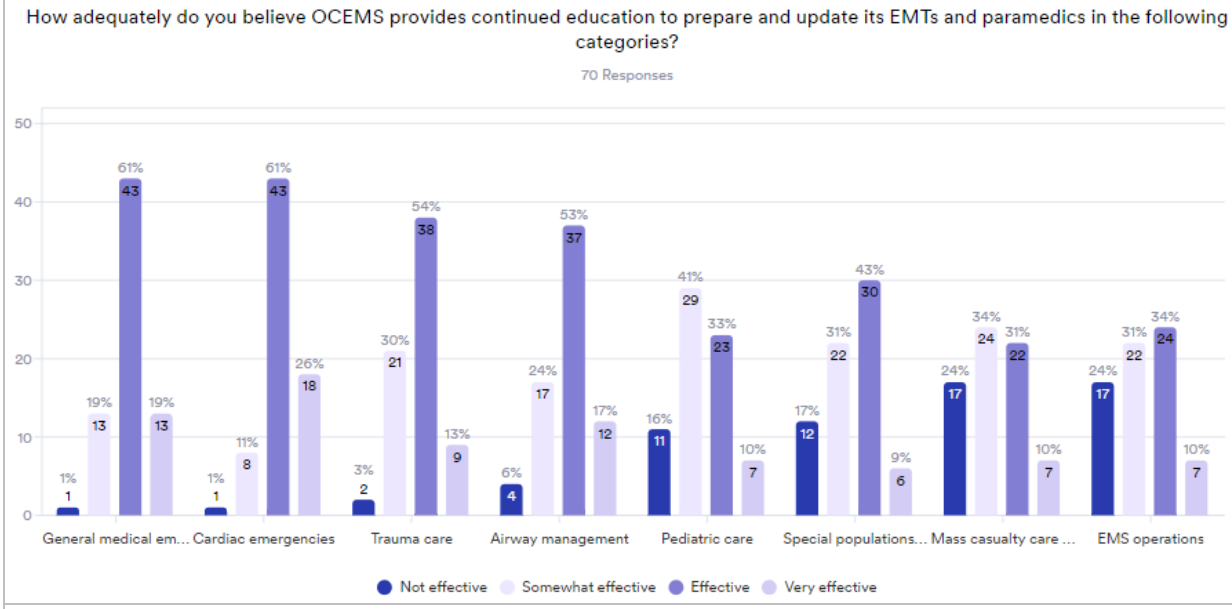
69.



Observations and Details:

- Well rated overall; should be considered a strength

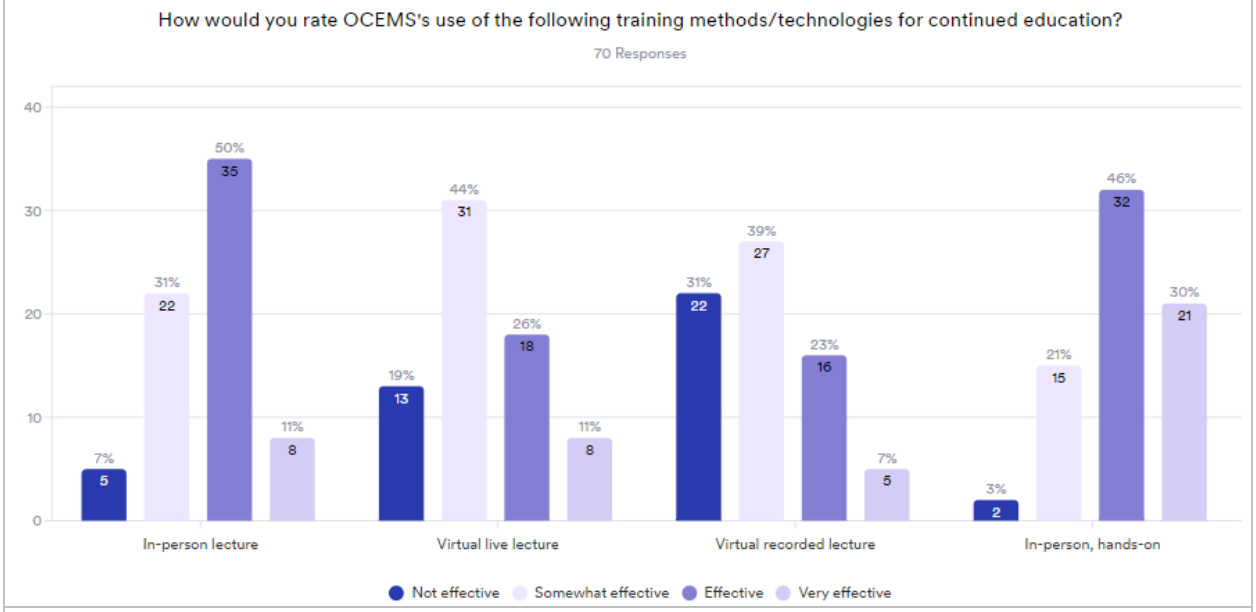
70.



Observations and Details:

- Poorly performing categories are consistent with low frequency/high acuity calls
- OCEMS appears to train well on the “bread and butter” EMS calls
- Consider outside resources for the more specialty categories (i.e., mass casualty, pediatrics)

71.



Observations and Details:

- Providers prefer hands-on, in-person, training
- Efforts should be made to ensure that these training sessions can happen in-house as well

72. What comments, if any, do you have to provide related to training or quality assurance/improvement provided or supported by OCEMS?

Observations and Details:

- "More hands-on training" was the most common response generated.
- "Provide advanced/specialty training for the more experienced providers"
- Providing more "actionable" items when giving feedback so that providers understand what/how to improve seemed important to the respondents as well

73. Regarding medical direction and the fellowship program, please rate each of the following from a scale of 1 (low/unsatisfactory) to 10 (high/satisfactory).

Observations and Details:

- Satisfaction with Primary Medical Director:
  - Mean Response: **5.7**
  - Median Response: **6**
  - Mode Response: **7**
- Satisfaction with Fellowship:
  - Mean Response: **6.3**
  - Median Response: **7**
  - Mode Response: **7**
- Ability to receive online Medical Direction:
  - Mean Response: **6.8**
  - Median Response: **7**
  - Mode Response: **10**
- Ability to receive consistent message/information from Medical Direction:
  - Mean Response: **5.8**
  - Median Response: **6**
  - Mode Response: **6**
- The scores reported under the primary medical director suggest a significant disconnect between the operational staff and medical direction; while the Medical Director should have little-to-no direct influence on operations, it is imperative that there is a healthy amount of communication between the and the staff working for OCEMS
- The ability for staff to receive medical direction is clearly a strength, likely due to the fellowship program

74. Please provide any additional comments that you might have related to medical direction and/or the fellowship program at OCEMS.

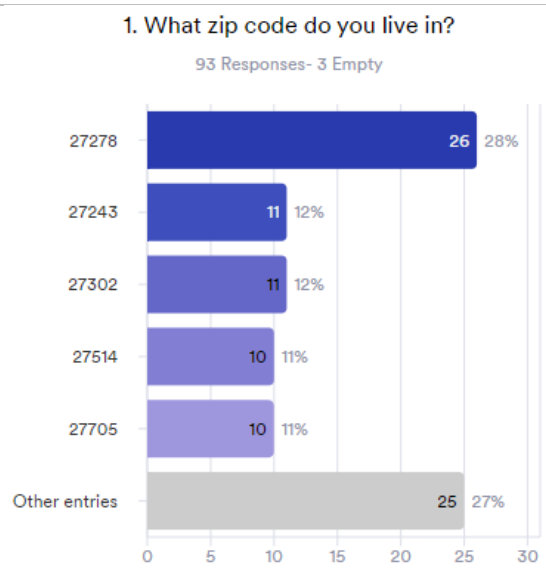
Observations and Details:

- The answers were widely varied and reinforce the previous questions findings of an inconsistent relationship between medical direction and the operational staff
- Issues with protocol development, trust of the providers, and scope of practice issues were mentioned in 70%+ of recorded responses
- There are multiple responses which report that medical direction has too much influence over “operational” issues
- It would be pertinent to create a committee designed to increased communication between the medical director and providers so that appropriate steps forward can be determined

APPENDIX B – COMMUNITY ENGAGEMENT SURVEY

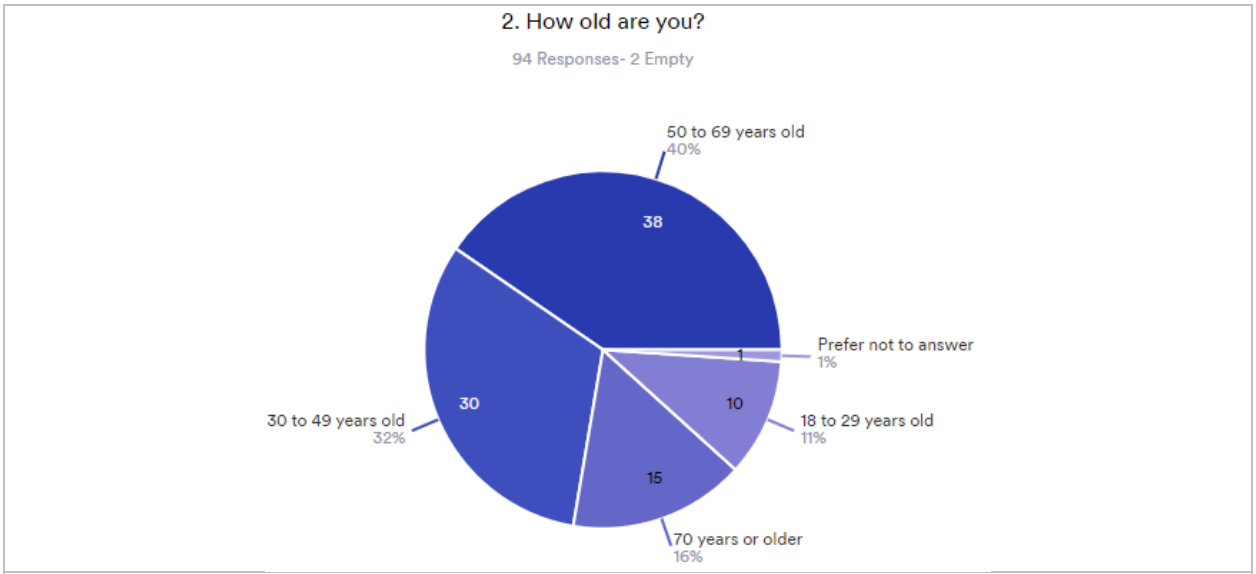
A community engagement survey was developed by PCG and was electronically dispersed to the community by Orange County Emergency Services. The survey was designed to provide anonymous results and received 96 responses. A Spanish translated survey was also available, but no responses were received. The collection time period for this survey was approximately one month.

Disclaimer: Due to the online nature of this survey, there was no way to control for participants that did not originate in the community. To keep the anonymity of the responses intact, our firm did not isolate these responses or delete them from the datasets. There were no obviously duplicated responses noted.



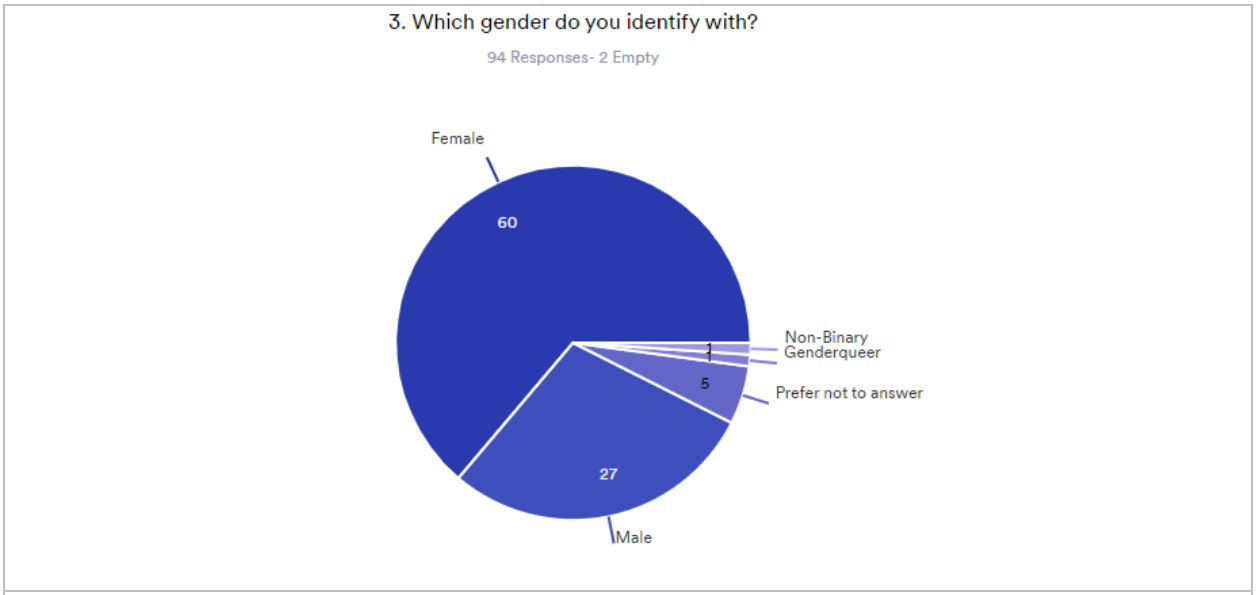
Observations and Details:

- Some of the "Other" entries included 27516 (9%), No answer/ "Other" (7%)
- Primary participation from Chapel Hill area (28%) and Hillsborough area (40%)



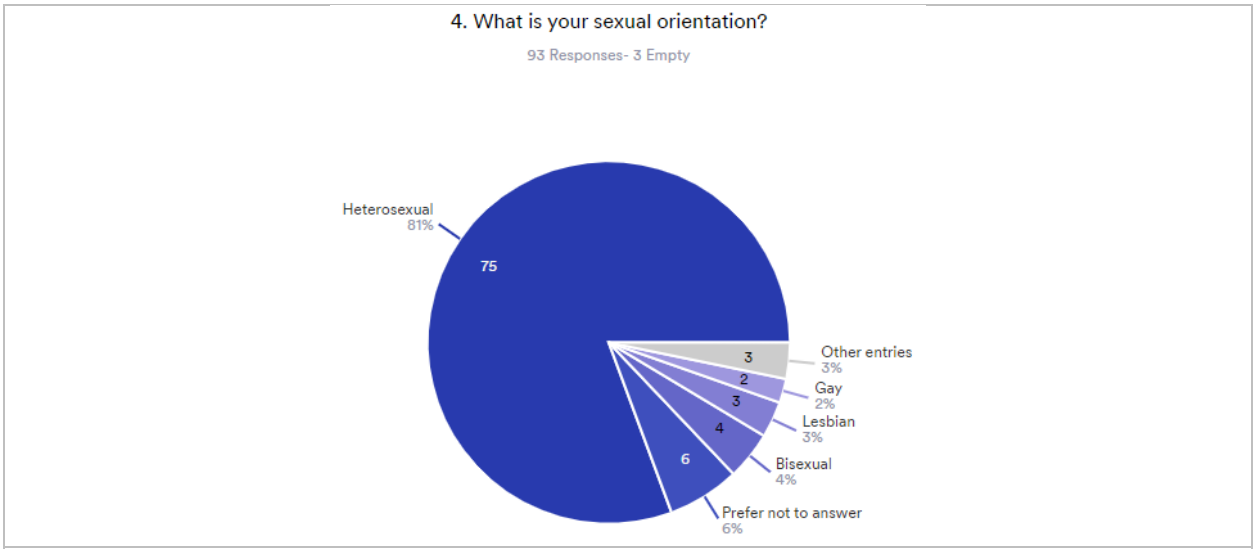
Observations and Details:

- Reasonable spread of ages noted
- Matches US Census Data well, suggesting a reasonable community representation in the survey.



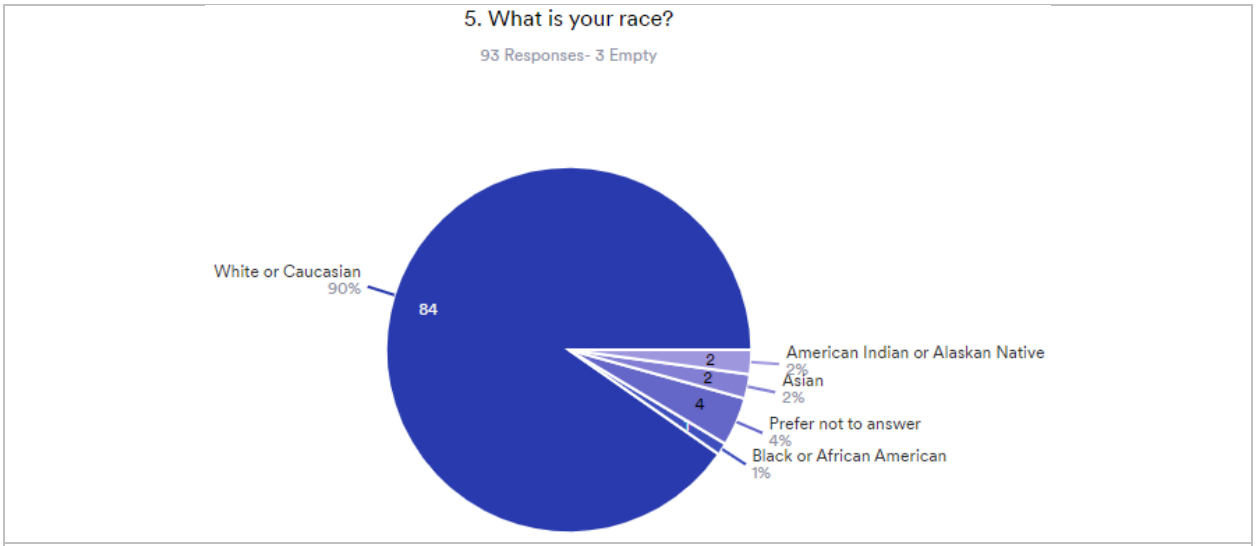
Observations and Details:

- Higher percentage of Female respondents noted versus US Census Data



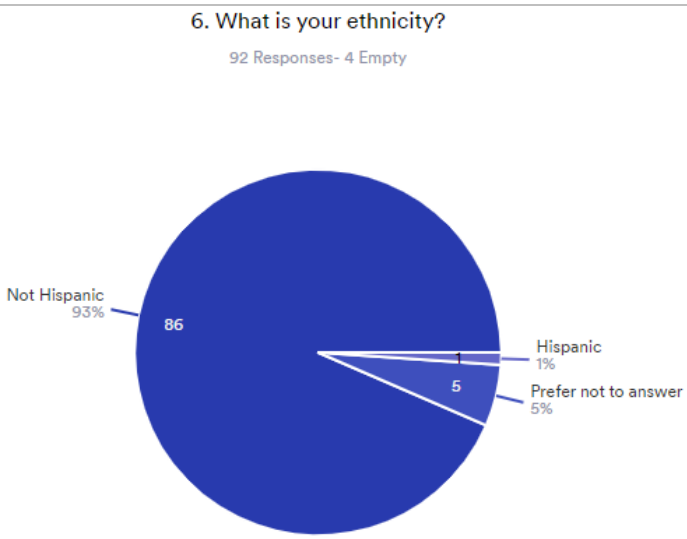
Observations and Details:

- Only 81% of respondents identified as heterosexual.
- Continue to consider, and implement, diversity training.
- Strive to employ a workforce that is representative of your community



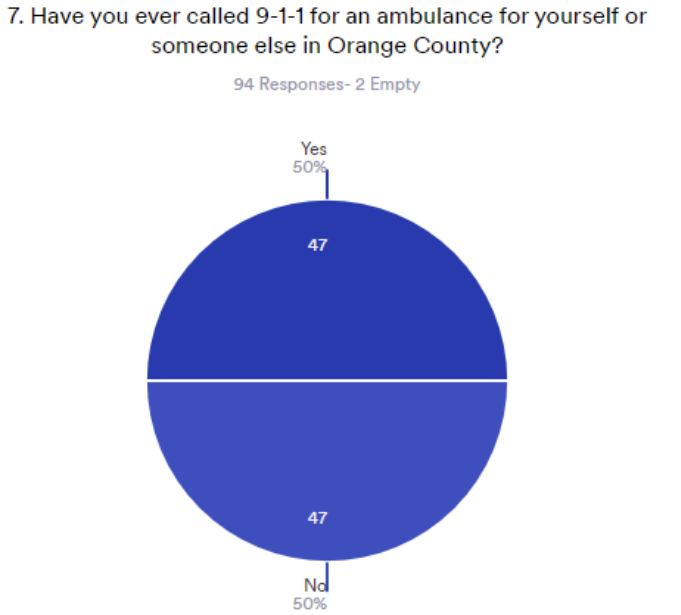
Observations and Details:

- US Census data shows a more diverse community versus the responses shown; this may be consistent with the communities primarily represented (Hillsborough and Chapel Hill)



Observations and Details:

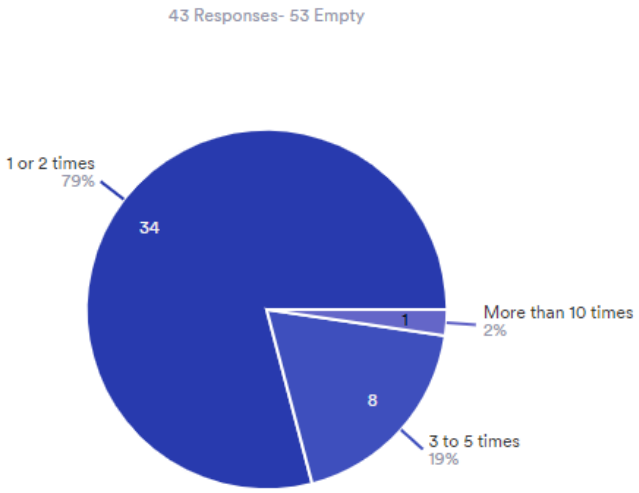
- Again, not representative of previously recorded data for the county, but maybe of the communities that responded



Observations and Details:

- OCEMS has a lot of exposure to the community
- People who have previously called 9-1-1 may be more likely to complete the survey, so these results may not be very generalizable

7a. How many times have you called 9-1-1 for an ambulance in the last two years?



Observations and Details:

- Consider looking that those who have called 3+ times for common themes
- May represent particular communities

7b. Please answer the following based on your experience interacting with ambulance crews within Orange County (47 total respondents):

- Was your 9-1-1 call answered quickly?
- Was the person who answered your 9-1-1 call professional, polite, and compassionate?
- Did the ambulance arrive quickly?
- Did the ambulance crew appear professional?
- Were you treated with compassion and respect by the ambulance crew?

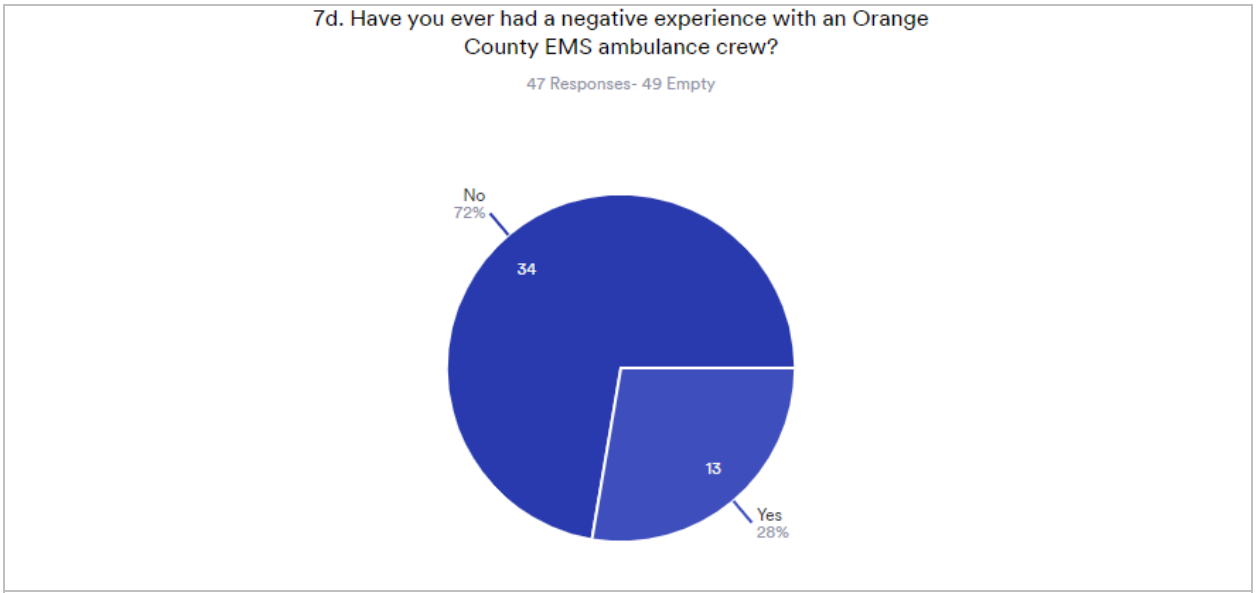
Observations and Details:

- 100% of respondents stated their call was answered quickly
- 96% of respondents identified the call taker as “professional, polite, and compassionate”
- 83% felt that the ambulance arrived quickly
- 78% stated that the crew appeared professional
- 80% responded that they were treated with compassion and respect

7c. Overall, how would you rate the level of service you've received from EMS crews from Orange County (46 total respondents)?

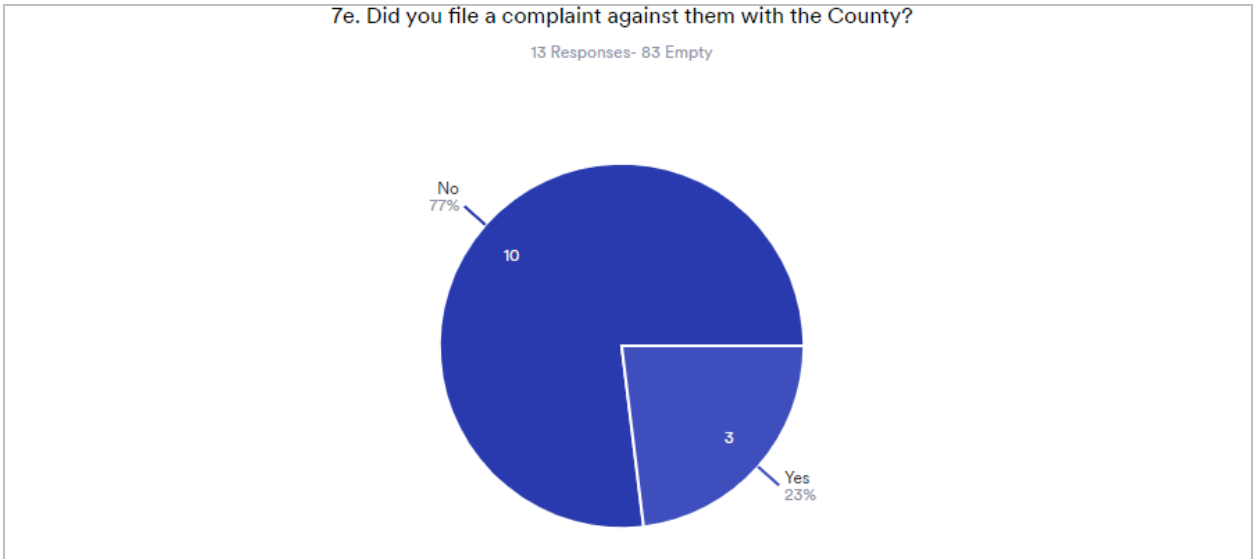
Observations and Details:

- Mean: **8.3**
- Median: **9.5**
- Mode: **10**
- OCEMS should be incredibly proud of these scores



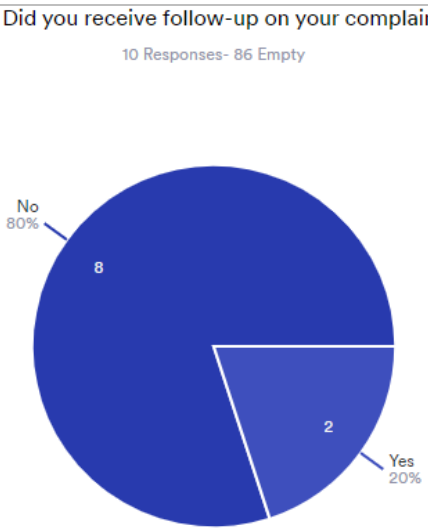
Observations and Details:

- Deserves more clarification in the question but presents an opportunity for administrative staff to ensure there is a well published process/procedure in place to handle issues



Observations and Details:

- Worth confirming that records of incidents are kept and there is a way to review them; no timeline was put on this question, so it is unknown when these issues may be from



Observations and Details:

- Efforts should be made to ensure a 100% follow-up rate with information that is legal to be released; these efforts increase departmental transparency and will build stronger community relations

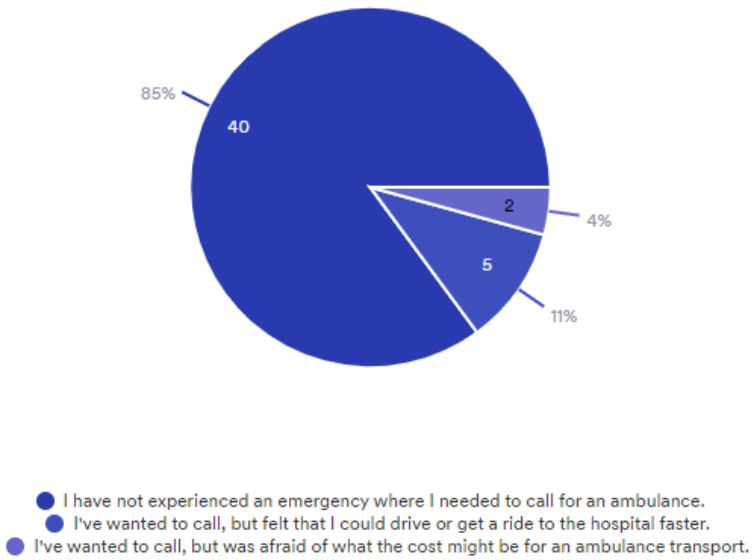
7g. Were you satisfied with how your complaint was handled? If no, why not?

Observations and Details:

- Responses included: “Crews were too young, inexperienced, and said they were from SORS”
- “No, received an email saying the matter would be investigated, but no further action was taken”
- “Delayed response and inexperienced crew”
- “Yes”
- These concerns are a small fraction of the call volume handled by OCEMS, but community members are far more likely to remember negative interactions versus praising positive ones

8. If you have not called 9-1-1 for an ambulance before, why?

47 Responses- 49 Empty



Observations and Details:

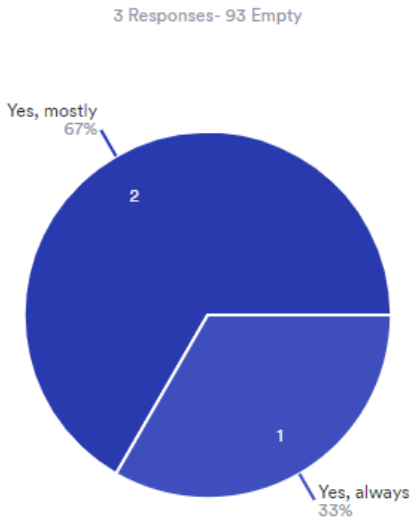
- Small percent (4%) were worried about costs; this could suggest that the fees have been well communicated to the community; not many community individuals understand EMS billing or costs associated with a transport

9. Do you work for a facility that often calls 9-1-1 requesting an ambulance within Orange County? (Note: This survey is related to Orange County EMS crews requested by 9-1-1 and not private vendor ambulance services.)

Observations and Details:

- 91 (97%) respondents recorded their answer as “No”
- 3 respondents said “Yes”

9a. When Orange County EMS crew members arrive, do they appear and act in a professional manner?



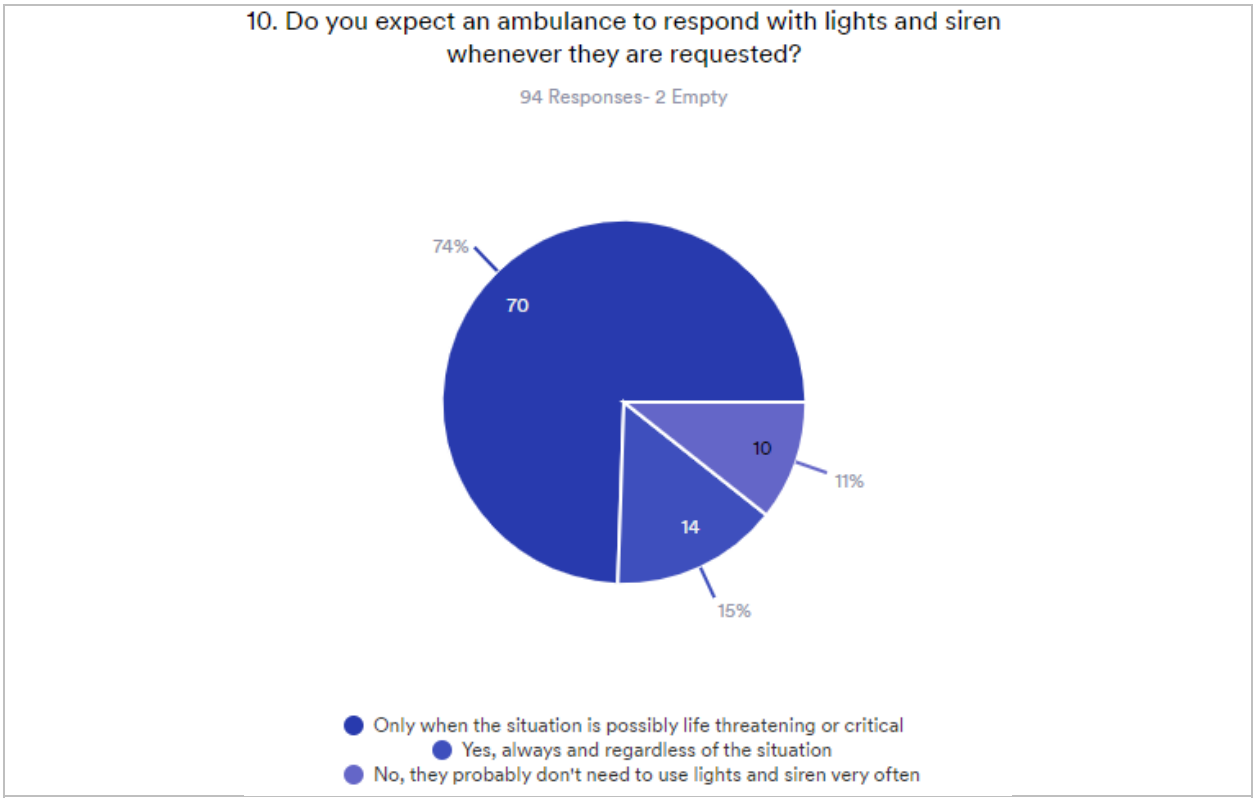
Observations and Details:

- Small sample size, but positive results given the average relations between EMS personnel and nursing home staff
- Answers ranged from “Yes, always” to “Yes, mostly” to “Yes, sometimes” to “No, not at all” or “I did not interact with them”

9b. Overall, how would you rate the level of service you've received from EMS crews after calling 9-1-1 in Orange County while at work? (3 responses)

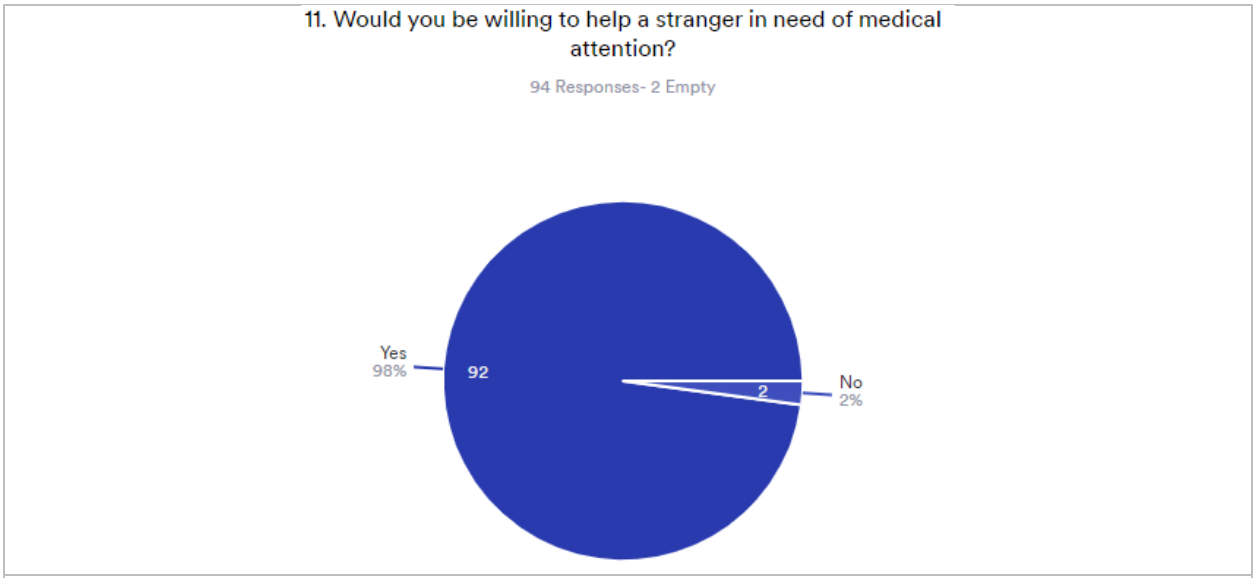
Observations and Details:

- Mean: **8.3**
- Median: **8**
- Mode: n/a



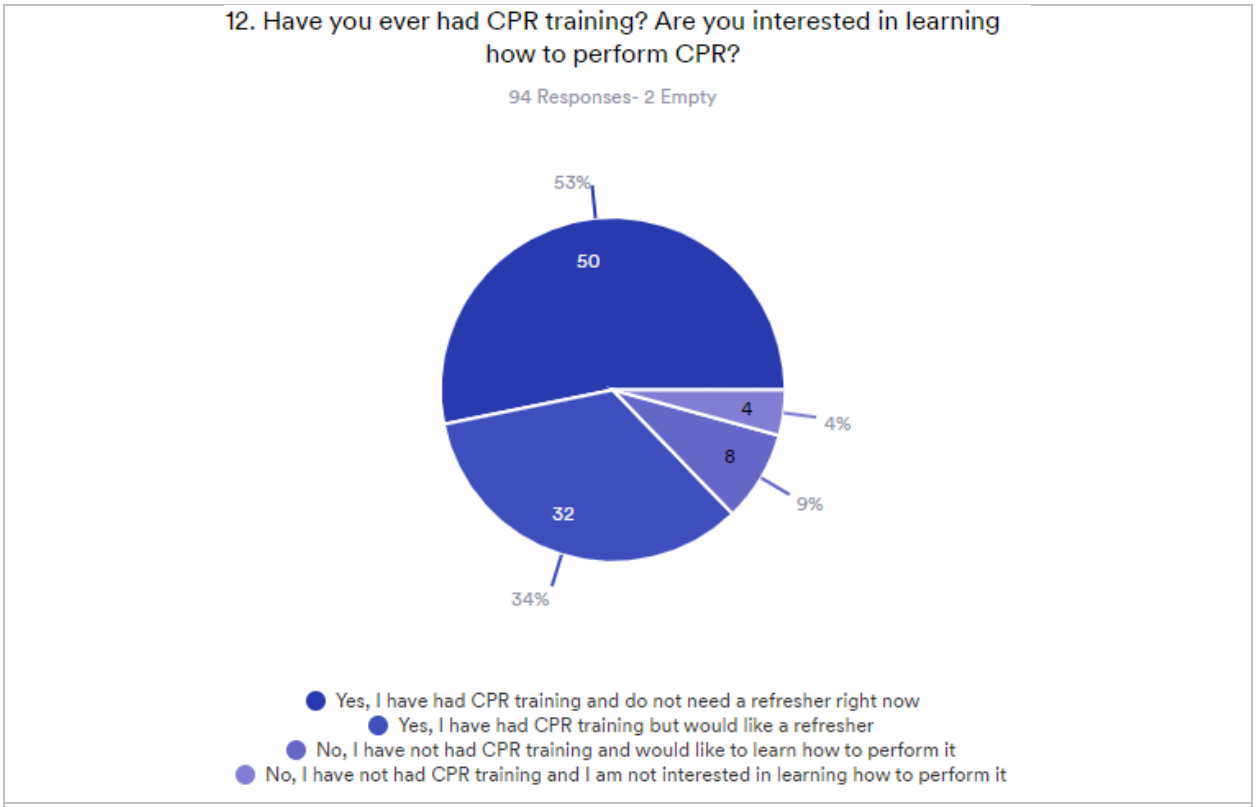
Observations and Details:

- The diversity of responses suggests an opportunity for community education on the topic of response



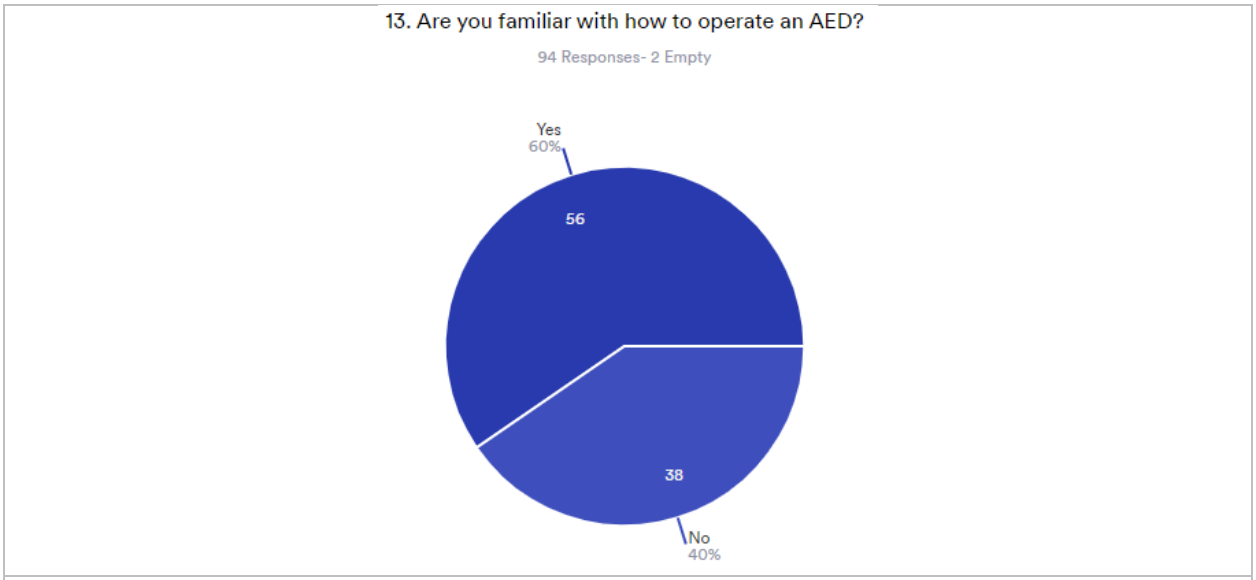
Observations and Details:

- Desired to be at 100% yes, but addressing why some respondents said "No" is important



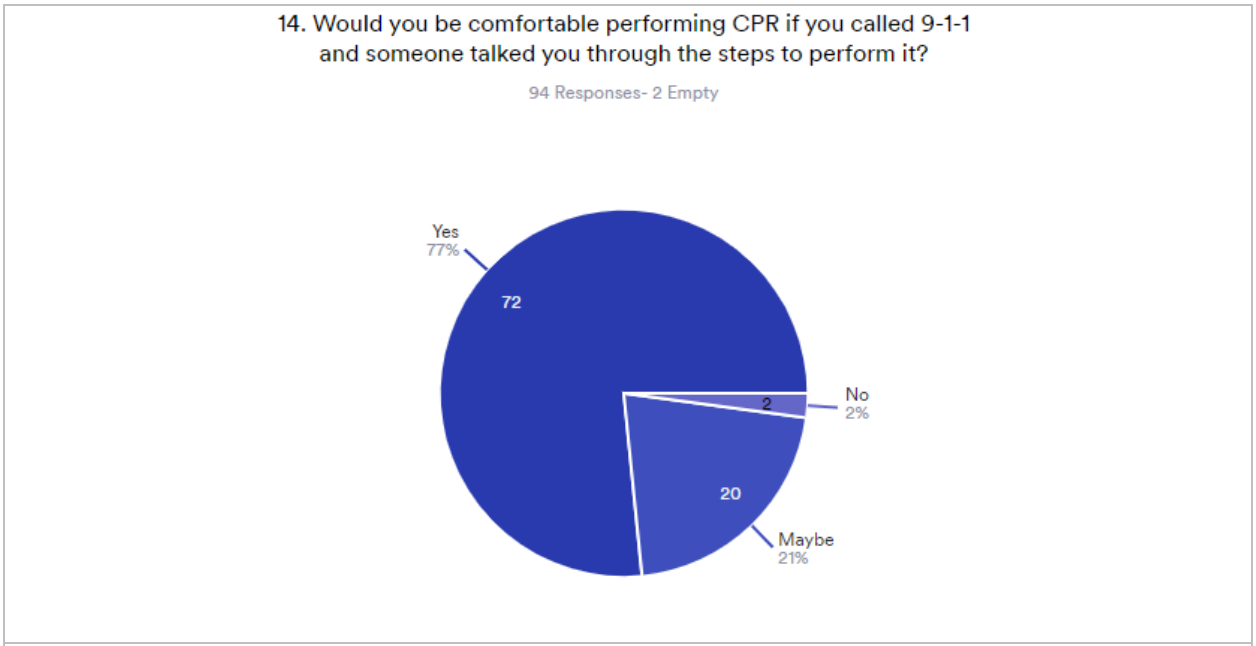
Observations and Details:

- Roughly 96% of the respondents either know how to assist, or would like to learn how to assist, in an emergency



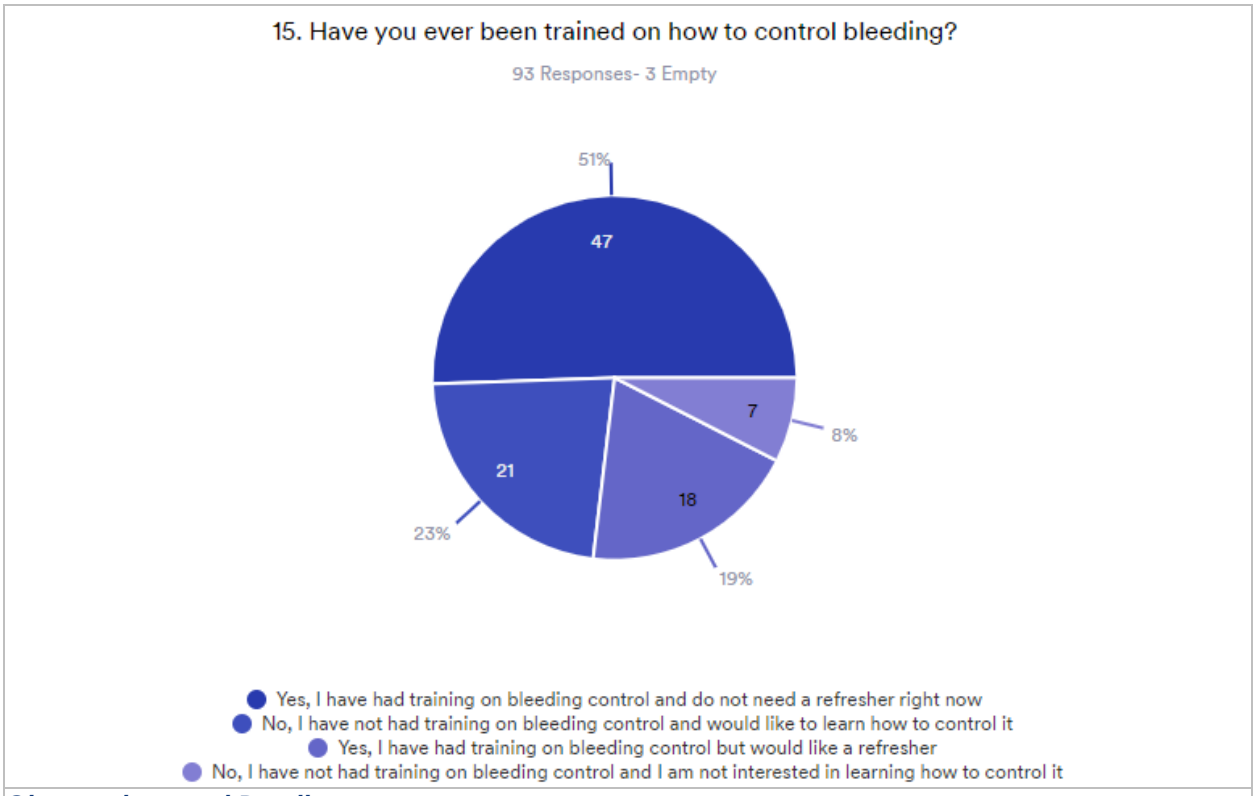
Observations and Details:

- Easy opportunity to provide impactful community education



Observations and Details:

- Good sign of a caring and resilient community



Observations and Details:

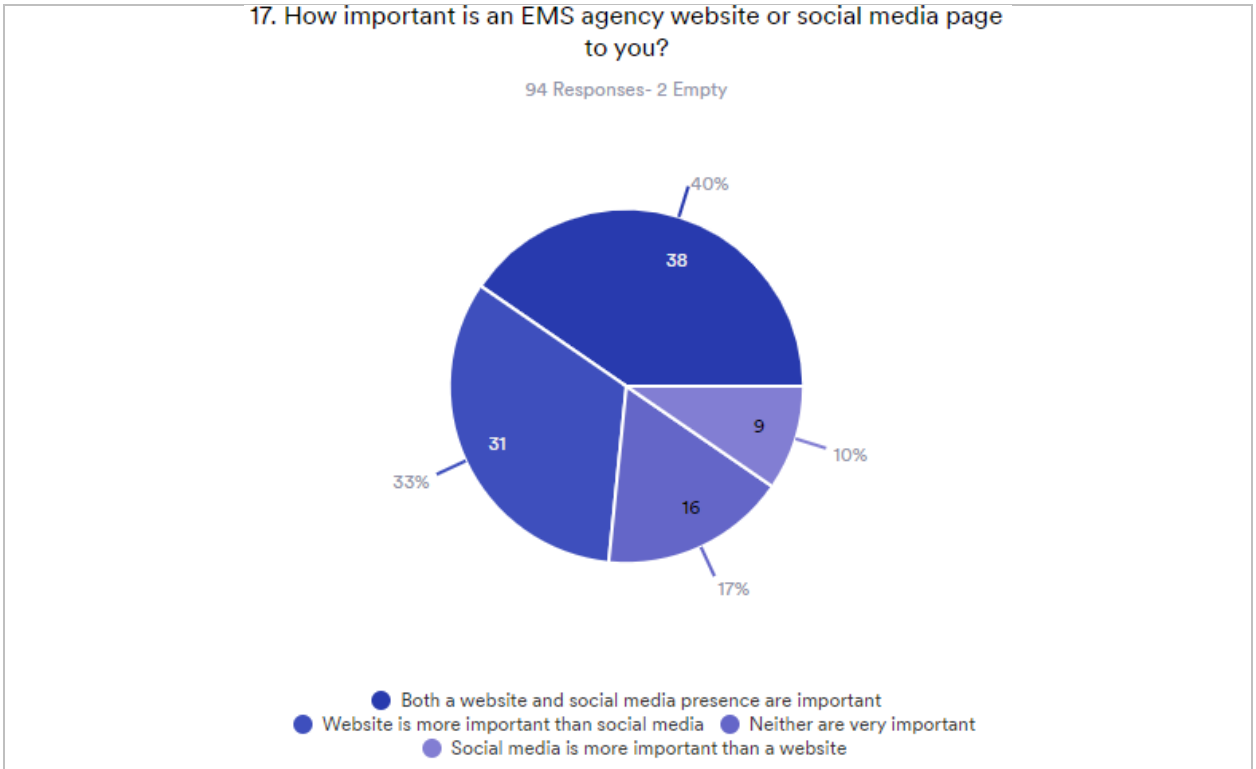
- "Stop the Bleed" presents as an easy, cost effective, community risk reduction measure
- Appears to be an area with substantially more need than CPR

16. How important do you think each of the below items are for our community?

- Availability of ambulances to respond to 9-1-1 calls
- EMTs and paramedics receiving a competitive, livable wage
- Maintaining tax funding and support for a countywide 9-1-1 ambulance service
- Ambulance services meeting performance goals for serious emergencies like heart attack and stroke
- Free CPR and bleeding control training provided by the ambulance service
- Public information and education on how to handle household injuries and emergencies
- In-home visits by EMTs and paramedics to prevent situations like falls to occur
- After-response visits or phone calls by EMTs and paramedics to follow-up with patients

Observations and Details:

- 98% of respondents think that ambulance availability is “Very Important”
- 91%of respondents thought that competitive wages were “Very Important” and another 7% thought they were “Somewhat Important”
- 87% responded that tax funding was “Very important” with an additional 10% recording it is “Somewhat important”
- The respondents did not respond as favorably to the community risk reduction questions, with only 40% believing free classes are “Very Important,” 52% responding that public information is “Very Important,” 36% answering that in-home visits were “Very Important,” and only 27% responding that after-response contact was “Very Important”
- Many of these measures can be very risk group specific; these numbers may not accurately reflect the impact that successful community risk reduction measures can have



Observations and Details:

- A large portion of the respondents (approximately 83%) responded that social media and/or a website are important resources
- The 17% responding that neither are important may not have found value in previously provided information

18. Do you have any questions that you would like answered about your ambulance services, or do you have any additional comments or suggestions for the ambulance service?
Observations and Details: • Approximately 25% of respondents answered in “No” or a similar manner • Needing “excellent pay” and “appropriate staffing” were mentioned more than once • Many of the responses were individual complaints or concerns with no general themes (i.e., concerns with demographics assessed in the survey); clearly communicating that the demographics were used to try and assess if an accurate portion of the population were captured may help avoid some of these issues in the future

APPENDIX C – PROPOSED FUTURE EMS STATION LOCATIONS / MASTER PLAN

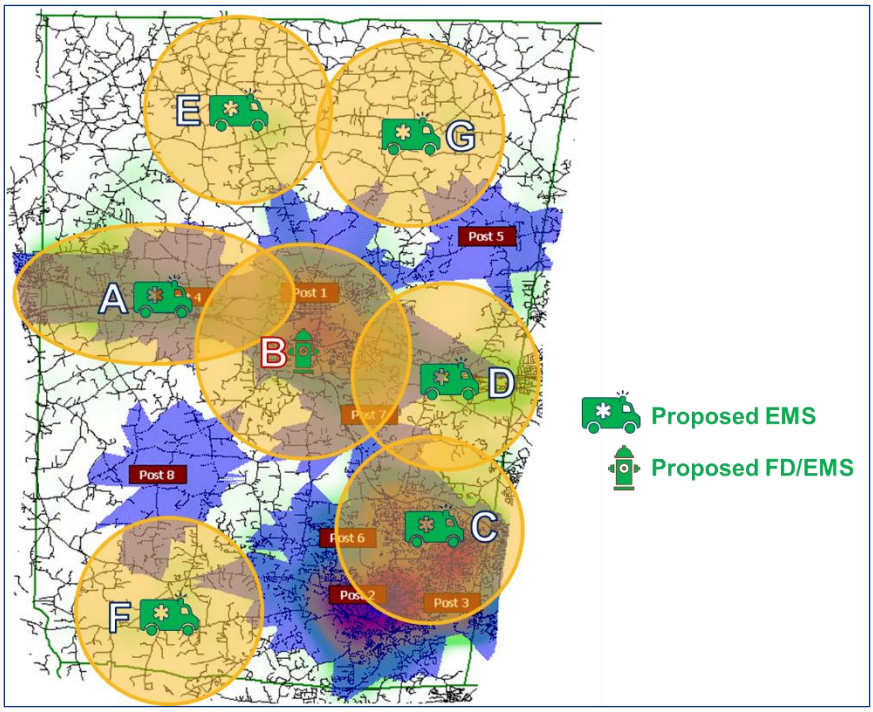


Figure C.1 – Proposed Future EMS Station Locations (Map)

Location	Details	Address/Location	Completion Timeline
A	New EMS Station 4; co-located with County Morgue	3800 US Hwy 20, Efland	2022-2023
B	New Orange Rural FD station	305 College Park Dr., Hillsborough	2023
C	Recommended new EMS headquarters and station	Northeast Chapel Hill area	2023-2024
D	Recommended new EMS station	Eno, near I-85 between Hillsborough and Durham	2024-2025
E	Recommended new EMS station	Cedar Grove (Cedar Grove Park, Orange County Parks and Recreation Department), Hwy 86 and Sawmill Rd.	2024-2025
F	Recommended new EMS station	White Cross (White Cross Recreation Center), White Cross Rd. between Hwy 54 and Old Greensboro Rd.	2025-2027
G	Recommended new EMS station	Caldwell, Hwy 57 between Pearson Rd. and Little River Church Rd.	2025-2027

Note: All proposed station locations are approximate. Ideal station locations would be on County/municipal land near these sites

Table C.1 – Proposed Future EMS Station Locations (Listing)

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