FINAL REPORT

Assessment of the Emergency Medical Services of Ross County, Ohio

February 2024

Conducted by the
Cambridge Consulting Group
January 2024

CONSULTANT REPORT

February 28, 2024

Dear Mr. Shoemaker,

Cambridge Consulting Group is honored that Ross County selected our team of EMS experts to develop this EMS system assessment and recommendations.

We very much appreciate the input and assistance with this project provided by the Ross County team, the EMS Planning Committee members, local elected and appointed officials, and EMS agency leaders.

We are presenting this final report as completion of the project. As you know, there were some challenges with information gathering for this report, which has resulted in a delay completing this final document. It appears unlikely that any additional information will be forthcoming at this time from any of the agencies involved in this study.

We hope that this assessment serves as a launching point for meaningful dialogue for logical, essential, and sustainable EMS delivery enhancements that will serve the County, its residents, and visitors for years to come.

Sincerely,

Matt Zavadsky
Engagement Manager
Ross County EMS Assessment Study

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INTRODUCTION

The Cambridge Consulting Group (CCG) was retained by Ross County to conduct a comprehensive study of the emergency medical services system delivery within the County. The system evaluation included two 911 centers' (Public Safety Answering Point (PSAP)) protocols and procedures, and an assessment of the various agencies participating in EMS delivery in Ross County.

In the Firm's review, CCG interacted extensively with County staff, the service providers, and key stakeholders to obtain and interpret certain documents, data, and information. CCG used this information/data to familiarize our Advisors with the various aspects associated with the effectiveness of EMS and ambulance service delivery in Ross County.

This information was used to determine the current state of EMS and ambulance service delivery in Ross County, develop a series of short and long-term recommendations, and provide seven potential options for future EMS delivery.

Despite significant challenges faced by the EMS system provider agencies, we have been very impressed with the level of passion for service to the community, and dedication of the Ross County staff, agency leaders, and all EMS system stakeholders with whom Cambridge had the pleasure of interacting throughout this project.

This study includes six major recommendations for enhancing the current EMS delivery model in Ross County, as well as seven options for evaluation regarding EMS system redesign for the future needs of the residents and visitors of Ross County.

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EXECUTIVE SUMMARY

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Ross County at a Crossroads

Ambulance service in Ross County is at a crossroads, and in many townships and communities, is failing. As noted in the data assessment that follows throughout thus report, communities who have chosen to fund EMS agencies in a way that facilitates paid staffing have a much more reliable response percentage and shorter response times, than those where local communities have remained volunteer. Except for Harrison and Green[1] Townships, communities that have chosen to not fund EMS delivery with career personnel, are struggling with low response rates for EMS calls, high mutual aid support and longer response times.

Volunteers and volunteer agencies have extraordinarily strong community commitment and are viewed as honorable providers serving local communities. Rural communities across the country have faced increasing challenges recruiting and retaining volunteers[2]. This is due to a combination of increasing sophistication and expectations for EMS professionals, enhanced training requirements, increasing time commitments for maintaining volunteer roles in EMS agencies, and often unstable funding for EMS agencies. A recent study of rural EMS Directors revealed that only 43% of rural EMS agencies in America were fully staffed[3].

Across the U.S., rural ambulance agencies face continual challenges to ensure a trained workforce to meet the prehospital emergency care needs of their communities. Reliance on volunteer emergency medical technicians (EMTs) and paramedics with decreasing volunteerism in rural areas has forced some ambulance agencies to close and others to consider changes in organizational structure and staffing models, even affiliation with other agencies[4].

Agencies that rely on volunteers, or part time paid personnel, are struggling to maintain service levels for their local communities, often relying on neighboring jurisdictions with paid staff for an EMS response through formal, or informal mutual aid agreements.
This similar patchwork of service levels and mutual aid agreements within the County creates essentially 'ambulance deserts' for some Ross County residents, and often generates response delays while an available ambulance is sought to respond to an EMS call.
Our assessment of Ross County ambulance service reliability varies greatly, generally aligned with the funding and staffing model of the local primary ambulance agency.

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[1] Green Township is reportedly partially staffed with paid, on-duty personnel.
[2] Rural Policy Health Institute: Characteristics and Challenges of Rural Ambulance Agencies – A Brief Review and Policy Considerations; January 2021
[3] Rural Health Research and Policy Center: Issues in Staffing Emergency Medical Services: A National Survey of Local Rural and Urban EMS Directors; May 2008
[4] https://www.cnn.com/2021/05/22/us/wyoming-pandemic-ems-shortage/index.html

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Staffing and Financial Challenges

Due to the problems facing rural EMS providers across the country and based on feedback from community stakeholders in Ross County, these challenges are likely to increase in the future. During a series of in-person meetings and an on-line survey, Ross County's ambulance agencies provided input on a series of questions related to the status of their agency. These questions included:

- The agency's top current and future challenges.
- The challenges of the current EMS/Ambulance delivery in Ross County.
- What things they feel should be changed about the current delivery model.

Staffing

Except for the City of Chillicothe Fire Department, all the ambulance agencies providing input as part of this study expressed increasing challenges maintaining ambulance staffing as one of their top three challenges.

Almost all the ambulance agencies providing input as part of this study expressed increasing challenges maintaining ambulance staffing as one of their top three challenges.

National EMS Staffing Crisis

The shortage of EMS workers is a national crisis that has been reported extensively by local and national media outlets. In fact, a national database being maintained by the American Ambulance Association (AAA), the National Association of Emergency Medical Technicians (NAEMT), and the Academy of International Mobile Healthcare Integration (AIMHI) has chronicled over 1,402 local and national media reports about EMS services in the United States. Of these, there were 782 (56%) stories citing EMS system delivery challenges due to the EMS staffing crisis[5].

The crisis is not limited to just ambulance providers, but every type of EMS service delivery model, including fire agencies, with many fire departments resorting to recruitment efforts that include sign-on bonuses for firefighter/paramedics of up to $10,000. Examples of news articles and recruitment ads for fire departments are included at the end of this report.

The causes of the EMS worker shortage includes the inherent risks of the EMS profession (the COVID-19 pandemic exacerbated this risk), the low wages that many EMS agencies are able to afford due to the challenging EMS economic model that prevents EMS agencies from paying competitive wages, and the current nursing shortage that is prompting many hospitals and other healthcare providers to offer high wages to EMTs and paramedics as an inexpensive alternative to nurse staffing in these settings.

[5] https://aimhi.mobi/news

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For example, a large hospital system in North Texas just advertised starting wages for paramedics to work in their emergency department at $48 per hour, with an $8,000 sign-on bonus. Current wages for paramedics in the region's EMS and fire agencies average $31 per hour.

The EMS worker shortage has forced many communities to re-evaluate their service delivery models to align actual clinical and patient experience expectations more effectively. Due to the increasing challenge of local volunteer EMS agencies mustering personnel to respond to EMS calls, many ambulance agencies have begun using paid staff, either hired directly by the agency, or contracted through an EMS staffing agency. In this report, we identify staffing models as either 'volunteer' if they are exclusively volunteer staffed, 'career/volunteer' if they are staffed primarily with volunteers, but augment that staffing with paid staff, or 'career' if they are primarily paid staff, with or without supplemental staffing by volunteers.

Across the U.S., difficulties staffing volunteer EMS agencies have been categorized into the following causative themes.

Time Demand Related:

- Two income families working multiple jobs (financial obligations require job change, overtime, etc.).
- Inability to commit to training/continuing education and recertification demands (unable to meet CEU requirements).
- Lengthy transport/patient contact time taking away time with family, or at work.
- Additional EMS demands beyond patient care, such as administrative duties (record keeping, scheduling).

Service Related:

- Broader range of services (new treatment methods and patient care requirements; some do not want added responsibility).
- Abuse of emergency services by public (use of ambulances for rides to a hospital, non-emergency).
- Internal challenges (varying culture among members, age of EMS members may be multi-generations).
- Over-use of ambulance services (transport of mentally ill patients, Long Term Care (LTC) patients for outpatient services, and hospital discharged patients: late night/after normal business hours).
- Leadership challenges (failure to manage change, lack of coordination).
- Friction/chronic problems between other health service personnel or agencies (lack of appreciation of acknowledgment of EMS by other parts of the healthcare system; and/or lack of involvement in seeking solution to problems faced by local providers).

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Social/Community Related:

- Less emphasis on social aspects of volunteering (lack of incentives).
- Less community pride/loss of community feeling (lack of appreciation/recognition).
- Transience (EMTs move or seek full-time employment with urban services).
- "Me" generation (self-gratification/personal needs placed over service requirements).
- Aging communities (greater number of older people, decline in population).

Funding Related:

- Challenges raising money for capital equipment and supplies.
- Insufficient ambulance transport volume to generate adequate fee for service revenue.
- Unstable public, ad valorem revenue (tax support).
- Inadequate reimbursement from government and insurers for services provided.

Funding

Except for the City of Chillicothe Fire Department, all the ambulance agencies providing input as part of this study mentioned revenue and funding as one of their top three challenges. As mentioned previously in this report, this is not an isolated issue to Ross County, but part of a broader, national economic crisis for EMS delivery. With solid funding and reimbursement, investments can be made in personnel wages, benefits, and capital infrastructure, leading to more stable and reliable EMS delivery.

National EMS Economic Crisis

The overall EMS economic model has been fragile for many years. EMS revenue is generally derived from either user fees, or public tax subsidy, or a combination of both. Fee for service revenue from ambulance service delivery is largely driven by the payer mix in the community. Payer mix is defined as the percentage of patients who are covered by major payer categories. Medicare is one payer and pays a fixed amount, based on the 'allowable' fee determined regionally by the Centers for Medicare and Medicaid Services (CMS). The Medicare allowed amount is generally less than the cost of providing the service. Medicaid, another payer, pays a fixed amount based on rates determined by the State Medicaid office. The Medicaid allowed amount is generally much less than the cost of providing the service.

Ambulance reimbursement from commercial insurance, the third payer group, is generally better than Medicare, Medicaid, and uninsured claims. Although, commercial insurers are known for underpaying claims, resulting in a significant balance bill to patients, and an ensuing disagreement between the ambulance provider, the insurer and patient regarding what a usual and customary insurance payment is. Substantial balance bills to patients have resulted in state and federal initiatives to limit the ability for ambulance providers to seek reimbursement from patients, which poses a significant financial risk to ambulance providers.

The national EMS economic crisis, like the national EMS staffing crisis, has been reported extensively in local and national media outlets. Well-established, highly performing EMS systems are failing, due primarily to the economic crises driven by skyrocketing costs for personnel, equipment, supplies and fuel, while fee for service revenues have remained low, or are decreasing.

All the ambulance agencies providing input as part of this study identified revenue and funding as one of their top three challenges

The national database maintained by the AAA, NAEMT, and AIMHI has chronicled over 523 news stories in the last three years citing EMS system delivery challenges due to the EMS funding crisis. The EMS workforce crisis is, in large part, due to the failing economic model. Over 73 reports identify communities that have lost ambulance service altogether since January 2021[6].

To bolster EMS revenue, Medicare adjusted its allowable payment rate in 2021 and 2022 by 5.4% and 11.2% respectively, the highest annual increases in the past 20 years. However, even with those increases, the Medicare allowed amounts are still substantially less than the cost-of-service delivery when the Consumer Price Index-Urban (CPI-U) is increasing at historic levels, often greater than 15% annually.

Medicare announced in November 2023 that they plan on increasing the Medicare allowable fee by only 2.6%[7].

[6] https://aimhi.mobi/news
[7] https://www.cms.gov/files/document/r12268cp.pdf

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SUMMARY OF MAJOR RECOMMENDATIONS FOR CURRENT DELIVERY MODEL

Cambridge Consulting Group makes the following recommendations for enhancement of the current Ross County EMS system. These recommendations are explained in more detail in the section titled RECOMMENDATIONS at the end of this report.

1. Consolidate dispatch and communication centers into a single agency.
2. Create consolidated EMS Response Districts, with reliable EMS agencies providing Automatic-Aid/Primary EMS coverage to surrounding communities receiving low response rates from their EMS agencies.
3. Establish response time, mutual aid use and clinical standards countywide and publish reports to the public to create accountability for maintaining response and clinical performance.
4. Establish active & effective Medical Advisory Board (MAB), requiring voting membership of all County EMS agency medical directors, focused on standardizing treatment protocols and clinical performance.
5. Establish a Countywide quality assurance & management committee. Send reports to the MAB and publish results to the public.
6. Initiate plans to establish a unified EMS response system, either through a district/automatic aid model, or county-based system.

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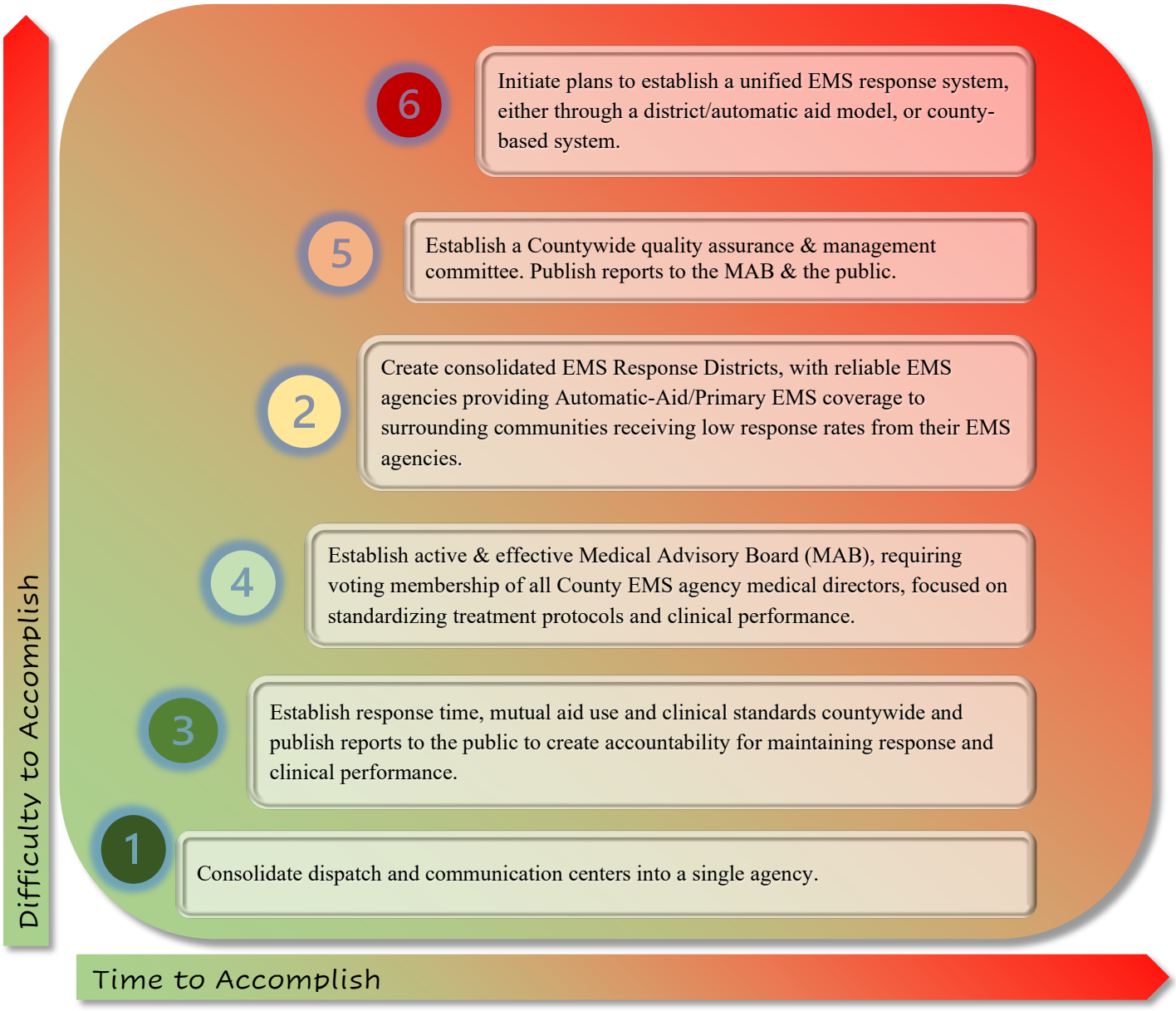
Ranking of Major Recommendations for Current Delivery Model



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SYSTEM ASSESSMENT

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Summary of Findings

The Cambridge Consulting group has determined the current Ross County EMS system is failing. Excluding the Chillicothe Fire Department EMS service, 17% of County EMS responses are provided by a mutual aid service, not the primary agency. This dependence on neighboring operations is as high as 72% in one township. In addition, average response times for the primary EMS units exceeded 10 minutes in every township but one and is greater than 18 minutes for mutual aid in every jurisdiction.

Only a few agencies are providing EMS services within, or near to reasonable, levels based on important measurements like response time and use of mutual aid. The trend revealed by this study causes deep concern for the long-term survival of most County EMS agencies. As the poor performing organizations deteriorate and collapse, additional strain will be placed on the remaining agencies, further hampering their ability to maintain adequate service.

It should be noted, the Chillicothe Fire Department EMS operation is functioning within acceptable limits in all important metrics, including response time, mutual aid use, and coverage of concurrent assignments.

Aside from multiple EMS agencies in the County unable to provide adequate EMS services to their communities, few, if any, maintained minimally appropriate or regulatorily required organizational components, including:

1) Adequate formal quality assurance programs and documentation.
2) Licensure/certification continuing education programs and documentation.
3) Clinical performance measurements, reporting, and documentation.
4) Detailed financial records, analysis, and cost reporting elements[8].

Substantial effort is necessary for most Ross County EMS agencies to create and put in place these elements.

[8] The Centers for Medicare and Medicaid services now requires all ambulance services that bill to submit when selected, a detailed cost report. None of the financial information provided by any agency in this study was sufficiently detailed to meet CMS's requirements.

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Evaluation of Current EMS System

EMS Provider Brief Profiles

There are twenty-six fire station locations throughout Ross County covering 692.9 square miles all of which identify as rural except for the city of Chillicothe. There are seventeen total EMS units including two 0.5 part time units (Paint).

Buckskin

Emergency Medical Service (EMS) delivery is provided by the Paint Creek Joint EMS/Fire District. There was no data provided regarding the PCJEMSFD's service to Buckskin Township for this study. As a result, Cambridge Consulting Group found it necessary to substitute inferred data and apply suppositions.

Chillicothe

Is a city run paid career organization that provides EMS delivery from three fire stations with two transport units for 10.6 square miles. They responded to 100% of the calls within their service area. The average response time was 6:13 (minutes:seconds) for the period reviewed.

Colerain

Is a volunteer organization that provided no specific staffing information. They provide EMS delivery from two fire stations with one transport unit for 35.4 square miles. They responded to 67% of the calls within their service area. The average response time was 15:44 for the period reviewed.

Concord

Is a volunteer organization that provided no specific staffing information. They provide EMS delivery from two fire stations with one transport unit for 75.7 square miles. They responded to 43% of the calls within their service area. The average response time was 12:32 for the period reviewed.

Concord placed a funding levy proposition before voters on November 7th, 2023. That levy failed by approximately nineteen votes. (698 In Favor -717 against).

Deerfield

Is a volunteer organization that provided no specific staffing information. They provide EMS delivery from one fire station with no transport units for 30.8 square miles. They receive transport EMS assistance from Union Twp. Deerfield responded to 84% of the calls within their service area. The average response time was 14:58 for the period reviewed.

The voters approved a .90 Mil renewal funding levy for Deerfield on November 7th, 2023. (205 In Favor - 68 Against). Although there is not an increase in taxes with this renewal, the approval

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levies 4.4 Mills for fire and EMS coverage in Deerfield.

Franklin

Is a volunteer organization that provided no specific staffing information. They provide EMS delivery from one fire station with one transport unit for 35.4 square miles. They responded to 37% of the calls within their service area. The average response time was 22:48 for the period reviewed.

Green

Is a volunteer organization with some part-time paid staff. They provided no specific additional staffing information. They provide EMS delivery from two fire stations with two transport units for 43.4 square miles. They responded to 95% of the calls within their service area. Their average response time was 9:41 for the period reviewed.

Harrison

Is a volunteer organization that provided no specific staffing information. They provide EMS delivery from one fire station with one transport unit for 36.2 square miles. They responded to 93% of the calls within their service area. Their average response time was 16:21 for the period reviewed.

Huntington

Is a combination volunteer/paid-career organization. They provide EMS delivery from one fire station with one transport unit for 59.6 square miles. They responded to 95% of the calls within their service area. Their average response time was 10:02 for the period reviewed.

Jefferson

Is a combination volunteer/paid-career organization. They provide EMS delivery from one fire station with one transport unit for 24.9 square miles. They responded to 75% of the calls within their service area. Their average response time was 16:58 for the period reviewed.

Liberty

Is a volunteer organization. They provide EMS delivery from one fire station with one transport unit for 36.1 square miles. They responded to 66% of the calls within their service area. Their average response time was 16:55 for the period reviewed.

Paint Creek Joint EMS/Fire District

Is a combination full-time, part-time, and volunteer organization that provided no specific staffing information. According to their website they cover 360 square miles across ten townships in three counties including Ross County. They provide EMS delivery from three fire stations with transport units that appear to be in service and staffed. However, no data was provided regarding the PCJEMSFD's service to Paint Creek Township for this study. As a result, Cambridge Consulting Group found it necessary to substitute inferred data and apply suppositions.

Paxton/Bainbridge

Is a volunteer organization that provides a stipend to their staff. They provide EMS delivery from two fire stations with one transport unit for 31.8 square miles. They responded to 87% of the calls within their service area. Their average response time was 12:24 for the period reviewed.

Scioto

Is a combination volunteer/paid career organization. They provide EMS delivery from two fire stations with one transport unit for 30.3 square miles. They responded to 81% of the calls within their service area. Their average response time was 11:19 for the period reviewed.

Springfield

Is a volunteer organization that provides a stipend to their staff. They provide EMS delivery from two fire stations with one transport unit for 30.8 square miles. They responded to 28% of the calls within their service area. Their average response time was 17:41 for the period reviewed.

Twin

Is a volunteer organization that provides mutual aid support only and receives contracted EMS transport services. They provide service from one station for 60.2 square miles. They responded to 12% of the calls within their service area. Their average response time was 18:04 for the period reviewed.

On November 7th, 2023, voters in Twin approved a 1.5 million dollar funding levy for EMS services with 55% of the vote in favor. Twin recently ceased their own operations of EMS and asked voters for approval to contract with Scioto, Huntington, and Bainbridge for EMS response and transport adding $52.50 on the average assessed value of residents' homes.

Union

Is a paid career organization that provides EMS delivery from three fire stations with two transport units for 66.8 square miles. They responded to 98% of the calls within their service area. Their average response time was 11:51 for the period reviewed.

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STAFFING

Ambulance service in Ross County is provided by 15 agencies, two fully staffed with career personnel, two with a combination of career and volunteer personnel, two with volunteers who receive financial stipends for calls to which they respond, and five with volunteers for whom no indication was made regarding their compensation or financial incentives. Four agencies did not provide information related to staffing models.

Ross County Township Ambulance Services	
Agency Staffing Profiles:	
Agency/Township	Staffing Model
Buckskin	No Data Provided*
Bainbridge/Paxton	Volunteer w/Stipend
Chillicothe City	Career
Colerain Township	No Data Provided
Concord Township	No Data Provided
Deerfield Township	No Data Provided
Franklin Township	Volunteer
Green Township	Volunteer w/Part Time Paid
Harrison Township	Volunteer
Huntington Township	Combination Career/Volunteer
Jefferson Township	Volunteer
Liberty Township	Volunteer
Paint Creek	No Data Provided*
Scioto Township	Combination Career/Volunteer
Springfield Township	Volunteer
Union Township	Career

*Buckskin and Paint Creek are served by the same agency: Paint Creek Joint EMS/Fire District.

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Ross County EMS agencies varied widely in their ability to handle their individual volume loads. The City of Chillicothe reportedly received no mutual aid assistance during the year examined, while Twin Township received the most of any jurisdiction at 88%. Normally, a five percent rate of mutual aid is the upper limit of acceptability since higher levels place an undue burden on neighboring agencies. At least eleven townships in Ross County exceeded the five percent mutual aid level.

Ross County Township Ambulance Agencies		
Response Reliability		
Agency/Township	% Primary Responded	% Received Mutual Aid
Buckskin (Staffing Data Not Provided)	No Data	
Chillicothe (Career)	100%	0%
Colerain (Staffing Data Not Provided)	67%	33%
Concord (Staffing Data Not Provided)	43%	57%
Deerfield (Staffing Data Not Provided)	84%	16%
Franklin (Volunteer)	37%	63%
Green (Combination Career/Volunteer)	95%	5%
Harrison (Volunteer)	93%	7%
Huntington (Combination Career/Volunteer)	95%	5%
Jefferson (Volunteer)	75%	25%
Liberty (Volunteer)	66%	34%
Paint (Staffing Data Not Provided)	No Data	
Paxton/Bainbridge (Volunteer w/Stipend)	87%	13%
Scioto (Combination Career/Volunteer)	81%	19%
Springfield (Volunteer)	28%	72%
Twin (Mutual Aid Providers Only)	12%	88%
Union (Career)	98%	2%
Overall	83%	17%

*Buckskin and Paint Creek are served by the same agency: Paint Creek Joint EMS/Fire District

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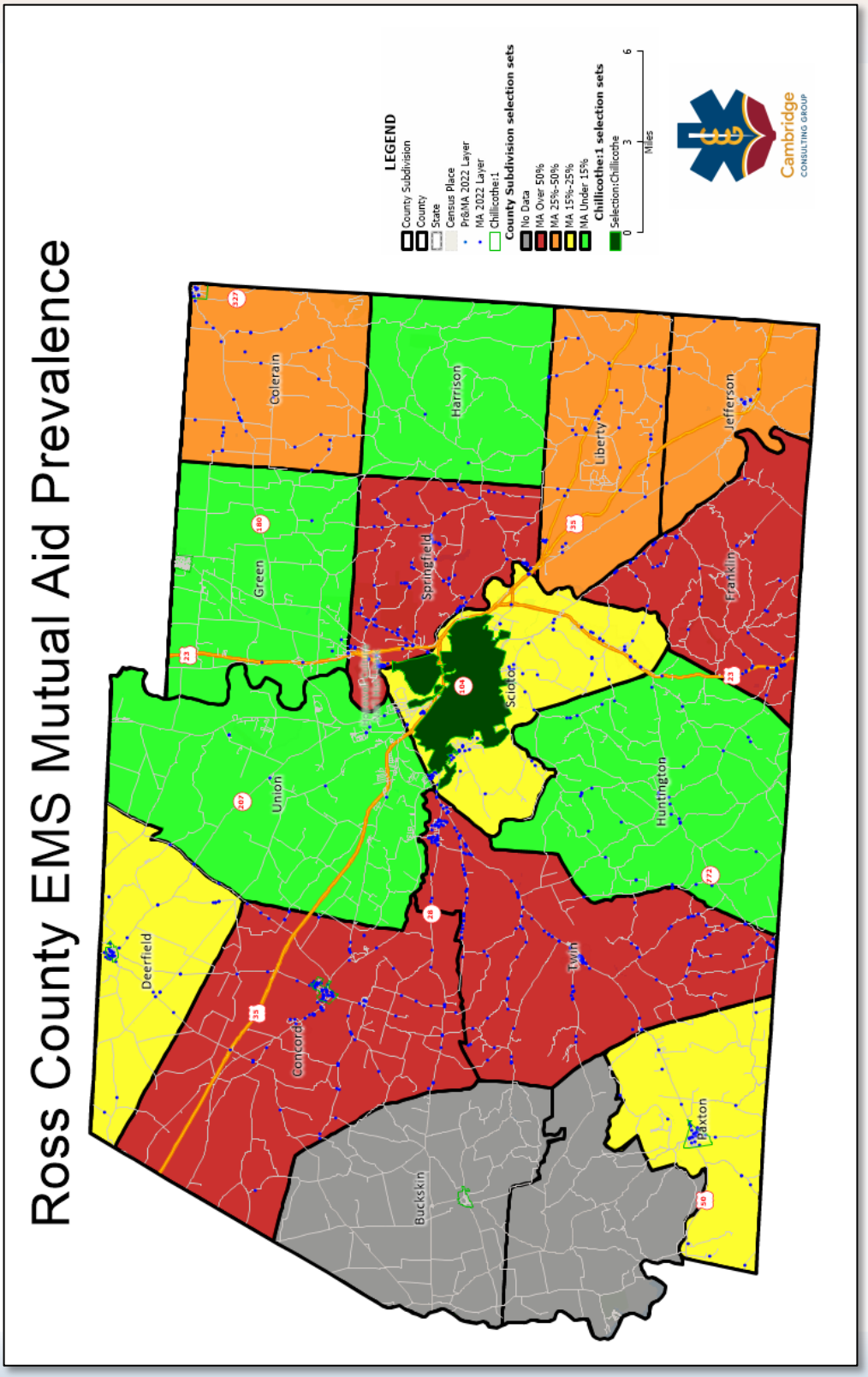
Response times are another measure of reliability and service provision in EMS. Recognizing that a significant portion of Ross County can be considered rural, average response times would be expected to vary significantly between different sections of the County. However, substantially long average response times were noted in large areas of Ross County and were attributable to a lack of adequate personnel availability, not distance to the incident.

Ross County Township Ambulance Agencies		
Response Time Reliability		
Agency/Township	Average Response Time Primary Unit (minutes:seconds)	Average Response Time Mutual Aid Unit (minutes:seconds)
Buckskin (Staffing Data Not Provided)	No Data	
Chillicothe (Career)	6:13	N/A
Colerain (Staffing Data Not Provided)	15:44	25:56
Concord (Staffing Data Not Provided)	12:32	24:45
Deerfield (Staffing Data Not Provided)	14:58	25:20
Franklin (Volunteer)	22:48	22:18
Green (Volunteer w/Stipend)	9:41	22:38
Harrison (Volunteer)	16:21	23:01
Huntington (Combination Career/Volunteer)	10:02	19:31
Jefferson (Volunteer)	16:58	27:38
Liberty (Volunteer)	16:55	25:58
Paint (Staffing Data Not Provided)	No Data	
Paxton/Bainbridge (Volunteer w/Stipend)	12:24	18:25
Scioto (Combination Career/Volunteer)	11:19	15:28
Springfield (Volunteer)	17:41	18:06
Twin (Mutual Aid Providers Only)	18:04	20:55
Union (Career)	11:51	12:19

*Buckskin and Paint Creek are served by the same agency: Paint Creek Joint EMS/Fire District.



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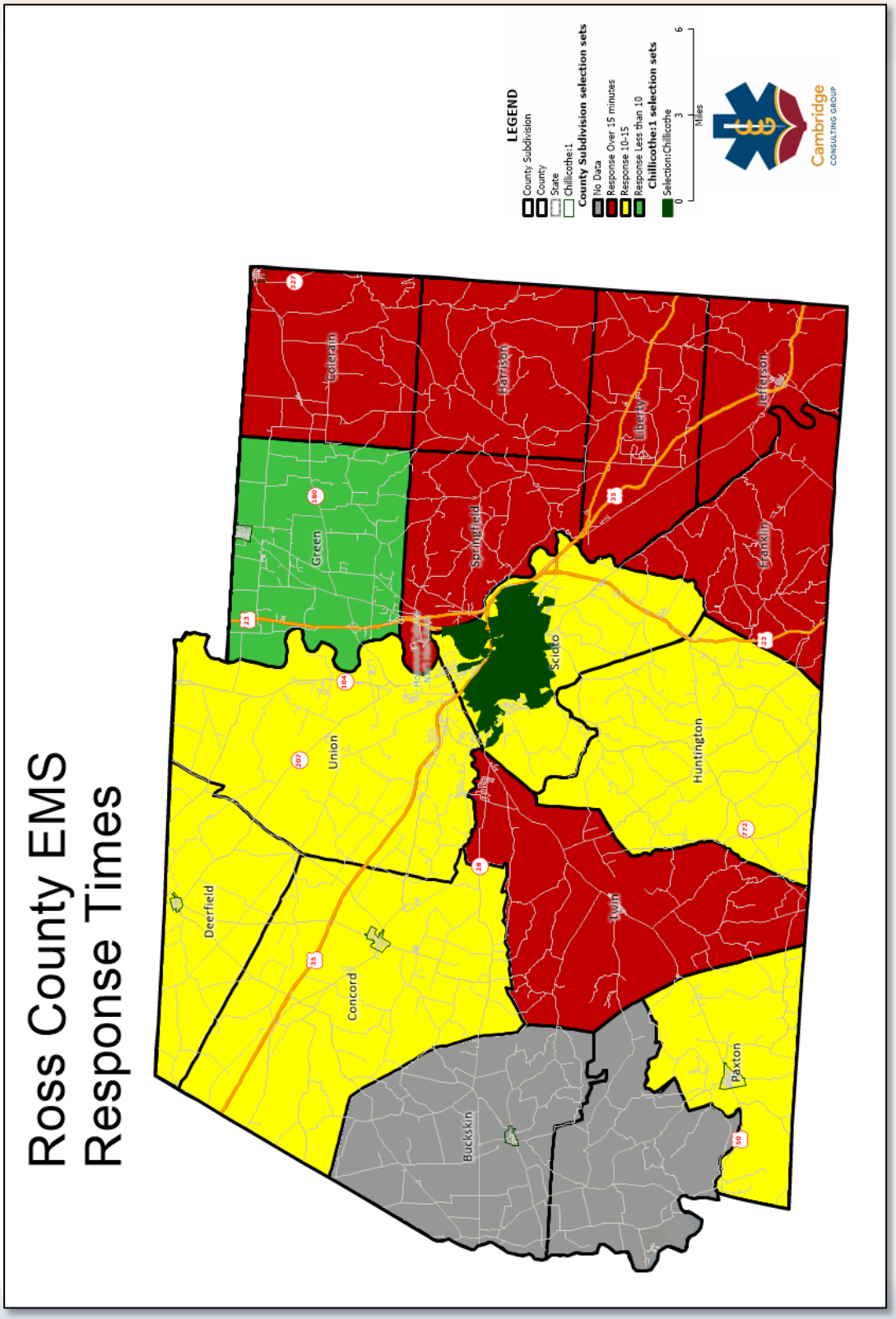

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These two aspects reveal that large areas of the County are receiving poor EMS service and threaten the health and safety of its residents.

Since insufficient personnel are a primary causative factor of the inadequate EMS service being experienced by substantial portions of the County, an attempt was made to examine that area more closely. While not all agencies reported information regarding their staffing types and levels, it was clear that the volunteer component of the EMS workforce in Ross County is woefully understaffed to sufficiently meet the needs of the current EMS system.

Summary Table of Staffing Analysis for Ross County EMS agencies

Municipality	Hourly Range	Certification	Staffing	Notes
Huntington Township	$12-$14	EMT-PM	3 FT FF	Combination of career and volunteer
Green Township	$13.50-$17.50	EMT-PM	PT only	Volunteer augmented with Part Time Paid staff
Concord Township				
Union Township	$12-$14	EMT-PM	36/14	Assuming FT but unable to determine by notes
Bainbridge/Paxton	$125-$145 shift	EMT-PM	13 PT paid EMS	Paid $35 stipend per run (7p-7a) Paid stipend per shift (7a-7p)
Chillicothe City		EMT-PM	six/39	45 uniformed employees, 10 per day, unable to determine by notes PT v FT
Jefferson Township	Volunteer		10 volunteers EMS	
Scioto Township	$16-$19	EMT-PM	four/2 FT	PT staffing in addition to FT at 12 hours day $91-$116 for six hour shift
Springfield Township	Volunteer	EMT-PM	"Whoever shows"	Appears to be all volunteer agency
Franklin Township	Volunteer	EMT		Volunteer agency requiring minimum of 20 hours per month
Harrison Township	Volunteer	EMT-PM	10 EMTs/2 PM	Volunteer agency with deployment based on who can respond
Paint Creek				No data submitted
Liberty Township	Volunteer	EMT	10 Volunteers	All volunteer squad, available members respond to calls
Colerain Township				No data submitted
Buckskin Township				No data submitted
Deerfield Township				No data submitted
Twin Township				No data submitted

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SWOT Analysis of EMS Staffing in Ross County

A SWOT analysis is a technique that analyzes strengths, weaknesses, opportunities, and threats. Many professionals apply this framework to entire organizations to determine if their current operations are sustainable over the long term, but it's also applicable to single departments or projects to determine their viability. The strengths and weaknesses portions identify internal components that affect an organization, such as intellectual property, location, employees, and more. Threats and Opportunities represent positive and negative effects that impact the organization externally.

A traditional SWOT analysis provides an inventory of these attributes throughout its sector. This Cambridge Consultants Group SWOT analysis is based on numerous interactions, including but not limited to, stakeholder meetings, historical research, and one-on-one conversations.

This SWOT analysis focuses on EMS staffing in Ross County and is based on the data provided by the County and individual agency submissions. Some agencies provided limited data that require further information gathering. The analysis is made within the context of Ross County's public commitment to "providing a reliable level of EMS services and care throughout Ross County."

STRENGTHS

The biggest strength of the Ross County EMS system is that the County is seeking awareness of its current system to ensure adequate EMS response into the future. Additionally, volunteerism, which makes up most of the EMS staffing models in Ross County, shows community commitment among providers. The stipend pay and per-shift compensation paid to volunteers is a great incentive for these practitioners. The mutual aid among neighboring municipalities is also a strength not always seen in EMS elsewhere. And, the existing infrastructure of the Ross County EMS system, while somewhat limited and aged, is still a strength.

WEAKNESSES

In terms of assessing EMS staffing in Ross County for this SWOT analysis, the ability to gather data has been challenging. Although volunteerism can be looked on as a strength reflecting community commitment, it is also a major weakness. It is quite concerning that the response to staffing questions in this project's survey indicated that staffing is based on "whoever shows up". Most EMS provision in the County is from a fire department agency.

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It is necessary to study in more detail each agency's operation, culture, and general view of EMS's importance to the organization. The stipends and shift incentives, although a plus in encouraging volunteers to pick up shifts and respond to calls, may also be problematic if inconsistent across the County. Volunteers may answer calls more often for agencies that offer stipends compared to those that do not.

OPPORTUNITIES

Where there are challenges, there are always opportunities and Ross County is no different. Due to staffing problems throughout the County and inconsistent staffing patterns, there is an opportunity for first responder or rapid response units at the ALS level to cover regional areas ensuring care begins quickly rather than waiting for an ambulance to arrive. In general, response times do not matter significantly for low acuity EMS cases. Even in critical incidents, the time it takes the ambulance to arrive on scene is less important than how long it takes qualified and appropriately equipped practitioners to arrive.

Considering regionalization, the opportunity for agencies to pool their resources from staffing and equipment to ambulances, would help to ensure a reliable level of EMS services. A regionalized system would include neighboring municipalities with call volume that allows for staging of EMS assets based on historical incident data to ensure an acceptable and consistent ambulance response performance. Certainly, those areas with higher call volume may need dedicated resources. A unified or consolidated EMS system could help with operational costs from an economy of scale perspective, improved coordination, more efficient resource management, and better quality communications.

THREATS

The largest threat to the EMS agencies in Ross County is continued degradation of service provision resulting in poor patient outcomes. Eventually, based on the current trends revealed during this study, it is likely that many of the local EMS agencies will fail in the next few years. Their predicted demise is consistent with the experience now playing out across the nation, especially for rural EMS organizations. It is important to engage the community regarding EMS to gather their expectations of their individual towns' service needs. To secure a reliable level of EMS care throughout the County, there will undoubtedly be a financial cost focused mainly on staff. Community engagement and support will help in building the support for the necessary funding by way of increased taxes.

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This SWOT analysis looks at the staffing of the current EMS system in Ross County but did not use a SOAR approach method. As an expansion of SWOT, the SOAR technique emphasizes the importance of identifying and leveraging opportunities. Like in SWOT, Opportunities in SOAR are external factors that organizations can capitalize on to achieve their strategic goals. By aligning strengths with opportunities, organizations can maximize their chances of success.

To identify opportunities, organizations need to monitor their market, industry trends, and emerging technologies. Conducting EMS service provision research, provider analysis, and community surveys can lend valuable insights into potential opportunities. Once identified, organizations can develop strategies to capitalize on these opportunities, leveraging their strengths to improve their services and attain sustainability.

The third component of the SOAR Technique is "Aspirations." Aspirations are the long-term goals and visions that organizations strive to achieve. By setting ambitious aspirations, organizations can inspire and motivate their personnel, align their actions, and drive strategic decision-making. To uncover aspirations, organizations need to engage in a process of introspection and reflection. This involves asking fundamental questions such as "What is our purpose?" and "What do we want to achieve in the long run?" By articulating clear aspirations, organizations can develop a roadmap for success and guide their strategic planning efforts.

While strengths, opportunities, and aspirations can yield a solid foundation for strategic planning, it is ultimately the results that matter. The final component of the SOAR Technique is achieving tangible outcomes. This requires setting specific goals, developing action plans, and monitoring progress. To achieve results, organizations need to establish key performance indicators (KPIs) and regularly track their performance. By aligning actions with aspirations, leveraging strengths, and capitalizing on opportunities, organizations can maximize their chances of achieving their desired results.

It is important to understand how to integrate SOAR into the strategic planning process. The SOAR technique can be used as a framework to guide discussions, decision-making, and resource allocation. To integrate the SOAR technique, organizations can incorporate it into their existing strategic planning processes or develop a dedicated SOAR strategy. This involves training leaders and personnel on the SOAR technique, facilitating workshops and brainstorming sessions, and continuously reviewing and updating the strategy based on new insights and changes in the EMS service environment.

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Implementing the SOAR technique requires the use of various tools and resources. They include:

1. Strengths Assessment Surveys:
   These surveys help organizations identify individual and collective strengths by gathering feedback from personnel, community members, political leaders, and other stakeholders.
2. SWOT Analysis Templates:
   SWOT analysis templates provide a structured framework for identifying strengths, weaknesses, opportunities, and threats. They help organizations visualize and prioritize their findings.
3. Goal-setting Frameworks:
   Goal-setting frameworks, such as SMART[9] goals, can help organizations set specific, measurable, achievable, relevant, and time-bound objectives. This ensures that actions are aligned with aspirations and results can be tracked effectively.
4. Strategic Planning Software:
   Strategic planning software provides a centralized platform for organizations to manage their strategic planning efforts. It allows for collaboration, tracking progress, and generating reports.

The SOAR assessment process was not included in this project's scope of work.

[9] SMART goals stands for Specific, Measurable, Achievable, Relevant, and Time-Bound parameters.

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STAKEHOLDER PERCEPTION

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PROJECT PUBLIC RELATIONS & MEDIA PLAN

Community education and feedback was an essential component of this project. Working collaboratively with the EMS Planning Committee and stakeholders throughout Ross County, CCG developed an on-line survey instrument to seek public feedback regarding EMS delivery in Ross County.

Distribution of the survey was facilitated through local media and community-based platforms (county and township websites, etc.), with a brief explanation of the purpose of the community survey.

The community information release and explanation are shown below:

Ross County Seeking Community Input on Emergency Medical Services Delivery in Ross County

The Cambridge Consulting Group has been retained by Ross County to develop a path forward to improve the Emergency Medical Services (EMS) System in Ross County now, in the short-term, and long-term looking for multiple solutions to improve pre-hospital care in Ross County.

A key component of this process is input from ***community members*** about your local EMS agency.

In cooperation with Ross County officials, Cambridge has developed a brief online survey asking about your perceptions of EMS delivery in your local community. The survey seeks community input on things like knowledge of how the system works, and if you've been a patient cared for by EMS, your perceptions of the care you received.

The online submission should only take about 7 minutes and will be very valuable for the future of EMS in Ross County.

The survey can be accessed here: https://forms.office.com/r/gbPXj7j2Ka

Or by scanning the QR Code:

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Community Leader/Stakeholder Perception of EMS Delivery in Ross County

As part of this engagement, CCG developed a community leader survey which was distributed to elected and appointed officials in Ross County. Responses to the survey provided valuable insight into the public's perception of EMS delivery in their local communities.

Every community leader responding to the survey indicated that although they are generally satisfied with EMS delivery in their community, staffing and funding are challenges within their service delivery model.

Ross County Community Stakeholder/Leader Survey; Question 1

Community	"What do you think is working well with the current EMS response system in your community?"
Buckskin	The response time is very good
Concord	The people we have bust their butts when they are able to cover.
Harrison	Our volunteers, response time
Huntington	We have full time crews 24/7. Our response time from dispatch to arrival averages under 10 minutes
Jefferson	personnel
Liberty	A collaborative effort with other surrounding townships.
Paint	We utilize the Paint Creek Joint EMS and Fire District. They have two locations within 5 or 10 minutes of our township. We think this is working very well and wouldn't change anything.
Union	A full time Chief, with a part time staff answering more than 2000 calls per year for service in Union Twp. and other communities when minimum staffing covers Union.

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ROSS COUNTY COMMUNITY STAKEHOLDER/LEADER SURVEY; QUESTION 2

Community	"What do you feel are the greatest challenges for the EMS response system in your community?"
Buckskin	The hiring and keeping employees. several EMS personnel have gone to work in Dayton and Columbus for better pay
Concord	Finding qualified employees to fill positions. What used to be a volunteer organization has exploded into an expensive and trying endeavor. We will have an additional levy this November on the ballot to try and offset some of the shortfalls that will happen.
Harrison	Lack of funding, we have no levies to support our fire or EMS departments
Huntington	Staffing shortages. There aren't enough EMTs trained to staff some days.
Jefferson	private companies hiring volunteers
Liberty	Trouble with getting volunteers to commit not only to service but to the mandatory training and continuing education required.
Paint	We're a very rural township so having coverage for quick response is a challenge. Paint Creek Joint EMS has solved this challenge for us.
Union	1) Transition and affordability of a full-time department that covers fire and EMS 2) The cost of converting to a 24-hour facility.

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Ross County Community Stakeholder/Leader Survey; Question 3

Community	"On a scale of 1-5, with 5 being most satisfied, how satisfied are you with the level of service your EMS agency is providing to your community?"
Buckskin	5
Concord	4
Harrison	5
Huntington	4
Jefferson	4
Liberty	2
Paint	5
Union	5

Ross County Community Stakeholder/Leader Survey; Question 4

Community	"Is there anything else you would like to share about the EMS services provided in your community?"
Buckskin	None
Concord	As to 11. The runs we can cover I feel we do a good job. It is there are times we cannot make all runs that are dispatched.
Harrison	Our department is totally volunteers and they are one of the hardest working group of individuals in the area. We are very proud of them.
Huntington	We have one of the finest departments in the county. When looking on doing this on a county level, Huntington has led the way as an example that you could use.
Jefferson	no
Liberty	We have a small, dedicated group of volunteers but that is not enough. Currently, between EMS and fire expenses, we are unable to even give them a stipend for the volunteer service.
Paint	The Paint Township Trustees are not in favor of changing anything with regard to our coverage.
Union	Don't expect the communities that have stepped up to the problem to fix those who have chosen to ignore it. This has been an ongoing issue since the early 2000s.

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Community Perception of EMS Delivery in Ross County Communities

As part of this engagement, CCG developed a community perception/input survey which was distributed throughout the county. Responses to the survey were robust and provided valuable insight into the public's perception of EMS delivery in their local community.

	Less than 3 Years	%	3-10 Years	%	More than 10 years	%	Total
"How long have you lived in Ross County?"	6	3.3%	17	9.2%	161	87.5%	184

Community	Responses	%
Adelphi	2	1.16%
Bainbridge	9	5.20%
Bourneville	2	1.16%
Chillicothe	20	11.56%
Clarksburg	4	2.31%
Colerain	2	1.16%
Concord	13	7.51%
Frankfort	45	26.01%
Franklin	2	1.16%
Green	6	3.47%
Harrison	5	2.89%
Huntington	8	4.62%
Kingston	4	2.31%
Knockemstiff	1	0.58%
Liberty	5	2.89%
Londonderry	10	5.78%
Paxton	3	1.73%
Richmond Dale	4	2.31%
Scioto	6	3.47%
Springfield	1	0.58%
Twin	6	3.47%
Union	15	8.67%
Total	173	100.00%

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"Do you know which agency provides EMS in your community?"

Community	Yes	No	% Yes
Adelphi	1	1	0.58%
Bainbridge	9	0	5.20%
Bourneville	1	1	0.58%
Chillicothe	18	2	10.40%
Clarksburg	4	0	2.31%
Colerain	2	0	1.16%
Concord	12	1	6.94%
Frankfort	32	13	18.50%
Franklin	2	0	1.16%
Green	6	0	3.47%
Harrison	5	0	2.89%
Huntington	8	0	4.62%
Kingston	4	0	2.31%
Knockemstiff	1	0	0.58%
Liberty	5	0	2.89%
Londonderry	10	0	5.78%
Paxton	3	0	1.73%
Richmond Dale	4	0	2.31%
Scioto	6	0	3.47%
Springfield	1	0	0.58%
Twin	6	0	3.47%
Union	15	0	8.67%
Total	155	18	89.60%

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"On a scale of 1-5, with 5 being most knowledgeable, how knowledgeable are you about the level of services provided to you by your local EMS agency (i.e.: level of clinical care, cost of service delivery, response times, etc.)?"

Community	Rating
Adelphi	3
Bainbridge	4.7
Bourneville	5
Chillicothe	4.1
Clarksburg	3.8
Colerain	5
Concord	4.2
Frankfort	3.3
Franklin	3
Green	4.2
Harrison	4.6
Huntington	4.4
Kingston	4.3
Knockemstiff	3
Liberty	4.5
Londonderry	4.1
Paxton	4.5
Richmond Dale	4
Scioto	4.6
Springfield	5
Twin	3.2
Union	4.1
Overall Average	3.96

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"Please rate your EMS agency on a scale of 1-5, with 5 being most satisfied."							
Community	Overall reputation.	Ability to meet community EMS needs.	Professionalism of the staff.	Medical care provided.	Facilities and equipment.	Response time.	Overall value to the community.
Adelphi	3.0	5.0	5.0	5.0	5.0	3.0	5.0
Bainbridge	4.6	4.8	4.6	4.7	5.0	4.4	4.8
Bourneville	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chillicothe	4.1	3.6	4.1	4.2	4.3	3.9	4.3
Clarksburg	1.8	1.5	3.3	2.8	3.8	1.5	2.3
Colerain	5.0	5.0	5.0	5.0	5.0	4.5	5.0
Concord	2.3	2.5	3.7	3.2	4.4	2.4	3.7
Frankfort	2.4	2.1	3.5	3.2	3.8	2.0	2.9
Franklin	1.0	1.0	2.5	2.5	3.0	1.0	1.5
Green	4.2	4.0	4.3	4.2	4.2	3.8	4.2
Harrison	4.6	4.6	4.4	4.8	3.8	4.6	4.6
Huntington	3.5	3.4	3.3	3.8	4.8	3.8	3.8
Kingston	4.6	4.4	4.2	4.2	4.2	4.4	4.6
Knockemstiff	3.0	3.0	4.0	3.0	3.0	2.0	3.0
Liberty	2.7	2.7	2.7	2.8	4.8	2.2	3.0
Londonderry	2.8	2.6	2.9	3.3	4.4	2.6	3.9
Paxton	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Richmond Dale	4.0	4.0	4.2	4.0	4.5	3.6	4.2
Scioto	3.7	3.7	3.8	3.8	4.0	3.7	3.7
Springfield	2.0	2.0	3.0	3.0	4.0	1.0	2.0
Twin	2.5	2.2	4.0	4.0	3.0	2.0	2.5
Union	4.4	4.7	4.5	4.6	4.6	4.5	4.9
Overall Average	3.3	3.2	3.8	3.8	4.1	3.1	3.7

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AGENCY PERCEPTION RESULTS

Respondents Who Were Patients Cared for by Their Local EMS Agency							
Community	Interaction with the 911 dispatcher.	The medical care provided by the EMS personnel.	EMS personnel kept you informed about your care.	Condition of the ambulance and equipment.	The ambulance billing process.	Timeliness of the ambulance arrival.	Likelihood of recommending the service to others.
Adelphi		5.0	5.0	5.0	4.0	4.0	5.0
Bainbridge	2.0	5.0	5.0	5.0	5.0	5.0	5.0
Chillicothe	4.7	4.4	4.3	4.3	4.0	4.1	4.3
Clarksburg	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Colerain	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Concord	3.5	4.7	4.7	4.7	4.2	3.3	4.0
Frankfort	4.1	3.5	3.5	4.1	3.9	2.5	2.6
Franklin	5.0	3.0	3.0	4.0	5.0	1.0	1.0
Green Township	3.6	4.5	4.3	4.6	3.8	3.8	4.4
Harrison	3.0	5.0	5.0	5.0	5.0	5.0	5.0
Huntington	4.5	3.5	4.0	4.0	3.5	3.5	3.0
Kingston	4.3	4.3	4.3	4.3	4.0	4.3	4.3
Liberty	3.3	4.3	4.3	5.0	4.3	3.7	4.3
Londonderry	4.0	3.5	3.5	5.0	4.5	3.5	2.0
Paxton	1.3	4.3	4.7	4.7	4.7	4.3	5.0
Richmond Dale	4.5	5.0	5.0	5.0	5.0	4.0	5.0
Scioto	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Twin	2.8	3.3	3.3	3.7	3.0	2.5	3.3
Union	4.2	4.4	4.6	4.5	3.8	4.5	4.6
Overall Average	3.5	3.9	3.9	4.3	3.6	3.2	3.4

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COMMUNITY PERCEPTION SURVEY – COMMENTS

An insightful component of the community perception survey were the comments submitted by many of the respondents. CCG has categorized these comments into two groups: generally favorable and generally unfavorable. While we have these comments available by community served and will provide that level of detail to the leaders of those communities, we are deidentifying the community for the purpose of this summary. CCG has also chosen to do no editing of the comments, they are directly replicated below as written by the respondent, except for deidentifying any references to specific agencies, or other information that may infringe on patient identification.

Overall, there were 35 “Generally Favorable” comments (37.6%), and 58 “Generally Unfavorable” comments (62.4%), with several of these comments indicating the belief that a potential failure of the EMS system to respond to loved ones may have contributed to a poor patient outcome, including death.

Based on these comments alone, irrespective of the actual data that provides evidence of the crisis in Ross County’s EMS system, it is apparent that the residents of Ross County are looking for significant change in EMS delivery in the County.

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EXCERPTED COMMENTS

Generally Favorable

December XX 2022, my husband, and I became very ill. It was strange because we didn't really realize how ill we were. Our son realized things were not good and he called for an ambulance. Colerain responded and they were great people. I was so out of it I can't really remember but my husband was a little better off at the time. He commented how they kept talking to him on the way to the hospital and stayed awhile after the we arrived at Adena Hospital. They were helpful to my son and daughter as well. I can't praise these guys enough for their care. I think they really may have saved our lives. It ended up we both had pneumonia and the flu. I've never been so sick in my life, I had gone septic at arrival at the hospital with a kidney infection as well. A couple of weeks after we got home from the hospital, one of the gentlemen that helped us that night stopped by the house just to say hi and see how we were doing. They truly are great people that serve this community and deserve anything we can possibly give them! God Bless Them!"

The XXXXX fire department is amazing. Ever since combining, their fire and EMS response times have drastically improved. It's nice know now when I call 911 that it will be my own fire department that shows up to care for me. These guys go above and beyond their duties for the community.

The best group of guys to serve the community.

Interacted with my family while checking my symptoms, very caring.

The patient care provided by the volunteers at XXXXX Twp. Is exceptional. The men and women have showed up numerous times regardless of time of day. You can't get any better in my opinion.

I wish XXXX Township could have paid employees around the clock to provide a faster response time to patients.

Very friendly and thoughtful

That they are doing the best they can. BUT ALL AGENCIES ARE IN NEED OF HELP AND PERSONNEL. KEEP UP THE SERVICE EVERYONE And thank you for all you do.

I've only had experience with two different EMS entities: XXXXX and XXXXX townships. There is absolutely No comparison. XXXXXX township is by Far superior.

XXXX provides quality and timely care to our citizens.

XXXX has done a great job since merging with XXXXX Township. I believe they are even covering most of Twin Township now. We see them answering calls all the time. Always hearing the sirens

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My agency recently combined fire and EMS services and have showed great improvement and I feel a county system would do nothing but downgrade service to the community and would be a slap in the face to EMS agencies who cover their calls

XXXXX township does not even have a fire or EMS anymore because one person ran everybody off and the trustees won't do nothing about it but yet we still pay taxes for their service

XXXXX Township is well staffed and equipped however that is not the case with some of our EMS providers in smaller Townships.

Very friendly and thoughtful

EMS responders are great - there's just not enough of them.

I rated most things a three only because I can't accurately rate good or bad ... I've have never needed to use the EMS system here in Ross County yet ..... however, I know how valuable they are if/when we do need them!!!!! I definitely think the community could use more info in general about services provided run times ..... Even more info about volunteering and donating and ways we can help also .....

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They have two Station that they rotate Squads in 3 days at one 2 days at the other. I live closer to one station than the other so response time can very.

The guys and gals are doing great things in the TWP safeguarding their community. Wouldn't change a thing. We see how county EMS services turn out with neighboring Pike County

In 30 years have needed EMS 2 times, fast response, professional, always impressed, and thankful.

My interactions with EMS in the most recent have exceeded my expectations. Many good changes have occurred in the last year.

As a citizen and someone who previously ran EMS the dispatch center and lack of training and obvious. They have significant room for improvement, and this negatively impact how EMS resources are used in this county."

It is a lot better since the XXXX township squad combined with the XXXX fire department.

Very good group of people who truly care about the community. They provide very good service to the

community with professionalism and fast response to emergencies. Always can count on XXXX fire department to be there for the community.

Consideration should be given to following the old "Emergency" TV series example for providing emergency care. Use highly trained first responder teams located around Ross County and then utilize local private or volunteer squads for stabilized transports. I have no idea of the emergency run frequency or the areas with the highest level of need around the County, so I can only guess that 4-5 of these 2/3-person paramedics teams would be needed. They should work for the County and not the townships and, at least, initially be located outside the XXXX limits in all directions.

Initially, these paramedic teams could be located within township buildings but eventually they should be moved to their own buildings based on need, highway access and future predictions on the growth of the community. Utilizing professional Paramedic teams would help eliminate the need for high levels of taxpayer funded training for Volunteers who are then frequently stolen away by the contract squads. Only basic EMTs would be needed on the volunteer squads for stabilized transports. A paramedic could ride with the patient when needed.

Any Ems and Fire department have room for improvement. XXXX Township is providing full time

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coverage of not only Ems but also FIRE. Full time fire has lowered the rating allowing lower property insurance rates!!!

What the Ems world of Ross County is doing fine the way it is. People are working along the lines to bettering the services along the way. There is no need for a stupid paid EMS. If that's the case. People will be dead. The response times to end to end of the county would kill people. So that's out. Keep Ross County doing what they are doing.

Before XXXX took over we didn't know if we would get an ambulance when we called 911. Since Bainbridge took over EMS in Twin Township has done a complete 360. Bainbridge seems to have it figured out.

Fast and well equipped and staffed.

District the county the same way the sheriff's office does, 5 districts, with 1 basic squad and a medic crew in each of the station.

Wonderful staff and department. They were quick and professional and all around great.

XXXX Township is one of the better EMS groups in Ross County. They do A TON for surrounding areas as well,

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which speaks to the staffing, dedication, and willingness to help our entire county. Chief XXXX is an excellent leader, in my own opinion.

XXXX twp does a great job taking care of the residents of XXXX, and often times some surrounding townships when staffing levels allow. Other townships have the opportunity to do what XXXX, and several others have done. Do not rob XXXX Twp residents of great service just to spread services to other townships. XXXX already has a levy in place and County wide EMS would create a double tax situation. Be sure to publicize and educate the public in all townships on the Pros and Cons of countywide EMS. Otherwise, it looks like you are less than transparent.

Very fast time between 911 n squad getting to house! No more than 5 min!!!!

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Generally Unfavorable

The volunteer system in Ross County is broken. Commissioners need to do their jobs and take the bill by the horns and implement a FULL TIME PAID EMS.

My husband is a double lung and kidney transplant recipient and is immune suppressed. In the past 8 years, I've called 911 3 times for EMS transport to hospital. All 3 times, wait time was 45 min to over an hour. XXXX Twp EMS didn't respond to any of the 3 events, and we had to wait for private ambulance to respond out of XXXX. We live about 4 miles from the XXXX EMS station. Response times are horrible. My father was having a heart attack. We called 911. The XXXX EMS didn't show. We waited 40 minutes and then got my father into the car. He died in our car 2 miles out from the hospital. He might of been saved if EMS responded. His home is less then 5 miles from XXXX EMS. He died in our car.

I called 911 for EMS in July 2022 when my husband had a stroke. It took almost 40 minutes for them to arrive. I called 911 back after 30 minutes to find out when they would get here. I later learned that XXXX twp wasn't answering calls and 911 had to wait 15 minutes before they could call others to take the call. Between getting him into the ambulance and driving to the hospital was another 45 minutes to an hour.
My husband was hospitalized for two months before he died. I can't help but wonder if a quicker response would have made a difference. The county needs a centralized system that provides all residents with reliable service to save lives."

Our local township hardly ever responds generally another areas EMS responds to XXXX. Sad

The twp EMS system has holes in it due to lack of manpower. A Countywide agency with on-duty personnel would be a step in the right direction. Turf wars do not help.

A countywide EMS would be the best thing for the residents. Lower response times would result and lives would be saved. Exploring a tax levy to support such a change is worth time, effort, and exploration.

We need more than a volunteer EMS to provide adequate service to the community.

We need a county wide, paid, EMS service with enough personnel that arrival times are faster.

They can't keep personnel. Another township usually responds or so I have heard.

Having worked for the City of XXXX for almost 30 years the #1 problem has always been staffing. To cover both EMS and fire services has placed a great strain on all service provided.

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In addition, I lived in XXXX Twp for app. 25 years and in that time the service provided was the best that could be done. Once again, the #1 issue is staffing. At one point in time, I was
the only paramedic in the township. I assisted Huntington township while working for the City of XXXX full time. For me to assist the township and work full time for the City of XXXX was not possible for the amount of time XXXX needed me cover.

The answer is more staffing for fire and EMS but that requires additional taxes, and I don't see that as something that residents will support.

The grading of service is for the City of XXXX and not for XXXX township. The townships rating would be significantly lower.

Too many politics in that township. Relatives & close friends of members and trustees appear to have personal agendas.

Needs work.

XXXX did not cover the run. XXXX covered it very professionally once they finally arrived.

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Ambulance service is spotty, units from private firms fill out capacity with long service times.

Local has never come. It has always been such different township that responds. Sadly, we are only a few blocks from the station.

County Wide EMS is needed. It's not the fault of Township Residents (who pay a tax levy for EMS services) to continue to pay for a service you receive from a mutual aid department. Either ban tax levy countywide or put one tax levy on and divide it up to the townships.

There are too many squads and fire apparatuses in the county, over lapping equipment but shortages of personal.

Dispatch has to improve process of transferring information from the call taker in Ross County and the dispatch office in XXXX county. XXXX is dispatched out of highland county for every call they receive and there can be significant delay in the call transfer process.

Please READ THIS!!! THIS ISSUE IS KILLING PEOPLE AND NEEDS FIXED , MY FATHER IS ONE OF THEM I am an advanced EMT and have been for almost 20 years and I will never understand the county's policy on waiting 10 minutes for a squad to try and get a crew together even

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if they are aware one crew is out before going to the next department or private service with a contract for mutual aid, ON XXXX, XX 20XX AROUND 9 AM. My mom woke me up to say my dad had stopped answering here while she was doing dishes and had a funny color well I remember walking towards the couch and my next memory is being on the floor doing CPR, I told my mom to call 911, them a witnessed cardiac Arrest CPR in progress, and I wasn't super panicked at this point as we are in sight of the squad house and he had immediate high quality CPR so everything was in his favor, what I didn't know was i was about to experience 45 minutes of hell, something that really changed me,

I will never forget hearing my mom I think calling back the dispatcher or she may have remained on the phone but I can hear her pleading to please send another department my husband's chance of survival is going down with every minute and me having her put it on speaker telling and nothing well after 45 minutes of one person doing compressions and your ability to do proper CPR goes down drastically after 2 minutes, I did something and said something I never dreamed I would have to do to my mother and father I told my mom if she wanted to tell my dad goodbye she needed to go ahead by it was time for me to stop he was not. Going to make it, and hearing her sobs and telling him she loved him so. Much and she will miss him every day, my hands began slipping from my tears as I told him how sorry I was that this happened to him and I loved him so much and I would do something to fix it, I stopped compressions and felt for a pulse I knew wasn't there and waited for about

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five or so more minutes for a squad to finally get here, My father had a very good chance of survival that day, and if they would have sent the next available squad which our township crew was out at Adena regional ER told them to do because this was the one of the most serious emergency and very time critical but they can't, that's why XXXX township went ahead and did away with their EMS service because it was the only way they could get the sheriff's office to not wait the 10 minutes, I am sure that our county medical director or anyone with any EMS education would ever think this was anything but a danger and trust me it is I KNOW ITS HARD WHEN YOU HAVE ALOT OF TOWNSHIP WITH ONE PAID CREW AND THE REST VOLUNTEER OR ALL VOLUNTEERS BUT THERE HAS TO BE SOME BETTER WAY BECAUSE NOBODY SHOULD DIE BECAUSE OF THERE ADDRESS NOBODY MY NAME IS XXXXXXX XXXXXXXX AND YOU CAN VERIFY MY STORY MY NUMBER IS XXX-XXX-XXXX.

I'm a retired deputy of the Ross County Sheriff's Office. Less and less people volunteer for local fire and EMS services. The younger people are not stepping up to the plate as the older members are leaving.

I am a career firefighter/EMT. The solution is not county EMS, it is dissolving township fire departments and letting paid ones cover them. County EMS will not have the run volume or funding. The problem lies with only a few departments in the county that drain other resources and so on.

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Most of the time they have to have another squad respond for them.

Township EMS staff and board of trustees are very limited in their abilities due to funding, staff shortages, resources, etc. we recognize and commend their efforts regardless of restrictions.

I feel bad for them because they aren't a full-time department, and they rely on XXXX Twp for back up. It's hard to have volunteers now a days even if they are paid, because everyone needs to work. There is minimal ALS providers available and lack of training is available.

The XXXX Twp Fire dept is fantastic. The EMS/squad side needs some serious help, both in terms of getting people to make the runs, and in overall leadership. Paying folks to stay on site, and not paying them a per run rate is just ridiculous.

As is paying them to sit at a private event on Saturday evening while the twp is uncovered. The few local folks who have been running lately are trying, and doing good work when they can. However, the leadership hasn't made runs in a very long time and is simply out of touch.

Majority of the Township runs are completed by mutual aid, "XXXX Twp."

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We have staffing issues, and lack of interest by outside parties to join this all-volunteer operation. This community deserves a full time EMS service.

I wish XXXXXXX Township could have paid employees around the clock to provide a faster response time to patients.

While I appreciate the value of volunteers, they are clearly lacking professionalism and motivation. They were polite but really don't give you a lot of confidence. I strongly suspect there is a lot of "good old boy" network going on. I have known multiple EMS students that do not receive proper orientation or even welcome to the EMS community.

We need faster response times!! Asap, people in this town have no chance in a life-threatening emergency!

Great people are doing a great job whenever they can but more help is needed. EMS doesn't pay well at all and most people have no interest in donating their time for a community service. I'd like to see updated mutual aid agreements essentially dividing the county into districts. Manpower is stretched thin, and more collaboration is needed to effectively cover all the runs. I am very active on 600 as a VFF/EMT-B and also a XXXX Trustee candidate. I see the problems and want to fix them. Another issue is the time required to obtain EMT

certifications, there are many nurses in our community that have the medical training and knowledge to help out, but they cannot without the EMT card. It took me 6-7 months to get my card going to class 2 evenings per week plus many weekends to get the clinical and run time. I donated my time to do all this and now I get $6.50/hr. to be on call plus a run stipend of $47, which I understand is much better than most townships. It's very difficult to recruit young people for meager pay when they can make more at McDonald's with no training, our system is currently relying mostly on older people who have multiple jobs. Healthcare is obviously expensive for everyone, but EMS doesn't seem to get a fair share when compared to hospitals. I appreciate that you're seeking input and solutions.

XXXX township was very good in the past. Now they call other townships to cover their runs.

We need more squad members to actually run the squad house.

If they cannot provide service, they should at least contact with a neighboring township.

They need help, totally under staff. Need paid position bad.

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We have no EMS in XXXX township.

We have had a volunteer service which has worked for decades the last batch of elected officials and selected EMTs and Fire Department are just too busy to handle the job correctly we do not need a paid EMT service or fire service we need a restructure of the community EMTs fire department and Council. XXXX needs to be staffed. I wrecked on 550 awhile back and 2 other townships showed up before XXXX did. When XXXX showed up they said they can't really do anything for me until med flight got there. I literally laid in the back of the squad naked until Medflight got there. Then when transferred to the helicopter XXXX told Medflight I was strapped to the board, but I was missing 2 buckles. While walking a fire fighter tossed the strapped over me and said oops. Med flight had to fix everything before take-off. In a situation where time matters it was a poor job

XXXX township is literally 1 block away from us and the EMS from XXXX XXXX Rd is who responded to my neighbor 911. Having a volunteer skeleton crew inside a rapidly aging community (especially in XXXX) is just not acceptable. These first responders deserve full time benefits and better pay as well as the community they serve the people deserve to feel their call for help will get answered and not by a responding township, but by the one next door their tax dollars paid to upgrade but is barely in use.

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Volunteers used to do a good job but now there aren't enough of them to cover the current population of the county. We need paid EMTs.

County Wide EMS is needed. It's not the fault of Township Residents (whom pay a tax levy for EMS services) to continue to pay for a service you receive from a mutual aid department. Either ban tax levy countywide or put one tax levy on and divide it up to the townships.

The Sheriff's office system is horrible. Instead of reaching out to mutual aid counties they will continuously dispatch for a squad in the county. I have personally witnessed 46 minutes of dispatch when there is a lot of county agency 20 minutes away.

There are several agencies within the county that are the main cause for such long responses. These departments handle little to none of the runs they are dispatched too. You have XXXX, XXXX, XXXX, XXXX, XXXX and XXXX townships whom find themselves answering a lot of the calls in the county that go unanswered by the agency in which is responsible for the response in their areas. XXXX, XXXX, XXXX, XXXX, XXXX Townships will let calls go unanswered almost every run, this puts restraints on the Departments that have to pick the runs up which in turn puts restraint on the local residents who reside in these townships. Because their local department is out covering another agency's call. Then you have a problem

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in dispatch none of them are adequately trained to be dispatchers for EMS and Fire which falls on their higher ups. We should have a separate dispatch for the Fire/Ems who listen and understands what we are doing and saying and actually helping us stay safe and assisting with our operations. We have a Fire or crash they don't like when we give sizes up, they don't acknowledge when we say we have water on the Fire they don't care when we say extrication started and complete, they don't give us updates on the call how long the incident Time has been since on scene. We will mark Enroute, clear or on scene and half of the time they aren't even listening and I believe that's due to the fact they are answering phones, dispatching deputies, and doing the law enforcement side and not really worrying about the Fire and EMS side. There's a big break down with the Sheriff several agencies have requested to have the CAD system in their apparatus he declined by saying he doesn't want people on his system, even though he goes and allows the city fire department and the city police to piggyback off of it. Sorry for the rant

Ems is failing because of big egos and some departments don't care.

They need more money to pay a decent wage and hire more staffing.

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One of the EMS staff was more concerned about discussing why the EMS department needs support than providing care. His name is XXXXXXXXX.

Using taxpayers' personnel and equipment to generate revenue

Standard operating procedures need a major overhaul. The county either needs more full time crews, or a large Countywide EMS system. Guidelines from the Medical directors for EMS agencies need to be Standard across the board and discussed, known, and made with input from law enforcement (preferably road units, not Admin) to ensure all liability aspects have been covered and all expectations are known.

Dispatch is a poor reflection on EMS.

911 call taker was not very professional when I called. Very short and argumentative. Seemed as though I was a hassle to the 911 dispatcher.

If you sit down and look at runs in the townships, and what townships cover their runs, it is clear where the problems are. There are certain townships who rarely respond, and don't seem to think there is a problem as other departments cover their calls for them. Instead of dumping money into departments that rarely cover their

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runs, and into a study countywide for EMS, put that money into the townships that are covering their own runs and others. The problem is clear if you sit down and look.

Our EMS is no longer and comes from other agencies now which shouldn't be

County wide system of care. All county town ships levied alike for full time stationed EMT's, centralized for best coverage response times at several stations.

As far as the squad I don't have much experience, but I can tell you the fire dept is less than a mile from where we needed them, and it took them 20 minutes to get there. Need to hire staff and not depend on volunteer.

XXXX township is a full time paid dept... which is a million dollars in the green....my taxes pay for this service . I am tired of XXXX township squads servicing half the county for mutual aid....

Living in a rural count[r]y mile[s] from town we need EMS services availability.

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Chillicothe, Ohio is the county seat of Ross County sitting at the intersection of Ohio State Route 23 and State Route 35 in south central Ohio. The EMS service delivery is provided through multiple methods including a paid professional fire department in Chillicothe to volunteer/part-paid agencies scattered throughout the county.

EMERGENCY MEDICAL SERVICES

Over 90% of the country's fire departments often provide some level of emergency medical services, including responding to medical emergencies, providing basic life support, and assisting or providing patient transport. Fire agencies are strategically placed throughout Ross County and in a position to aid EMS response. Many agencies are dependent on their staffing to provide both fire and EMS response to their community.

LIMITED RESOURCES

Fiscal challenges that face cities and townships throughout the country also impact Ross County. Agencies within the County face budget constraints, limiting their ability to invest in equipment, training, and personnel. This can make it challenging to provide efficient and effective fire and emergency medical services. In addition, fire agencies throughout Ross County frequently have limited funding resources that can impact the availability and quality of care and/or service delivery.

STAFFING

Ross County faces staffing shortages in the volunteer services which can impact fire and emergency medical services. This is leading to increased response times and use of mutual aid. Many fire and EMS departments in the rural areas of the County rely heavily on volunteer personnel, some of whom volunteer, or are employed, with other fire/EMS agencies.

RECRUITING

The recruitment and retention of volunteers is declining nationally. While there are many reasons at play, this difficulty is in part due to the demands of the State of Ohio related to initial education and continuing education for EMS practitioners. Recently, there have been changes to the Ohio Administrative Code that have attempted to address some of the EMS recruitment concerns.

Many departments are currently educating their fire departments in the first responder qualifications to reduce the stress of continuing education (CE) while still supporting the EMS mission and the ambulance driver requirements. In addition, the time commitment associated with EMS travel time to medical facilities throughout southeast Ohio, strains volunteer abilities to meet full-time employment requirements and attendance obligations. These challenges exacerbate the shortage of volunteers and can stress available resources and impact response times.

GEOGRAPHIC CHALLENGES

According to the 2020 census, outside of the 23,000 residents of Chillicothe, Ross County has a significant rural population nearing 56,000 people. This predominantly rural county, with vast stretches of land and remote locations, provides considerable recreational areas for camping, hiking, water sports, four-wheeling, etc. The Scioto River runs throughout the County, providing boating, swimming, and fishing opportunities. This terrain can pose challenges in terms of accessibility during emergencies. EMS personnel may have to travel long distances to reach incidents, use non-traditional response vehicles, such as four-wheelers or other off-road assets, increasing costs and delaying response times, and increasing practitioner injury or the risk of loss of life. This places challenges on EMS agencies in these areas to provide adequate first response care, including transport, extrication, and rescue services, as well as coordination for air-medical landing zones.

There are also challenges along Ohio State Route 23 or State Route 35 throughout Ross County. These State Routes are highly traveled corridors and increase risks of significant accidents involving entrapment and extrication, severe trauma emergencies, and hazardous material response. Weather is often a factor impacting EMS service delivery throughout the region, especially in the hilly region of the south and southeast County. Snow, fog, and ice conditions can make travel and response difficult.

Communities throughout Ross County, including Chillicothe, have infrastructure challenges, including older buildings. This can make EMS efforts more difficult. In addition, Chillicothe has a United States Veterans Hospital and an Ohio Medium Security Correctional Facility that the fire department must pre-plan for emergencies and be prepared to provide fire and other emergency response for.

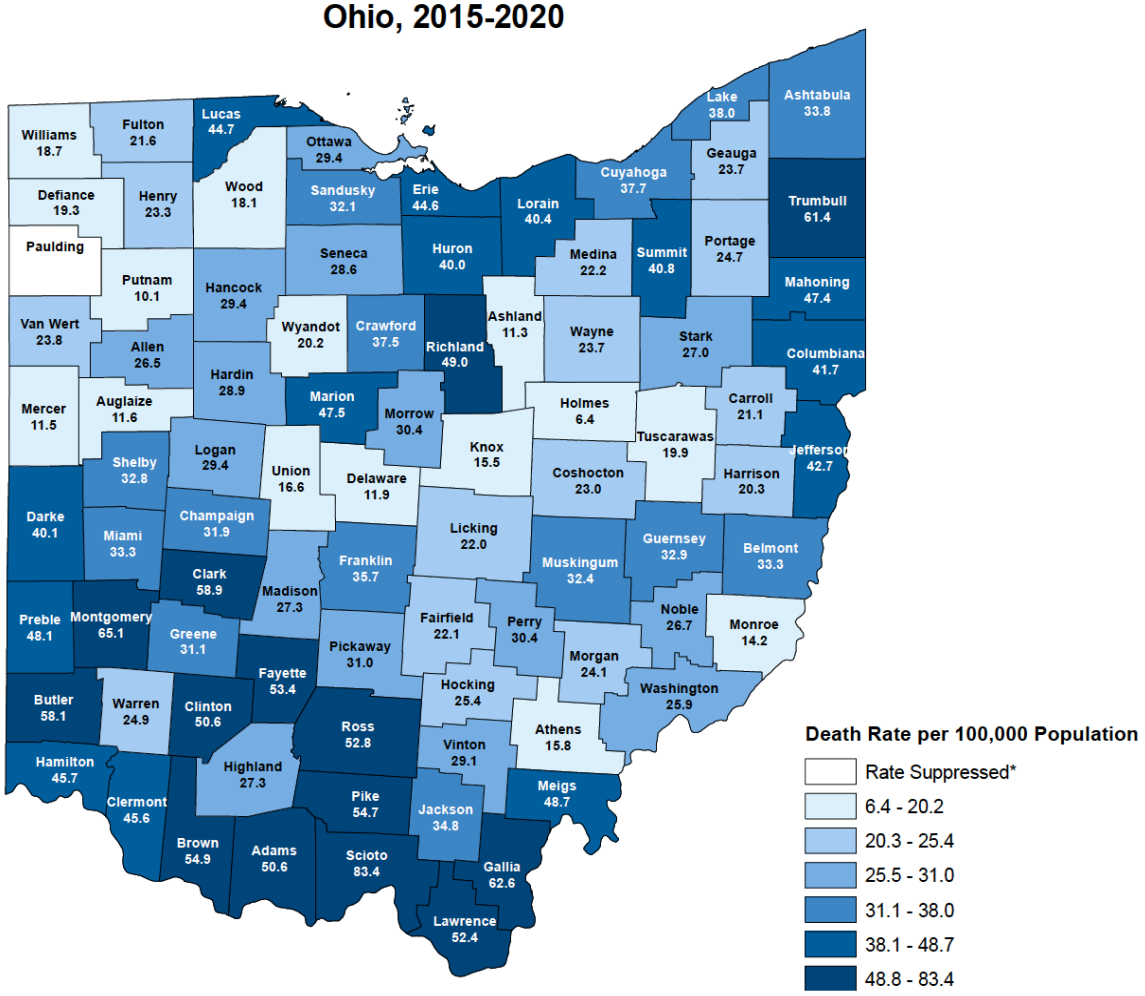
LIMITED MUTUAL AID AGREEMENTS

Based on the information provided to CCG, only some mutual aid agreements exist (see section on “Use of Mutual Aid” later in this report). Limited resources and geographic isolation can make it challenging to establish and maintain effective formal understandings between agencies, but they are vital to a coordinated EMS system.

SUBSTANCE USE DISORDER AND OVERDOSE INCIDENTS

Ross County, like many other regions, has been challenged with a prevalence of substance abuse and overdose incidents. EMS agencies are more often responding to overdose emergencies and administering life-saving interventions, such as naloxone and oxygen. Ross County, unfortunately, ranks among the higher incidence counties in this area. While funding has been made partially available to agencies through the state of Ohio, support remains a challenge.

Average Age-Adjusted Rate of Unintentional Drug Overdose Deaths by County, Ohio, 2015-2020



Scioto County had the highest unintentional drug overdose death rate at 83.4 deaths per 100,000 population, followed by Montgomery County and Gallia County (65.1 and 62.6 deaths per 100,000 population, respectively).

Reference Credit: 1 Ohio State Department of Health

Acute Care Prevention and Health Education

While Ross County EMS organizations can play a crucial role in safety and health education within their communities, there is additional need to create capacity for an overall community health strategy. Any long-term plan must recognize that challenges exist in reaching all segments of the population, particularly vulnerable populations such as the elderly or low-income individuals who may have limited access to care, may be in more remote areas of the county, and may suffer from financial, medication, and/or food insecurity. EMS agencies throughout Ross County are aware of difficulties in their defined response areas and should develop targeted outreach strategies, such as a community paramedicine/community health strategy to help ensure that a community health improvement model is developed.

Training and Education

Continuous training and education are required and established by the State of Ohio for EMS providers. While initial education and continuing education are available in Ross County, a considerable amount of in-person education is provided from resources in Chillicothe or Columbus. This can create challenges with access for some in the more remote areas of the county.

The Adena Health System is a provider of hospitalization and healthcare to the Ross County community and provides quality assurance and EMS education to agencies requesting assistance. Ohio University based in Athens, Ohio has a satellite campus in Chillicothe that has previously assisted with initial EMS education. Pickaway/Ross Joint Vocational School also presents an opportunity for educational resources within Ross County. These relationships are imperative to regional collaboration and educational initiatives and should be part of any additional plans on regionalization and collaboration projects for EMS service delivery (see more detailed assessment of this topic later in the report).

Limited Specialized Care and Coordination with Other Healthcare Providers

Adena Regional Medical Center is the principal healthcare provider for Ross County. They are partially limited in certain specialized medical care and services, such as trauma centers or specialized pediatric care. These patients are initially stabilized and transferred to Columbus which is approximately fifty miles to the north. This can provide additional challenges to EMS agencies for transport and create service area gaps when units are out of their service areas for extended periods.

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Facilities and Equipment Inventory

No information of any substance was provided to Cambridge Consulting Group from County agencies regarding their EMS assets and apparatus. Cambridge Consulting Group did receive some information about EMS facilities and augmented that with research from publicly available data. However, that information fell short of the level of detail the Firm requested and needed for several elements of this project. Unfortunately, CCG was unable to compile an inventory or to analyze the impact of these existing physical resources upon different delivery models.

The following is what was reported to Cambridge Consulting Group regarding assets and apparatus:

Municipality	Reported Resources
Huntington Township	
Green Township	
Concord Township	2 ambulances (2001/2019)
Union Township	
Bainbridge/Paxton	2 ambulances owned by Paxton Twp. Leased to Bainbridge
Chillicothe City	
Jefferson Township	
Scioto Township	
Springfield Township	
Franklin Township	1 ambulance "about a year old"
Harrison Township	2 ambulances (2011/2015)
Paint Creek	
Liberty Township	
Colerain Township	
Buckskin Township	
Deerfield Township	
Twin Township	
Limited or no data submitted to CCG	

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Dispatch Assessment

911 call taking and dispatching for EMS in Ross County is provided by two Public Safety Answering Points (PSAP), one operated by the Ross County Sheriff's Office, and one operated by the Chillicothe Police Department. The County PSAP receives EMS calls from landlines outside of the City of Chillicothe, and cell phone 911 calls countywide. According to data provided by the National Emergency Number Association (NENA), more than 80% of all 911 calls are placed by cell phone users[10].

For the 12 months between May 2022 and April 2023, the combined EMS response volume for both Chillicothe and County EMS agencies was 11,981. Of these responses, 6,872 (57.4%) were in the City of Chillicothe and 5,109 (42.6%) of the responses were in the remaining parts of the County.

Using the 80% cell phone use identified by NENA as a guide, this means 5,498 (45.9%) of the 911 EMS calls received at the County PSAP were likely transferred to Chillicothe for dispatch processing.

911 call transfers are problematic due to the possibility of calls being dropped during the transfer and they delay the dispatching process. A best practice in most PSAPs is that prior to a call transfer between PSAPs, the initial PSAP should obtain the caller's phone number, type of assistance needed and response location, in case the call is lost during the transfer. This would facilitate a response, even if the call is lost. However, the caller would need to provide their phone number, type of request, and response location, prior to being transferred, only to have to repeat the same information for the call taker at the secondary PSAP.

Call transfers are also not patient-centric unless there is a significant EMS service level increase due to the call transfer. An example of this is: the PSAP receiving the call transfer can conduct enhanced Emergency Medical Dispatch (EMD) which is not available in the primary PSAP.

[10] https://www.nena.org/page/911statistics

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Call Taking, Dispatch and Response Performance

In this part of the analysis, Cambridge would typically report response time statistics for different call types, ambulance agencies, and areas. CCG would separate response time into its identifiable components.

- Processing Time is the difference between the time a call is received at the 911 dispatch center and the earliest dispatch time of a transport-capable medical unit (i.e., ambulance or helicopter). Processing time includes the time required to determine the nature of the emergency and the type of resources to dispatch.

- Activation Time is the difference between the earliest dispatch time and the earliest enroute time of a transport-capable unit.

- Travel Time is the difference between the earliest enroute time and the earliest on-scene time of a transport-capable unit.

- Response Time is the total time elapsed between the time the call is received by the PSAP to arriving on scene.

For this engagement, due to limitation of data reporting from the computer aided dispatch (CAD) systems used by the Ross County Sheriff's Office, and the Chillicothe Police Department, CCG was unable to complete a comprehensive analysis of response time performance for EMS agencies in Ross County.

Ross County Data Extract

The data provided from the Ross County CAD extract did not include a data field for "Enroute" time stamp for EMS responses. Therefore, although CCG was able to determine overall Response Time, there is virtually no ability to determine "Activation Time".

For the Ross County project, this information is crucial since the extensive use of mutual aid, and the time lapse between the time a unit is first dispatched to respond, and the time a unit initiated a response, would help quantify the time lag awaiting a confirmed response unit that was requested for mutual aid.

In addition, the data provided by Ross County did not include seconds in the time stamps. This is essential information for system evaluation since, for example, there is a significant difference between the time stamp of 13:00 and 13:59, which is not reflected in this analysis. Thus, reported times may be inaccurate by as much as 59 seconds for every response.

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With the CAD data provided, CCG was still able to provide a cursory analysis of the time components of 10,996 responses evaluated during the assessment period:

Ross County PSAP Call Processing Time Detail			
	Responses Evaluated	Average	90th Percentile
Processing Time (Primary Agency Responded)	10,996	0:02:01	0:03:00
Processing Time (Mutual Aid Agency Responded)	2,845	0:02:10	0:03:00

90TH PERCENTILE DEFINITION

A 90th percentile means that ***90 percent of calls had a time at or below that number***. For example, a 90th percentile processing time of 03:00 minutes means that 90 percent of the time, a call had a processing time of no more than 03:00 minutes. Stated another way, only 10% of the calls were processed in more than 03:00 minutes.

The challenge with the lack of seconds in the time stamps provided becomes evident in this analysis especially. The 90th percentile call processing time of 03:00 could mean 03:00, or 03:59, a full 59 second difference, representing a variance potential of 33%.

It was noted that the reported Call Processing times are remarkably similar for a primary unit response as they are for a response in which a mutual aid provider responded. This is most likely because in a mutual aid response, the time recorded for the primary unit dispatch was also used for the mutual aid provider's dispatch. Therefore, without "Enroute" times in the County data, CCG was unable to assess the actual "Activation Time", the time between the primary unit being dispatched and the eventual time a mutual aid unit initiates a response.

CHILLICOTHE POLICE DEPARTMENT (PD) DATA EXTRACT

The data provided by Chillicothe PD for EMS responses did not include a "Call Received Time", therefore, CCG was unable to conduct a "Call Processing Time" analysis. Further, the data extract provided by Chillicothe PD did not identify calls that were sent to mutual aid providers, or who the mutual aid provider was. Therefore, CCG was unable to evaluate call processing times for Chillicothe, their mutual aid use (if any), nor the response times related to a mutual aid response into Chillicothe.

Further, the inability to quantify call processing time for Chillicothe PD does not facilitate a full assessment of the dispatch process for 911 calls answered by Chillicothe PD.

Finally, the data provided by Chillicothe PD also did not include seconds in the time stamps. Again, this is essential information for system evaluation.

However, with the CAD data that was provided, CCG was still able to provide a generalized analysis of several of the time components of 6,811 responses evaluated:

	Responses Evaluated	Average	90th Percentile
Activation Time	6,811	0:02:04	0:04:00
Travel Time	6,745	0:04:06	0:07:00
Scene Time	4,565	0:07:48	0:14:00
Total Task Time	6,748	0:34:55	0:54:00

OBSERVATION – Note the highlighted Average Scene Time in the table above. The call data provided by Chillicothe reveals an average time that an ambulance was on-scene was seven minutes and 48 seconds, with 90% of scene times lasting less than 14 minutes. By industry standards, this is a very short period for an ambulance to be on-scene treating a patient. We recommend that the Chillicothe Police and Fire Departments review internal documentation processes to ensure ambulance arrival and initiating transport times are being recorded appropriately. If they are, review should be given to the treatment process of patients by EMS practitioners.

ROSS COUNTY EMERGENCY MEDICAL DISPATCH

Emergency medical dispatch (EMD) is a systematic program of handling medical calls for assistance. Trained telecommunicators use locally approved EMD guide cards to quickly and properly determine the nature and priority of the call, dispatch the appropriate response assets, and give the caller instructions to help treat the patient until the EMS unit(s) arrive.

During interviews conducted as part of this assessment, it was relayed that Ross County's PSAP uses EMD provided by the Association of Public-Safety Communications Officials (APCO). During observations in the county PSAP performed by CCG, it was observed that APCO guide cards were available in the center, during observed 911 calls for EMS, but the call takers did not use them. When asked about the lack of use of EMD, the Ross County call takers on duty indicated they were aware of the presence of the EMD guide cards, but rarely actually used them.

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The current APCO EMD process used by Ross County dispatch is supposed to determine whether an incident should receive a Basic Life Support (BLS) or an Advanced Life Support (ALS) response.

- A 'Stable' call category determines a BLS Ambulance.
- An 'Unstable' call category determines an ALS response configuration, either with an ALS ambulance, or a BLS ambulance with the addition of an ALS non-transport unit (often referred to as a “fly car”).
- A ‘Critical’ call category determines an ALS response, plus medical first response, and a Police Medical Advisement.

This is an effective triage process that should be used to its fullest capability to assist EMS agencies in not only determining what type of response configuration is appropriate based on the nature of the call, but also whether the type of incident should be responded to using a lights and siren (L&S) response mode, or not. Improving public and provider safety through the reduction of EWD responses is discussed in greater detail later in this report.

Some Ross County agencies have demonstrated low response performance reliability. By using the APCO EMD system to its fullest capability, a more coordinated process of resource assignment to locations where EMS agencies challenged by low response rates, could be made. The simultaneous notification of a mutual aid provider for responses triaged by the APCO system as ‘Unstable’ or ‘Critical’, to incidents within the jurisdictions of poorly performing EMS agencies, would result in shorted overall response times.

This process could also be invaluable for triaging multiple responses occurring simultaneously (called concurrent incidents or assignments). For example, in a case where two requests for EMS, one serious and one not, are received nearly at the same time, limited ambulance resources could be rerouted as necessary. An ambulance dispatched and enroute to an adult patient with an ankle injury from a ground level fall, could easily be redirected to a second call for a baby not breathing. The first call would receive a longer, but acceptable, response from a subsequent ambulance, while the higher acuity case received the priority, and shorter, ambulance response.

This type of prioritization, or triage process, could be used to determine whether an ALS unit is necessary for an EMS response.

Using the example above, a BLS crew would be sufficient for the ankle injury, but an ALS response, either as primary or as an ALS intercept, would be appropriate for the baby not breathing call. In counties like Ross, where resources are limited, a dispatch triage process such as this could be very beneficial and save lives.

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Historically, resource assignment decisions have been left up to the local agency. However, the personnel with the local agency may not be aware of the overall system response needs occurring at a specific moment in time. The cognizant PSAP should have the authority to make resource allocation and dispatch decisions, since they are generally more aware of overall system needs than individual agency personnel may be.

Interviews with County 911 PSAP personnel revealed increasing concern regarding the current ambulance service coverage throughout the county. They related increasing challenges with dispatching emergency ambulance units to 911 requests for EMS, often resulting in multiple dispatches for the primary ambulance agency, and then back-up mutual aid providers from neighboring jurisdictions, consuming significant amounts of time.

This is concerning for the PSAP center staff. It is emotionally very difficult when they are unable to tell a caller requesting EMS whether an ambulance has begun responding to their emergency call. The level of frustration experienced by call takers and dispatchers in such circumstances is highly stressful and can be debilitating over time.

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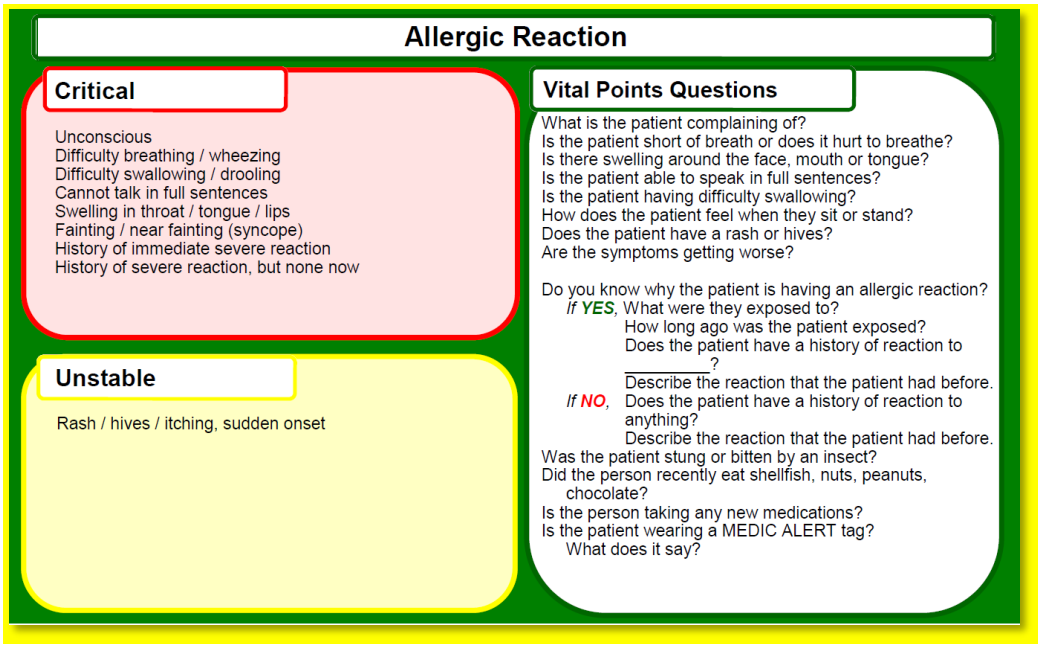
APCO EMD Guide Card Example

Examples of an APCO EMD Guide Card for an EMS request for an Allergic Reaction:



Allergic Reaction

Critical

Unconscious
Difficulty breathing / wheezing
Difficulty swallowing / drooling
Cannot talk in full sentences
Swelling in throat / tongue / lips
Fainting / near fainting (syncope)
History of immediate severe reaction
History of severe reaction, but none now

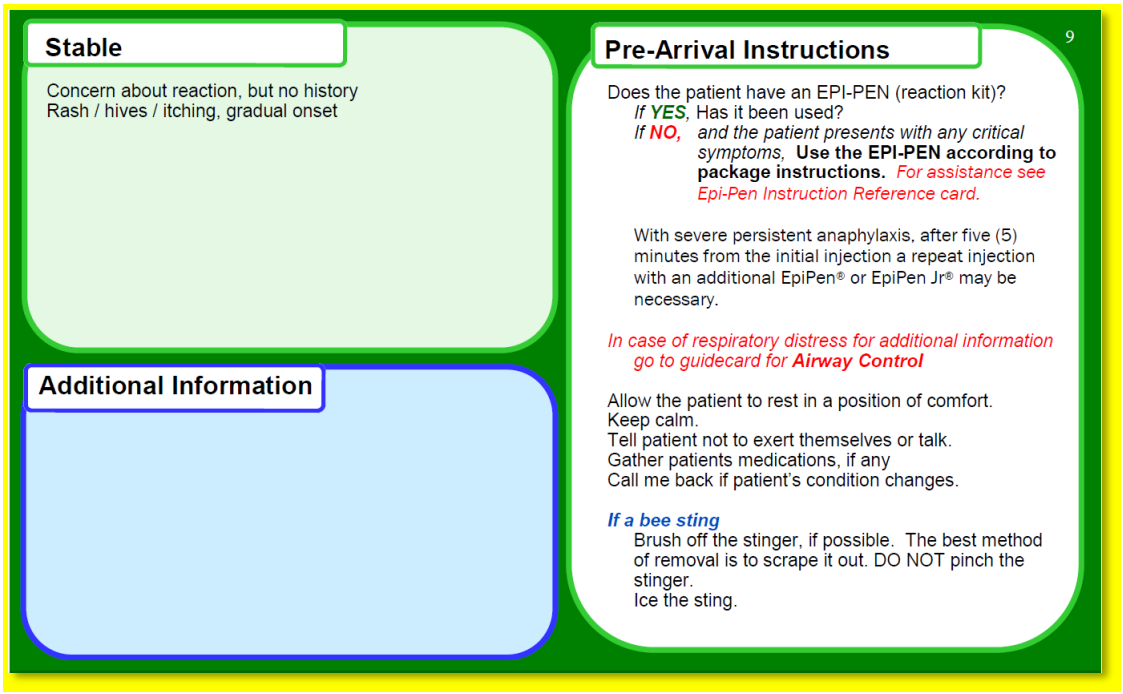
Unstable

Rash / hives / itching, sudden onset

Vital Points Questions

What is the patient complaining of?
Is the patient short of breath or does it hurt to breathe?
Is there swelling around the face, mouth or tongue?
Is the patient able to speak in full sentences?
Is the patient having difficulty swallowing?
How does the patient feel when they sit or stand?
Does the patient have a rash or hives?
Are the symptoms getting worse?

Do you know why the patient is having an allergic reaction?
*If **YES**,* What were they exposed to?
How long ago was the patient exposed?
Does the patient have a history of reaction to _____?
Describe the reaction that the patient had before.
*If **NO**,* Does the patient have a history of reaction to anything?
Describe the reaction that the patient had before.
Was the patient stung or bitten by an insect?
Did the person recently eat shellfish, nuts, peanuts, chocolate?
Is the person taking any new medications?
Is the patient wearing a MEDIC ALERT tag?
What does it say?



Stable

Concern about reaction, but no history
Rash / hives / itching, gradual onset

Additional Information

Pre-Arrival Instructions

9

Does the patient have an EPI-PEN (reaction kit)?
*If **YES**,* Has it been used?
*If **NO**, and the patient presents with any critical symptoms,* **Use the EPI-PEN according to package instructions.** *For assistance see Epi-Pen Instruction Reference card.*

With severe persistent anaphylaxis, after five (5) minutes from the initial injection a repeat injection with an additional EpiPen® or EpiPen Jr® may be necessary.

*In case of respiratory distress for additional information go to guidecard for **Airway Control***

Allow the patient to rest in a position of comfort.
Keep calm.
Tell patient not to exert themselves or talk.
Gather patients medications, if any
Call me back if patient's condition changes.

If a bee sting
Brush off the stinger, if possible. The best method of removal is to scrape it out. DO NOT pinch the stinger.
Ice the sting.

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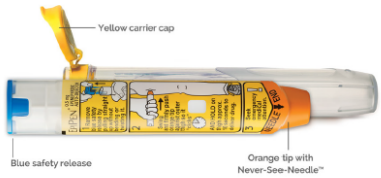
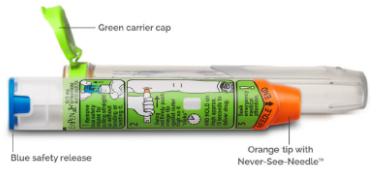
(EPI-PEN) Epinephrine Auto-Injector Instructions

EpiPen® Auto-Injector 0.3mg (yellow label) removed from carrier tube



EpiPen Jr® Auto-Injector 0.15mg (green label) removed from carrier tube



- Prepare the EpiPen or EpiPen Jr for injection by removing the EpiPen from the clear carrier tube by opening the yellow (Adult) or green (Pediatric) cap of your carrier tube.
- Tip and slide the auto-injector out of the carrier tube.
- Grasp the auto-injector in your fist with the orange tip (needle end) pointing downward.
- To avoid an accidental injection, never put your thumb, fingers or hand over the orange tip.
- With your other hand, remove the blue safety release by pulling straight up without bending or twisting it.
- If you are administering EpiPen or EpiPen Jr to a young child, hold the leg firmly in place with administering an injection.
- Place the orange tip against the middle of the outer thigh (upper leg) at a right angle (perpendicular) to the thigh.
- Swing and push the auto-injector firmly until it 'clicks'. The click signals that the injection has started.

Continued on next page

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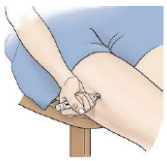
(EPI-PEN) Epinephrine Auto-Injector Instructions (Continued)

- Hold firmly in place for 3 seconds (count slowly 1, 2, 3). The injection is now complete.
- Remove the auto-injector from the thigh. The orange tip will extend to cover the needle. If the needle is still visible, do not attempt to reuse it.
- Massage the injection area for 10 seconds.
- The used auto-injector with extended needle cover will not fit in the carrier tube.



With severe persistent anaphylaxis, after five (5) minutes from the initial injection a repeat injection with an additional EpiPen® or EpiPen Jr® may be necessary.

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Dual PSAPs

Ross County and the City of Chillicothe operate independent PSAPs, operating out of the same facility. Based on information provided by Chillicothe and the County, each center generally staffs two personnel in the PSAP to receive and dispatch calls and have been struggling to find qualified personnel to fill their schedules.

According to a 2023 NENA study of PSAPs across the U.S., a staggering 82% of public safety communications centers reported being understaffed and struggling with hiring and retention, with respondents citing stress and low pay as the top obstacles to attracting and keeping staff. The data also shows a growing shortfall in younger workers to replace those who are retiring or experiencing career fatigue (often referred to as "burning out")[11]. The report also found that a substantial number of PSAPs are unfamiliar with emerging technologies and their potential to help solve problems such as staffing shortages and call surges.

As mentioned earlier, nearly 50% of 911 EMS requests received by the County PSAP are likely transferred to the Chillicothe PSAP.

For these reasons, operating two separate PSAPs for a community the size of Ross County is operationally less than ideal, and not fiscally efficient. Ross County and Chillicothe should investigate the potential to combine their two PSAPs into one center. This would make call processing more efficient, save time, be safer for the caller, and result in a caller-centric experience. It would also help avoid the competition for qualified personnel and reduce the overall labor pool demand. In addition, a consolidation of this nature would make the implementation of emerging technology more economically efficient.

[11] https://www.nena.org/news/646775/New-Report-Reveals-9-1-1-Profession-Stressed--Stretched-to-Its-Limits.htm

Use of Mutual Aid by Ross County Ambulance Agencies

Many agencies in Ross County rely on mutual aid to provide coverage for EMS requests in their primary response area. That reliance is becoming threatened, with potential disastrous impacts. According to the analysis conducted by CCG, five of the 15 agencies providing data responded to less than 75% of the EMS requests in their primary service area, and four of the 15 (27%) responded to less than 50% of the EMS requests in their primary service area.

During interviews with EMS and community leaders in Ross County, several interviewees stated that mutual aid is becoming increasingly problematic, especially from agencies that are being funded by the community. The communities do not want their 'community funded' ambulance to be taken away to respond to neighboring jurisdictions who are not funding their local EMS system. One Chief stated that their first attempt at getting a levy approved from their local township residents failed due to the belief that the funded ambulance would "always" be out of the township covering calls for a neighboring community that did not choose to fund EMS.

Therefore, the current mutual aid processes may become more limited, unless a more equitable method for requesting, and providing, mutual aid can be identified and agreed to by the agencies and their jurisdictions.

Some stakeholders suggested the development of requiring mutual aid agreements that assess a meaningful fee for a primary mutual aid response (defined as a "first call" when the community/agency requesting mutual aid was unable to assemble a crew for a response), and a lesser, or no fee, for a secondary call occurring when the primary crew was already on a response. It was suggested that a fee of $500-$1,000 be assessed to the requesting community for a first call mutual aid response, and no fee for a mutual aid request because the primary response agency is already on a call. This fee would be in addition to any revenue generated by the responding agency billing for the response.

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Not all townships/towns reported financial information in a form that allowed for analysis of EMS services' costs and funding. Even separation of capital costs and financing from operating expenses and funding was inconsistent and often aggregated. Thus, determining the actual amount it costs any particular township/town to provide EMS and how the operation is funded, was essentially not reliably possible.

Likewise, it was not achievable to figure the expenses associated with facilities' upkeep and capital expenses for EMS alone. These numbers we intermingled with either the entire fire service entity or lumped into the whole township/town. Separating them to highlight EMS only was not possible.

In addition, the information provided, for the most part, was not sufficiently detailed to separate EMS costs from fire service expenses. In addition, segregation of costs by expense category was not consistent between all reporting townships/towns or didn't exist. Therefore, it was extremely difficult to assess the actual costs associated with EMS services either for any individual township/town, or for the County at large. It was also not possible to identify critical costs by category, such as labor or benefit expenses.

Unfortunately, Cambridge Consulting Group was forced to introduce estimates and extrapolate data from what was provided, applying industry norms. This resulted in a gross approximation of the current costs for the Ross County EMS system.

As a result, Cambridge was able to determine certain key metrics regarding the financial condition of the various EMS agencies in the County. The cost per dispatch for EMS services ranged from $340 (Bainbridge/Paxton) to $2,217 (Franklin), and the cost per EMS transport spanned a low of $500 (Bainbridge/Paxton) to a high of $3,260 (Franklin). It must be remembered that these numbers are artificially low, since in most cases volunteers compose either all or a portion of, the staffing component. Labor (including salary and benefits) is the single largest expense for a career staffed EMS service accounting for nearly 70% of all costs. The calculations associated with all-volunteer EMS services in Ross County would need to be tripled to reveal actual real-world expenses.

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MUTUAL AID AND OTHER AGREEMENTS

EMS mutual aid agreements define the terms and conditions under which parties to the agreement will provide aid to one another. Memorializing the agreement in a written document allows the parties to have confidence that the understanding is, in fact, mutual. Many agencies across the U.S. have unwritten or sparsely written agreements. The thrust of such agreements is good intentions: "if you call, we'll try to respond". Such agreements leave issues unresolved. Robust mutual aid agreements will include types of response included or excluded (specific incident, shift coverage, standby, staging, special events), liability, finance (billing, compensation), duration of the agreement, and more.

Many local government EMS agencies engage in "soft billing". The practice is generally understood as the agency accepting the amount a third party (insurance, Medicare, Medicaid, Caresource, Tricare, etc.) pays, and not requiring payment of the patient responsibility amount (co-pay or deductible). Both for reasons of meeting the expectations of the residents, and for administrative efficiency, mutual aid agreements frequently anticipate reciprocity in the billing arrangements when providing mutual aid. This expectation is best addressed in a written mutual aid agreement to prevent unexpected billing practices and avoid negative publicity. The written agreement can also prevent Medicare compliance ambiguities by structuring such agreements to comport with several OIG Advisory Opinions on the subject. (E.g., OIG Advisory Opinion No. 09-03, OIG Advisory Opinion No. 13-11, OIG Advisory Opinion No. 18-08).

Ross County municipalities indicate they have EMS mutual aid agreements, but few appear to be in written form. Despite the apparent lack of written mutual aid agreements, mutual aid requests occur and are often filled. Several of the communities referenced the Ross County Mutual Aid and Secondary Response Agreement. The agreement is in the form of a government resolution. It provides a reasonable foundation for a county wide mutual aid agreement. It is unclear whether the local governments ever adopted the Ross County agreement. It can be inferred from the responses received to the CCG questionnaire that the agreement may not have been formally adopted. The Ross County agreement allows for primary response areas, secondary dispatch as designated by the primary jurisdiction, and for automatic aid agreements.

In reviewing the mutual aid agreement status for each jurisdiction, the following observations are made:

BUCKSKIN

Is served by the Joint Fire District of Paint Creek.

CHILLICOTHE

No data was provided. However, the city web site[12] asserts that fire department mutual aid agreements exist.

[12] https://www.chillicothe.com/departments/public_safety/fire_department_history.php

COLERAIN

The 3-year analysis of date shows Colerain Fire Department relies on mutual aid or private providers for approximately 33% of its EMS incidents. In Ross County, Colerain has Green Township to the west, Springfield to the southwest, and Harrison to the south. None of the three contiguous Ross County townships noted mutual aid agreements with Colerain.

CONCORD TOWNSHIP

Concord Township receives EMS service from Union Township by written agreement. Union Township provided an unsigned copy of the written agreement (expired 31 July 2023). The agreement addresses finance and liability. Concord voters rejected a fire and EMS levy increase in November 2023[13].

DEERFIELD TOWNSHIP

No mutual aid agreements were provided or referenced in response to the questionnaire. From other data provided, it appears that Deerfield averages 1-2 EMS request per week, with the majority being handled by Union Township or private providers.

FRANKLIN TOWNSHIP

The Franklin Township Fire Department SOPs reference mutual aid in several Articles. Of note, the Ross County Mutual Aid and Secondary Response Agreement is referenced. A July 28, 2023 email from Chief Siders indicates "we use mutual aid for runs that we cannot cover or a private ambulance service."

TOWNSHIP OF GREEN

The survey response references "County wide mutual aid agreement as well as the State mutual aid agreement." In the "Legal Review" heading, further reference is made to mutual aid contracts. Analysis of response data provided suggests Green Township Fire Department handles 95% of the requests received.

TOWNSHIP OF HARRISON

Harrison acknowledges county wide and statewide mutual aid agreements. Neither document was provided for review.

Harrison Township FD has an agreement for Automatic Mutual Aid with Liberty Township FD and provided the agreement for review. Dispatch of EMS is automatic, but at the discretion of the Ross County dispatcher, or a member of either FD in the event "said department is unable to cover the dispatched run." The agreement addresses liability with a provision that each entity shall hold the other harmless in connection with the performance of the agreement.

[13] https://www.chillicothegazette.com/story/news/local/2023/11/07/voters-pass-levies-in-twin-and-deerfield-townships/71486058007/

Harrison Township FD has an agreement for Automatic Mutual Aid with Springfield Township FD and provided the agreement for review. Dispatch of EMS is automatic, but at the discretion of the Ross County dispatcher, or a member of either FD in the event "said department is unable to cover the dispatched run." The agreement addresses liability with a provision that each entity shall hold the other harmless in connection with the performance of the agreement.

Harrison Township Fire Department covers 93% of its dispatched incidents.

Huntington Township

Though no agreement was provided for review, the response to the CCG questionnaire reveals Huntington Township Fire Department covers "1/3 of Twin Township by agreement and provides mutual aid when feasible." Huntington Township Fire Department responded to 95% of the EMS requests in Huntington during the 3 year period analyzed.

Bainbridge Village provided a copy of a mutual aid agreement with Huntington.

Township of Jefferson

In the response from Jefferson, the county mutual aid plan is referenced (not provided). Under the Legal Review heading, "mutual aid with Ross County Depts" is listed, though none were provided for review. During the three year analysis period, Jefferson Fire Department responded to 75% of the local EMS requests. Most of the remaining 25% were covered by Harrison and Liberty. Neither Liberty, nor Harrison indicated a mutual aid agreement with Jefferson in their questionnaire responses. It is noted that Jefferson provided mutual aid to Liberty during the analysis period.

Liberty Township

The Liberty Township Fire-Rescue response to the survey indicates an "intergovernmental EMS agreement – Statewide mutual plan."

Liberty Township FD has an agreement for Automatic Mutual Aid with Harrison Township FD. Harrison Township FD provided the agreement for review. Dispatch of EMS is automatic, but at the discretion of the Ross County dispatcher, or a member of either FD in the event "said department is unable to cover the dispatched run." The agreement addresses liability with a provision that each entity shall hold the other harmless in connection with the performance of the agreement.

Liberty Township also appears in the Station 23 Primary Area Response for Paint Creek though it is not clear if this is only for Fire alarms or includes EMS.

Liberty handled 66% of its EMS requests during the 3 year analysis period. The remaining 34% were handled by Harrison, Scioto, and Jefferson.

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Paint Creek

The SOGs provided refer to mutual aid agreements with Highland, Ross, and Fayette County, as well as Bainbridge (under Station 21's primary response area). The mutual aid agreements were not provided.

Paxton Township

Paxton EMS merged with Village of Bainbridge FD. Bainbridge covers Paxton by contract, referenced further under Bainbridge, below.

Scioto Township

Reference to EMS mutual aid is made in the SOGs. Reference to automatic response is also in the SOGs. mutual aid agreements were not provided. The SOGs do not refer to specific mutual aid agreements or mutual aid jurisdictions.

Scioto Fire Department responded to 81% of its EMS requests during the According to a May 2, 2023 report in the Chillicothe Gazette[14], Scioto hired 6 full time crew members in April 2023. With the additional full time personnel, it seems likely Scioto will rely on mutual aid less. The news report further indicates approximately 25% of Scioto's responses are mutual aid to surrounding communities.

Springfield Township

Under the heading General/Legal, Springfield lists automatic response agreements with Liberty, Green, Scioto, and Harrison. The Liberty, Green, and Scioto agreements were not provided; however, Harrison provided a copy of the Springfield agreement.

Springfield Township FD has an agreement for Automatic Mutual Aid with Harrison Township FD. Harrison Township FD provided the agreement for review. Dispatch of EMS is automatic, but at the discretion of the Ross County dispatcher, or a member of either FD in the event "said department is unable to cover the dispatched run." The agreement addresses liability with a provision that each entity shall hold the other harmless in connection with the performance of the agreement.

During the 3 year analysis period, Springfield Fire Department responded to 28% of the 647 EMS incidents in Springfield. Presumedly, Harrison Fire Department covers some or all the remaining 72%, as no other entity acknowledged a mutual aid agreement with Springfield in response to the questionnaire.

[14] https://www.chillicothegazette.com/story/news/2023/05/02/ross-county-ems-study-faces-controversy-from-local-fire-departments/7627619001/

Twin Township

In a response from Huntington Township, Huntington FD replied that it covers "1/3" of Twin Township for EMS. It appears Bainbridge covers Twin as well. It is noted that Twin Township EMS ceased operating in January 2023 due to lack of volunteer personnel. By ceasing operations, Twin decreased the response time for EMS in Twin, as there was no longer a delay waiting for a Twin response before dispatching a neighboring agency. An article in the Chillicothe Gazette has a levy passing in November 2023[15] for EMS contracts with Scioto, Huntington, and Bainbridge.

Union Township

Union provided an unsigned copy of the Mutual and Secondary Response Agreement for Fire and Squad Protection in Ross County, Ohio in Appendix H of the Union Township response to CCG's request. The agreement appears to originate in 2017 and is in the form of a resolution. The agreement addresses liability concerns. Finance/billing is not addressed by the agreement. Section 5 of the agreement contemplates the various jurisdictions in Ross County will provide the county dispatch agency with a "requested order of dispatch" to establish secondary dispatch in the event there is no response after 10 minutes on the initial dispatch. Subsection C of Section 5 continues into mutual aid dispatch. Subsection D addresses Automatic Aid and Subsection E for private contracted entities. Union responded to 98% of the EMS requests during the 3 year analysis period.

Union provides EMS to Concord Township by written agreement. An unsigned copy of the agreement was provided. The agreement addresses finance and liability. The agreement expired 31 July 2023.

Village of Bainbridge

Bainbridge provided an agreement by which it provides EMS to the entirety of Paxton Township and Paxton ceased operation of its EMS. Fire Chief Branson Leisure's July 10, 2023, letter to CCG explains the Paxton Township EMS was merged into Bainbridge Fire Dept. The agreement provides for Paxton to pay funds from the tax levy to Bainbridge, as well as transferring apparatus and equipment to Bainbridge. The agreement is dated 10-3-2023 by Paxton, and 10-3-2022 for Bainbridge. The term is for 1 year, can be renewed up to four times, and is terminable on 30 days' notice.

[15] https://www.chillicothegazette.com/story/news/local/2023/11/07/voters-pass-levies-in-twin-and-deerfield-townships/71486058007/

Bainbridge FD provides EMS to Twin Township under a contract for services retroactive to October 1, 2022. Bainbridge FD invoices Twin Township monthly.

Bainbridge provided a copy of a mutual aid agreement with Huntington Township that further references the Ross County Mutual and Secondary Response Agreement for Fire and Squad Protection. Bainbridge also provided a copy of the Ross County agreement. Both agreements have a liability clause. Neither addresses billing or finance terms.

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EMS Protocols, Policies, and Procedures

Through its engagement with Cambridge Consulting Group, Ross County and its municipalities have provided documents related to their Emergency Medical Services policies and procedures. In reviewing all available submitted data it was determined that most municipal agencies did not submit the necessary documents to allow for a complete review for the county. Cambridge has utilized all documentation made available to Cambridge Consulting group. The documents that were submitted are titled in various ways, such as "policies and procedures (P&P)" , "standard operating guidelines (SOG)", and "rules and regulations". For those jurisdictions that did submit documents, an assessment was made and provided below. It should further be noted that this review does not include those SOG or P&P specific to fire operations or non-EMS activity.

In terms of the standing orders for patient care or medical protocols, it seems that the County has a list of required equipment for ambulances as well as medical protocols however it was found that agencies also used a Highland County medical protocol guideline. Basic Life Support care seems to be in line with the standard of care and the advanced life support interventions also seem to be within the standard of care.

Municipality	Submitted Documents?
Bainbridge/Paxton	NO
Buckskin	NO
Chillicothe	YES
Colerain	NO
Concord	NO
Deerfield	NO
Franklin	YES
Green	NO
Harrison	NO

Municipality	Submitted Documents?
Huntington	NO
Jefferson	NO
Liberty	YES
Paint Creek	YES
Scioto	YES
Springfield	NO
Twin	NO
Union	YES
Countywide Medical	YES

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Chillicothe

The fire department submitted several guidelines for fire operations within depth guidance for various aspects of fire response and fire ground operation but nothing specific to EMS operations.

Franklin

The Franklin Township Fire Department provided detailed standard operating procedures that outlined their origination, membership, organizational structure, responsibilities of each officer, expectation of members, safety, training, communications, vehicle operation, uniform and gear, accountability of members, harassment guidelines, HR specific, and for social media. Specific to EMS, Cambridge found the policies to be well organized and specific without addressing actual medical care.

Liberty

The Liberty Township Fire Department provided a detailed rules and regulations document that clearly outlines their mission and purpose, organizational structure, responsibilities of each officer, membership types, HR specific including disciplinary action, social media, private (personal) health information (PHI), vehicle operations, uniform and gear, communications, line of duty death (LODD), health and safety, law enforcement related guidance, infection control, fire ground operations, training and education. Specific to EMS, Cambridge found the policies to be well organized and specific to membership, response, documentation, and authority.

Paint Creek

The Paint Creek Joint EMS/Fire District provided a very detailed standard operating guidelines document that very clearly outlined their purpose, mission, chain of command and organizational structure, responsibilities of each officer, membership types, membership responsibilities, HR specific including disciplinary action, PHI, uniforms and gear, communications, health and safety, scheduling, vehicle operations, infection control, law enforcement related guidance, scene operations, fire ground operations, hazardous materials (HAZMAT) handling, and multiple casualty incident (MCI) operations. Specific to EMS, Cambridge found the policies to be well organized with reference to Highland County EMS treatment protocols. The policies also included, certification requirements, primary transport facilities, violent scenes, psychiatric emergencies, use of Air Medical, transport beyond the emergency department (ED)s, management of death, MCI, narcotics, other medication, medical equipment, electronic patient care reports (EPCR), quality assurance, and training.

Scioto

The Scioto Township Fire Department provided their standard operating guidelines that detailed their department's operations to include, mission statement and purpose, social media, command structure and responsibilities, membership structure and responsibilities, HR specific guidelines, vehicle operation, equipment, communications, substance abuse, infection control, fire ground operations, scheduling, and documentation. Specific to EMS, the policies were limited and very broad.

The overall SOG is an older document with paper forms. Scioto Township FD also provided a very detailed EMS care protocol listing that seemed to follow current ACLS and BCLS guidelines.

UNION

The Union Township Fire Department provided their Rules and Regulations document that had a lengthy and detailed table of contents but only the appendices were present in the document, so Cambridge was unable to review their specific policies and procedures. Their EMS protocols for care also listed a detailed table of contents with no attachments found for reference.

With the limited data provided, Cambridge was able to determine that most of these fire departments share similar guidelines and structure but would benefit from a single source structure in policies and procedures except for what is specific to their department and township. The Paint Creek Joint EMS/Fire District had the most comprehensive policy and procedures of all those reviewed.

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Quality Assurance/Improvement/Management

Based on the data obtained from the Cambridge Consulting Group information requests and interviews, the quality management[16] programs that are currently in place with EMS provider agencies in Ross County have very limited scope and depth.

Section 4765.12 of the State of Ohio Regulations for EMS[17] requires that "each emergency medical service organization in this state shall implement ongoing peer review and quality assurance programs designed to improve the availability and quality of the emergency medical services it provides. The form and content of the programs shall be determined by each emergency medical service organization. In implementing the programs, each emergency medical service organization shall consider how to improve its ability to provide effective trauma care, particularly for pediatric and geriatric trauma victims, and shall consider the trauma care guidelines developed by the state board of emergency medical, fire, and transportation services under this section."

Information about "ongoing peer review and quality assurance programs" was not provided by most Ross County EMS agencies. The topic was not addressed in the standard operating procedures or other potentially relevant documents provided to Cambridge Consulting Group. A notable exception was Bainbridge Fire Department. They provided a copy of their 'PCR QI Worksheet', 'EMS QC Cheat Sheet', and '2023 Q3 and Q4 EMS Trainings.'

The Firm did not see evidence of staff positions at any EMS agency with specific responsibility for quality management as a full-time role or dedicated time in a part time role.

Based on the Firm's experience and observations across the United States, it is not particularly unusual for EMS provider organizations to not have formally documented quality management programs. To the extent that most EMS quality management programs exist, they tend to be limited to two areas – billing and incident management.

From a billing perspective, the quality assurance program efforts should focus on ensuring that the information needed to generate a bill, and adequately justifies the services provided. The Bainbridge Fire Department's EMS QC Chest Sheet clearly has this type of billing focus. This is an important and necessary category of EMS ePCR review for quality assurance[18].

[16] The term 'quality management' is used in this report as a term that is inclusive of quality planning, quality assurance, quality improvement, and associate peer-review activities.
[17] https://codes.ohio.gov/ohio-revised-code/section-4765.12
[18] The term 'quality assurance' is used in this report to describe activities that seek to assure that existing policies, procedures, and processes are appropriately followed.

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From an incident management perspective, many EMS agencies have documented processes to react to incidents stemming from complaints, bad outcomes, or mistakes. These processes are often connected to disciplinary processes. Having a process that formally describes how such incidents are handled is also important and necessary for quality assurance.

EMS agencies with slightly more developed quality management programs will start to introduce elements of quality improvement[19], with a process for review of a random sample of a rotating list of case categories (e.g., seizures, pediatrics cases, 'sick person') or all cases for specific high risk low frequency cases (e.g., resuscitations; endotracheal intubations; STEMI, stroke, and trauma alerts) in a specified month. These reviews will often have a predominant quality assurance focus on protocol compliance. When the results of the month's selected cases are reviewed in a group meeting setting, ideas for quality improvement changes will often come up in conversation and may lead to changes intended to yield better performance levels (i.e., a quality improvement effort).

Evidence of quality assurance for billing, incident management, and monthly care reviews were found in the documents provided. Because documents on quality management were only provided by a few agencies, we cannot attest to how common these activities are across all EMS provider agencies in Ross County. However, it is also common to find EMS agencies in the same county modelling each other's processes. Therefore, we might optimistically presume that many other EMS provider agencies in Ross County also engage in these three types of activities. It is important to note that in the documentation provided, there was no evidence of quality management activities beyond the types just described.

The Firm did not see evidence of any aggregate data analysis of clinical data to measure the levels of protocol compliance across cases in a specific time frame for a specific agency (e.g., what percent of stroke cases documented last known well time in the ePCR) or across the county as a whole.

The Firm did not see evidence of formal quality improvement projects where:

- the performance of a specific process was measured before a change,
- change(es) was introduced as a test or series of tests,
- performance was measured after the change(s), or
- when the performance showed sustained improvement after the change, the change was memorialized as a permanent change in the process design.

EMS agencies often make changes in hopes of improving process performance, but it is rare, unfortunately, to see such changes made with the discipline of a formal quality improvement project to objectively measure if the change made a measurable improvement.

[19] The term 'quality improvement' is used to describe activities that seek to change existing policies, procedures, and processes in an attempt to improve performance.

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The Firm did not see evidence of formal EMS Quality Committees in place at individual agencies or as a Countywide collaboration. This suggests a failure to comply with Section 4765.12 of the State of Ohio Regulations for EMS. In addition, the lack of such programs exposes EMS agencies to unnecessary risk because it likely fails to exempt quality program information from the definition of public records under section 149.43 of the Ohio's Revised Code for access to public records[20].

The lack of quality program formality also risks failure to qualify agencies for protections under Section 4765.12, where "any discussion conducted in the course of a peer review or quality assurance program conducted on behalf of an emergency medical service organization, is not subject to discovery in a civil action and shall not be introduced into evidence in a civil action against the emergency medical service organization on whose behalf the information was generated or the discussion occurred. No emergency medical service organization on whose behalf a peer review or quality assurance program is conducted, and no person who conducts such a program, because of performing such functions, shall be liable in a civil action for betrayal of professional confidence or otherwise in the absence of willful or wanton misconduct."

Based on the information provided, Cambridge concludes that the EMS agencies in Ross County have very rudimentary quality management processes limited to quality assurance activities for billing processes and EMS protocol compliance. Those rudimentary quality management activities are being conducted as informal processes outside the scope of a formal and adequately documented EMS quality management program that is compliant with Section 4765.12 of the State of Ohio Regulations for EMS.

[20] https://codes.ohio.gov/ohio-revised-code/section-149.43

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EMS Performance Measures & Quality

Clinical Quality Metrics

Most communities evaluate the effectiveness of an EMS system based on response times. However, as stated previously, for most EMS responses, elapsed time is not a critical factor in the outcome for most patients.

A position statement developed by the 2007 consortium of U.S. Metropolitan Municipality EMS Medical Directors[21] cited that in many jurisdictions, response-time intervals for advanced life support units and resuscitation rates for victims of cardiac arrest are the primary measures of EMS system performance. However, the association of the former with patient outcomes is not supported explicitly by the medical literature, while the latter focuses on a very small proportion of the EMS patient population and thus does not represent a sufficiently broad selection of performance measures.

However, there is evidence that certain medical emergencies are time-sensitive regarding the response of EMS resources and the interval between symptom onset and arrival at an appropriate medical facility. These include stokes, certain cardiac emergencies (ST segment Elevated Myocardial Infarctions, STEMI), and severe trauma cases. While the number of these high acuity calls is few (approximated nationally at 6.9%) relative to the total EMS activity in a particular region, they must be factored into the design of any system.

Ross County, along with community and healthcare stakeholders should establish an "EMS System Performance Committee" comprised of EMS agency leadership, Medical Directors, hospital emergency department medical directors, and community stakeholders (elected and appointed officials, hospital administrators, community leaders, first responders) to undertake a process to identify key performance indicators that should be used to measure the clinical and operational effectiveness of the EMS system.

Developing and reporting on a clinical bundle for conditions such as cardiac arrest, advanced airway management, STEMI, Stroke, and Trauma could be a very effective method for identifying opportunities to improve key clinical performance, as well as demonstrate to local communities the clinical quality being provided by their EMS agencies.

[21] https://pubmed.ncbi.nlm.nih.gov/18379908/

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Examples of clinical bundles are represented below.

Clinical Bundle Performance Dashboard

Agency:

Ventilation Management	Goal	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Current Avg.	Goal
% of cases with etCO2 use for non-invasive ventilation management (CPAP, BVM) when equipped										
% of cases with etCO2 use for invasive ventilation management (KA, ETT, Cric)										
% of successful ventilation management as evidenced by etCO2 waveform throughout the case										
% of successful King Airway placement										
% of successful endotracheal tube placement										
System response time < 5 mins for Dispatch-presumed compromised airway										

STEMI	Goal	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Current Avg.	Goal
% of suspected STEMI patients correctly identified by EMS										
% of suspected STEMI patients w/ASA admin (*in the absence of contraindications*)										
% of suspected STEMI patients w/NTG admin (*in the absence of contraindications*)										
% of suspected STEMI patients with 12L acquisition within 10 minutes of patient contact										
% of suspected STEMI patients with 12L transmitted within 5 minutes of transport initiation										
% of suspected STEMI patients with PCI facility notified of suspected STEMI within 10 minutes of EMS patient contact										
% of patients with Suspected STEMI Transported to PCI Center										
% of suspected STEMI patients with EMS activation to Cath Lab intervention time < 90 minutes										

Stroke	Goal	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Current Avg.	Goal
% of suspected Stroke patients correctly identified by EMS										
% of suspected Stroke patients w/BGL measured										
% of suspected Stroke patients w/CSS measured										
% of suspected Stroke patients w/positive CSS scores receiving Los Angeles Motor Score (LAMS) measured										
% of suspected stroke patients with stroke facility notified of suspected stroke within 10 minutes of EMS patient contact										
% of suspected stroke patients w/LAMS scores 4 - 5 transported to Comprehensive Stroke Center										

Trauma	Goal	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Current Avg.	Goal
% of patients meeting Trauma Alert criteria correctly identified by EMS										
% of suspected Trauma Alert patients with trauma facility notified of trauma alert within 10 minutes of EMS patient contact										
% of suspected Trauma Alert patients with scene time < 10 minutes (*in the asbsence of extrication delay*)										

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Ambulance Operations Safety enhancement; Reducing Lights and Siren Responses

For EMS, the purpose of using a lights and siren (emergency warning devices, or EWD) response is to improve patient outcomes by decreasing the time to care at the scene or to arrival at a hospital for additional care, but only a small percentage of medical emergencies have better outcomes from EWD use. Over a dozen studies show that the average time saved with a HOT response or transport ranges from 42 seconds to 3.8 minutes. Alternatively, EWD response increases the chance of an EMS vehicle crash by 50% and almost triples the chance of crash during patient transport.

Emergency vehicle crashes cause delays to care and injuries to patients, EMS practitioners, and the public. These crashes also increase emergency vehicle resources use through the need for additional vehicle responses, have long-lasting effects on the reputation of an emergency organization, and increase stress and anxiety among emergency services personnel.

In 2009, there were 1,579 ambulance crash injuries in the United States, and most EMS vehicle crashes occur when driving with L&S. When compared with other similar-sized vehicles, ambulance crashes are more often at intersections, more often at traffic signals, and more often with multiple injuries, including 84% involving three or more people.

Although EWD response is currently common to medical calls, a few (6.9%) of these result in a potentially lifesaving intervention by emergency practitioners. Some agencies have used an evidence-based or quality improvement approach to reduce their use of EWD during responses to medical calls to 20-33%, without any discernable harmful effect on patient outcome.

Additionally, many EMS agencies transport very few patients to the hospital using L&S. EMD protocols have been proven to categorize requests safely and effectively for medical response by types of call and level of medical acuity and urgency.

Emergency response agencies have successfully used these EMD categorizations to prioritize the calls that justify a EWD response.

Physician medical oversight, formal quality improvement programs, and collaboration with responding emergency services agencies to understand outcomes is essential to effective, safe, consistent, and high-quality EMD.

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In most settings, a EWD response or transport saves less than a few minutes during an emergency medical response, and there are few time-sensitive medical emergencies where an immediate intervention or treatment in those minutes is lifesaving. These time-sensitive emergencies can usually be identified through utilization of high-quality dispatcher call prioritization using approved EMD protocols. For many medical calls, a prompt response by EMS practitioners without lights and siren provides high-quality patient care without the risk of lights and siren- related crashes.

A joint position paper published by 14 national EMS, fire, and physician professional associations[22] encourages communities to reduce EWD responses to 30% of 911 EMS calls, and no more than five percent of patient transports.

Ross County's 911 PSAPs currently provides EMD, and they should work with area agencies and their medical directors to review patient outcomes based on care provided on scene and crosswalk this data with EMD determinants to try and reduce the incidence of EWD response to no more than 30% of overall responses.

[22] https://www.ems1.com/ambulance-safety/articles/14-groups-issue-joint-statement-on-ems-use-of-lights-sirens-AAfswfKx2gaog3dy/

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EDUCATION & TRAINING

The current process for the provision of EMS continuing education in Ross County is based and monitored by each individual EMS providing agency. There is currently no Countywide regulations or requirements for development, administration, tracking or medical director involvement in EMS education.

Licensure is the process through which a government entity grants an individual permission to practice in a specified occupation or profession that is subject to statute and/or regulation under the government entity's authority. In the State of Ohio applicants for an initial license must meet the requirements as outlined in Ohio Laws and Administrative Rules, Chapter 4765, First responder, Emergency Medical Technicians

"In accordance with section 4765.30 of the Ohio Revised Code, individuals must be issued a certificate to practice to provide emergency medical services (provider or instructor). EMS certifications are issued by the State Board of Emergency Medical, Fire, and Transportation Services through the Ohio Department of Public Safety, Department of Emergency Medical Services.

In accordance with section 4765.55 of the Ohio Revised Code, individuals must possess a certificate to provide fire services (firefighting, fire safety inspector, or instructor). Fire service certifications are issued by the executive director of the Department of Emergency Medical Services."[23] Rule 4765-8-01 Qualifications for a certificate to practice,

1) An applicant for a certificate to practice as an emergency medical responder, emergency medical technician, advanced emergency medical technician, or paramedic must meet the following requirements:

    a) Submit a completed application on a form approved by the board;

    b) Successfully complete an EMS training program through an accredited institution, pursuant to section 4765.17 of the Revised Code and Chapter 4765-7 of the Administrative Code and receive a certificate verifying completion of such program at the level for which the certificate to practice is sought. Such program must have been completed no more than two years prior to making application;

    c) Submit documentation of successful completion of the following federal emergency management agency training courses:

[23] https://ems.ohio.gov/education-and-testing

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(1) National incident management system course IS-700.b:

(2) For online courses, the web site can be accessed at FEMA's website[24].

d) For materials and information for instructor led, classroom-based courses, the web site can be accessed at FEMA's website[25].

(1) Incident command system course IS-100.c:

e) For online courses, the FEMA web site provides supporting material[26].

f) For materials and information for instructor led, classroom-based courses, the web site can be accessed at https://training.fema.gov/is/coursematerials.aspx?code=IS-100.c.

g) Completion of the above courses is mandated by the department of homeland security pursuant to homeland security presidential directives five (HSPD-5, February 28, 2003) and eight (HSPD-8, March 30, 2011) and approved by the board as being necessary for initial training.

2) Pass an initial certification examination in accordance with rule 4765-8-05 of the Administrative Code;

3) Be at least eighteen years of age;

4) Has not been convicted of, pled guilty to, had a judicial finding of guilt for, or had a judicial finding of eligibility for treatment and/or intervention in lieu of conviction for, any of the following:

a) Any felony;

b) A misdemeanor committed during practice;

c) A misdemeanor involving moral turpitude;

d) A violation of any federal, state, county, or municipal narcotics or controlled substance law;

[24] http://training.fema.gov/emiweb/IS/crslist.asp
[25] https://training.fema.gov/is/coursematerials.aspx?code=IS-700.b
[26] http://training.fema.gov/emiweb/IS/crslist.asp;

e) Any act committed in another state or jurisdiction that, if committed in Ohio, would constitute a violation set forth in this paragraph.

5) Has not been adjudicated mentally incompetent by a court of law;

6) At the time of application, is not under indictment for any felony or has any misdemeanor charges pending as outlined in paragraph (A)(6) of this rule;

7) Does not engage in the illegal use or illegal acquisition of controlled substances, alcohol, or other habit-forming drugs or chemical substances while on duty as an EMS provider;

8) Has not committed fraud or material deception in applying for, or obtaining a certificate issued under Chapter 4765. of the Revised Code;

9) Has not been convicted, in this state or another state, of providing emergency medical services or representing himself/herself as an EMS provider without a license or certificate, or similar crime directly related to the profession of EMS;

10) If the applicant is, or has been, certified or licensed as an EMS provider in this state or another state, the applicant's certificate or license is not currently on probationary status, nor has it been suspended or revoked by the board or the EMS certifying or licensing entity in another state.

11) In deciding whether to grant a certificate to practice, the board has the following options:

a) The board shall issue a certificate to practice to an applicant who meets all the requirements listed in paragraph (A) of this rule;

b) The board shall refuse to grant a certificate to practice to an applicant who fails to meet one or more of the requirements listed in paragraphs (A)(1) to (A)(5) of this rule;

c) The board may grant, refuse to grant, or limit a certificate to practice to an applicant who meets the requirements listed in paragraphs (A)(1) to (A)(5) of this rule, but fails to meet one or more of the requirements listed in paragraphs (A)(6) to (A)(12) of this rule[27].

Certification is the process through which an organization recognizes an individual for meeting specific criteria for advanced knowledge and skills as established by that organization.

[27] https://codes.ohio.gov/ohio-administrative-code/rule-4765-8-01

In the State of Ohio, the National Registry of EMT's certification examinations are the designated process for becoming certified and applying for licensure as outlined in Rule 4765-8-5 Examinations.

Rule 4765-8-5 Examinations - Ohio Administrative Code

1) The initial certification examination shall consist of written and practical portions established by the national registry of emergency medical technicians (NREMT) and the board.

   a) The passing score for the written portion of the examination shall be determined by the NREMT.

   b) The passing score for the practical portion of the examination for the emergency medical responder and emergency medical technician shall be determined by the board.

   c) The passing score for the practical portion of the examination for the advanced emergency medical technician and paramedic shall be established by the NREMT.

   d) The written and practical portions of the examination shall remain valid for one year from the date of successful completion.

      i) (B) The reinstatement examination and the examination in lieu of continuing education shall be established by the board and the NREMT, and a passing score on these tests shall be determined by the NREMT[28].

      ii) Education/training documentation was requested from Ross County EMS and fire agencies. The documentation was not constantly available, necessitating the inquiry process be adapted utilizing Zoom meetings, zoom meeting summaries, EMS and fire agency websites, and Cambridge Consulting Group site visit and team reports.

[28] Rule 4765-8-05 - Ohio Administrative Code | Ohio Laws.

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Initial EMS Education

Initial EMS education (EMT, AEMT & Paramedic) is available from Pickaway-Ross Career and Technology Center. These programs are currently certificate only programs with no college credit or degree available to the students.

Pickaway-Ross Career and Technology Center does not have a contract to provide initial EMS education (EMT, AEMT & Paramedic), most students pay their own tuition to attend education programs. Pickaway Ross Career and Technology Center has an established process through which EMS and fire agencies in Ross County can pay student (employee) tuition should they wish to.

Continuing Education

Ross County does not presently have an EMS continuing education process that each EMS agency is required to follow. There is currently no Countywide coordination of EMS continuing education development, delivery, medical director involvement or for tracking of agency personnel's certification/licensure.

EMS continuing education in Ross County is based on state requirements with each EMS and fire agency being responsible for providing and managing EMS continuing education and certification/licensure.

During the analysis little to no information was available related to how each EMS and fire agency develops, presents and track EMS continuing education and certification/licensure.

Ross Career and Technology Center provides EMT and Paramedic refresher courses, and CPR certification courses when needed. Ross Career and Technology Center does these courses upon request and does not have a standardized scheduling process for EMS continuing education courses.

Ross Career and Technology Center does not currently have any specialty EMS continuing education courses, (AMLS, ACLS, PALS, PEPP, ITLS, TCCC, bike medic, wilderness medic, etc.) however they have stated that they are interested in establishing these type courses should the EMS and fire agencies request them and be willing to support employee attendance.

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MEDICAL OVERSIGHT

Medical Direction

Currently there are three individual medical directors associated with the Ross County EMS agencies and they appear dedicated and interested in best practices for their respective services. These physicians have significant experience in Emergency Medical Services; however, none has a developed strategy succession when they retire or leave EMS. This would leave a significant gap in medical oversight. Each has various additional responsibilities which overlap with their colleagues and expressed interest in being more engaged in the EMS system overall. They are an underutilized resource.

These three medical directors do not meet regularly and have limited engagement with each other specifically to discuss EMS protocols and countywide system recommendations. Although the physicians are aware of the County steering committee meetings, only Dr. Ben Trotter attends them. Cambridge believes it would be more productive for all the medical directors to attend the meetings and begin to develop commonly accepted treatment protocols and mutually acceptable strategic planning initiatives focused on medical oversight issues for EMS. Although the major portion of medical protocols are state standardized, each medical director does have some latitude to promulgate individual, local protocols. For these physicians to be more engaged, consideration must be made for some sort of compensation to address the time they will need to expend.

Each individual medical director oversees different ALS/BLS services within the county and no uniform opinion exists regarding best practices. This is probably a result of the different agencies each oversees, the various geographies involved, the distribution of EMS resources, and the crew configurations used.

From a physician medical direction standpoint, a unified EMS system, or hybrid, would result in standardized policies and procedures. Individual medical directors could retain oversight of their current municipalities and one physician could be always “on call” for the whole system. Medical directors should be required to attend most of the county steering committee meetings and eventually become familiar with more practitioners and EMS operational leadership.

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OBSERVATIONS ON MEDICAL DIRECTORS-

- There are three total medical directors for the County: Dr. Frazier serves one town. Dr. Schneider serves eight towns and Dr. Trotter serves six towns (approximately).
- The medical directors don't collaborate or attend meetings together.
- No physician appears to be fully engaged to the level expected of an EMS medical director.
- All physicians indicated they would be adaptable to any changes in the system. However, one physician interviewed is judged to be somewhat resistant to system changes.
- Representatives from Adena Hospital indicated they would contact Cambridge Consulting Group after September 4th, 2023, however, Cambridge has not received a follow-up contact.
- All physicians seemed agreeable to conduct a videoconference together regarding proposed changes to the system following this study.
- All physicians felt EMS medical direction is a "very part time job" and indicated they have several other responsibilities that compete for their time.
- No physician has specific EMS training (non has completed an EMS fellowship). They are all Emergency Department physicians. No physician has a replacement selected or prepared if they should leave.
- There were minimal suggestions from the physicians on how to improve the EMS system. One physician felt the system is working well as is.

HOSPITAL COLLABORATION

During discussions with Ross County EMS agencies, County EMS staff, and hospital representatives, all indicated little to no actual coordination of care between the hospital and the EMS system. While some agency medical directors also work clinically at Ross County hospitals, there is a general perception that collaboration between the EMS agencies and the hospitals would be an enhancement to EMS delivery in Ross County.

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An emerging best practice for EMS delivery is a close collaboration between EMS agencies and local hospitals. These collaborations include regularly scheduled meetings between hospital 'C-Suite' members: Chief Executive Officer (CEO), Chief Operating Officer (COO), Chief Medical Officer (CMO), and Chief Nursing Officer (CNO). These regular confabs serve to build relationships between the hospital and the EMS agency, as well as serve as a forum for identification and discussion of challenges the hospital or EMS agencies many be encountering and serve as a forum to discuss potential options for resolutions.

A further enhanced collaboration opportunity could also be the inclusion of EMS representatives on regularly scheduled meetings for hospital clinical service lines, such as cardiovascular, stroke and trauma services, for hospitals providing those services. The inclusion of EMS in these service line meetings augment protocols and procedures related to pre and potentially post-hospital care. Understanding the continuum of care, from pre-hospital care to inpatient care could improve clinical practices and enhance patient outcomes.

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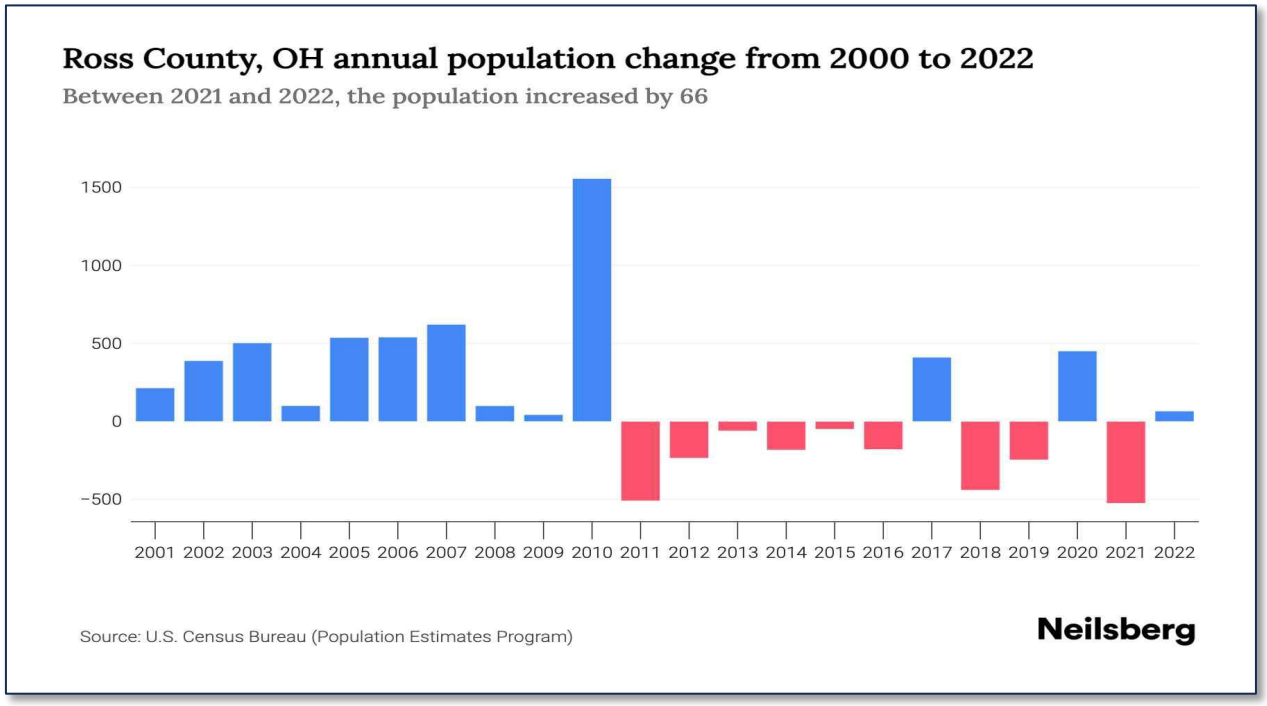
Demand Analysis

Demographics

The Ohio state Department of Development published a comprehensive demographic profile of Ross County in 2021. Cambridge Consulting Group used the information contained in this report to inform our analysis of the EMS system within the County[29].

Of particular importance in the report were the population projections due to the impact such changes would have on the volume activity of the EMS system in the future. The Ohio Department of Development predicts a decline in the total population for Ross County between 2020 and 2050[30]. However, it should be noted, the amount of population reduction was inconsistent among the several documents issued by the Department.

Focusing on population projections, research indicates it is not likely that Ross County will experience any significant increase, and based on recent historical trends, will probably see a decline. Neilsberg Research[31] compiled population data for the County over the last two decades.



[29] https://development.ohio.gov/about-us/research/county/ross
[30] The prediction of population decline was disputed by some representatives of the Ross County EMS Assessment Steering Committee.
[31] https://www.neilsberg.com/

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It supports the conclusion of the Ohio Department of Development that the County's population will decline.

Likewise, the Mid-Ohio Regional Planning Commission (MORPC) predicts a loss of population in Ross County over the next several decades[32]. While neither Neilsberg Research nor MORPC project a population decline in the County as dramatic as the Department of Development, they still envision a reduction.

While this effects the planning for EMS from both a volume of activity standpoint, as well as a funding perspective, the uncertainty of such changes were not considered in this study of the current state of EMS in Ross County.

[32] https://experience.arcgis.com/experience/cd446109151f474db74b13fa0795023c/page/County-Forecasts/

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EMS Services

There are 18 EMS units from 15 agencies in the County, serving 17 "communities"[33]. Some agencies, like Union, also provide primary services to Concord & Deerfield Townships. Buckskin, Paint, and Twin Townships also rely upon neighboring or joint-jurisdictional EMS providers for primary response.

Township	Sq. mi.	Provider(s)	Stations	EMS units
Buckskin	50.3	Paint Creek Joint EMS/Fire District Station 21	1	1
Chillicothe	10.6	Chillicothe FD	3	2
Colerain	35.4	Colerain	2	1
Concord	75.7	Concord FD	2	1
Deerfield	30.8	Union	1	
Franklin	35.4	Franklin	1	1
Green	43.4	Green	2	2
Harrison	36.2	Harrison	1	1
Huntington	59.6	Huntington	1	1
Jefferson	24.9	Jefferson	1	1
Liberty	34.6	Liberty	1	1
Paint	36.1	Paint Creek Joint EMS/Fire District Station 21	1	1
Paxton	31.8	Paxton/Bainbridge	1	1
Scioto	30.3	Scioto	2	1
Springfield	30.8	Springfield	2	1
Twin	60.2	Paxton/Huntington/Scioto	1	
Union	66.8	Union	3	2

Unit staffing hours varied by provider. There are also several private ambulance services in the County that provide care when available, usually on a mutual aid basis, and when no other units are available to respond. The following map shows which stations provide ambulance services.

Several years of data were provided to CCG concerning EMS activity. Not all data was for the same periods for each jurisdiction. The firm aggregated and averaged the data depending on the analysis being performed. Therefore, the totals used in different charts in this report may not exactly match those associated with others.

[33] The term "communities" is loosely defined here to mean incorporated and non-incorporated sections of the County that may include portions or whole townships or towns.

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Data Supplied		2020	2021	2022	2023
	Months' Data Provided	0	0	12	0
Chillicothe	Total Volume	N/A	N/A	6,872	N/A
	Monthly Average	Data Missing	Data Missing	573	Data Missing
	Months' Data Provided	8	12	12	4
Colerain	Total Volume	116	192	218	69
	Monthly Average	15	16	18	17
	Months' Data Provided	0	9	12	0
Concord	Total Volume	N/A	377	409	N/A
	Monthly Average	Data Missing	42	34	Data Missing
	Months' Data Provided	8	12	12	4
Deerfield	Total Volume	51	89	82	25
	Monthly Average	6	7	7	6
	Months' Data Provided	0	0	12	0
Franklin	Total Volume	N/A	N/A	193	N/A
	Monthly Average	Data Missing	Data Missing	16	Data Missing
	Months' Data Provided	8	12	12	4
Green	Total Volume	286	516	525	155
	Monthly Average	36	43	44	39
	Months' Data Provided	8	12	12	4
Harrison	Total Volume	52	76	86	34
	Monthly Average	7	6	7	9
	Months' Data Provided	8	12	12	4
Huntington	Total Volume	383	569	449	141
	Monthly Average	48	47	37	35
	Months' Data Provided	8	12	12	4
Jefferson	Total Volume	61	110	82	23
	Monthly Average	8	9	7	6
	Months' Data Provided	8	12	12	4
Liberty	Total Volume	86	121	101	50
	Monthly Average	11	10	8	13
	Months' Data Provided	8	12	12	4
Paxton	Total Volume	139	296	249	80
	Monthly Average	17	25	21	20
	Months' Data Provided	8	12	12	4
Scioto	Total Volume	595	1,022	1,176	306
	Monthly Average	74	85	98	77
	Months' Data Provided	8	12	12	4

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Data Supplied		2020	2021	2022	2023
Springfield	Total Volume	210	282	383	77
	Monthly Average	26	24	32	19
	Months' Data Provided	8	12	12	4
Twin	Total Volume	177	290	327	77
	Monthly Average	22	24	27	19
	Months' Data Provided	8	12	12	4
Union	Total Volume	548	970	1,003	264
	Monthly Average	69	81	84	66

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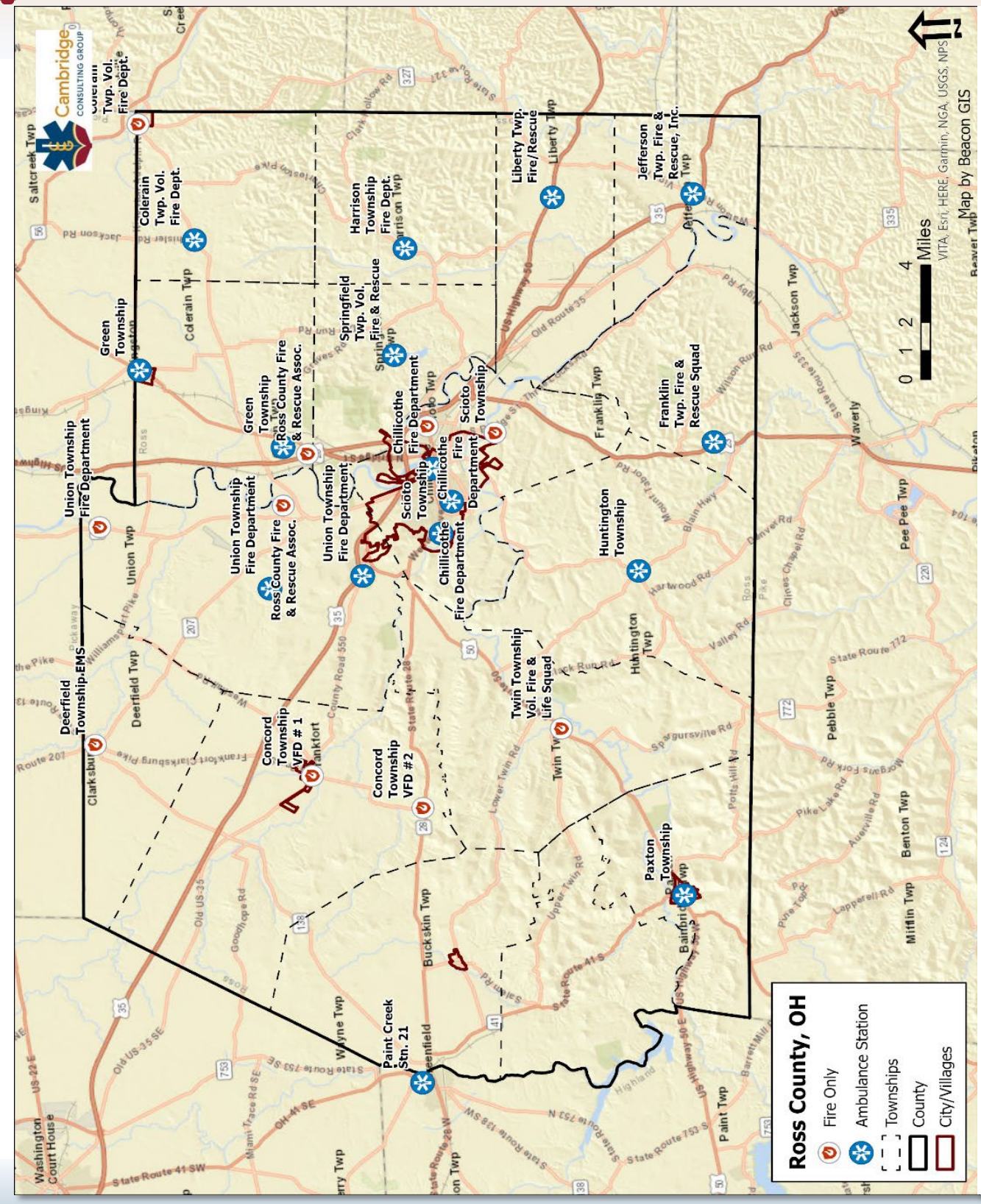

Figure 2 Ross County EMS Stations

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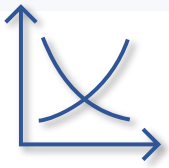
Overall System Activity



EMS Providers Performance Analysis

The Ross County Sheriff's Department provided incident data for each township from May 2020 to May 2023, three full years of data. For each Township, three separate datasets were submitted by the Sheriff's Office. "Actual" data reportedly included calls that were responded to by the township primary provider of EMS. This may be the local fire department or contracted to a neighboring EMS Squad. A second dataset, "Mutual Aid" was provided that is the calls within a department that were answered by a neighboring EMS squad when the primary was unavailable. The third dataset, "Private", were the EMS responses answered by a private ambulance company when the primary and mutual aid units were unavailable for whatever reason. Each subsection that follows examines the available data for workload levels, trends, and reliability to respond within the township or area served.

The Chillicothe Police Department provided Computer Aided Dispatch (CAD) exported data for the City of Chillicothe Fire Department's EMS operation and response. This data had similar limitations of certain time stamp components.

The following is important to note regarding the information Cambridge Consulting Group received for this study. Dispatch and response data was not supplied for Buckskin and Paint Townships. In addition, the data for the remainder of the townships did not have certain timestamps for a more granular analysis such as criticality level, time enroute, time left scene, time arrived hospital (if transported), and time completed. In addition, which hospitals transported to was also not provided nor were timestamps provided for private ambulances summoned for incidents. Additionally given the data, it cannot be determined how long from the initial summons of the primary provider took before resorting to mutual aid or private response.

Response Time performance is reported as both an average and as the 80th percentile in line with National Fire Protection Association's (NFPA) Standard 1720 response performance for volunteer fire departments in rural communities (except City of Chillicothe which would fall under NFPA 1710 Standards).

The location of EMS stations was identified as detailed in the following maps.

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VOLUME DISTRIBUTION

Total countywide EMS activity was plotted geographically to determine areas of concentration. Nationally, EMS cases tend to cluster around population centers.

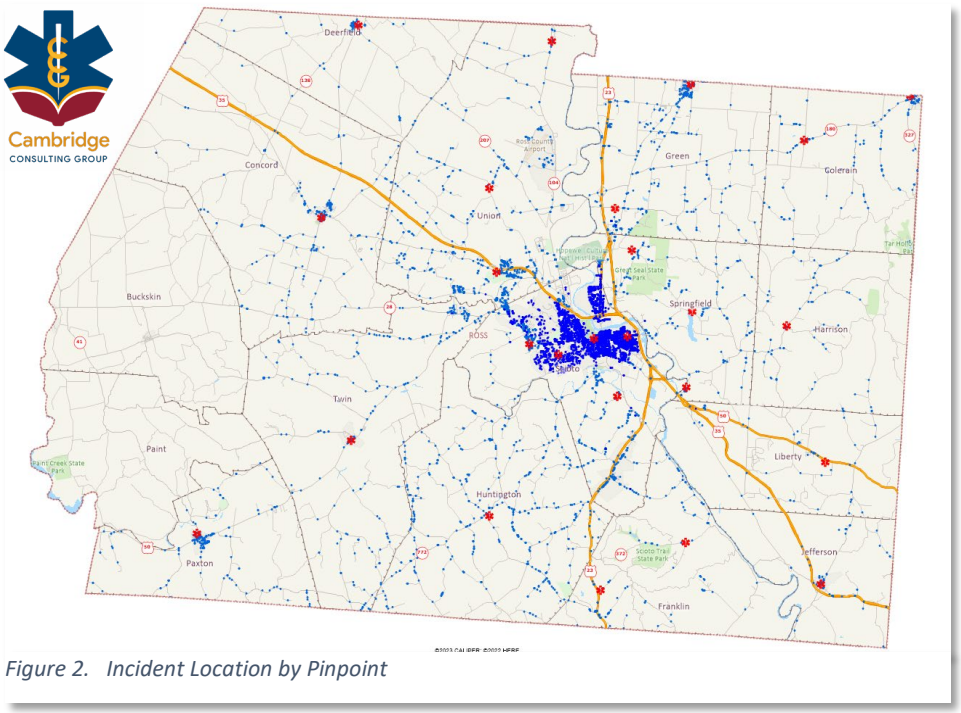

Figure 2. Incident Location by Pinpoint

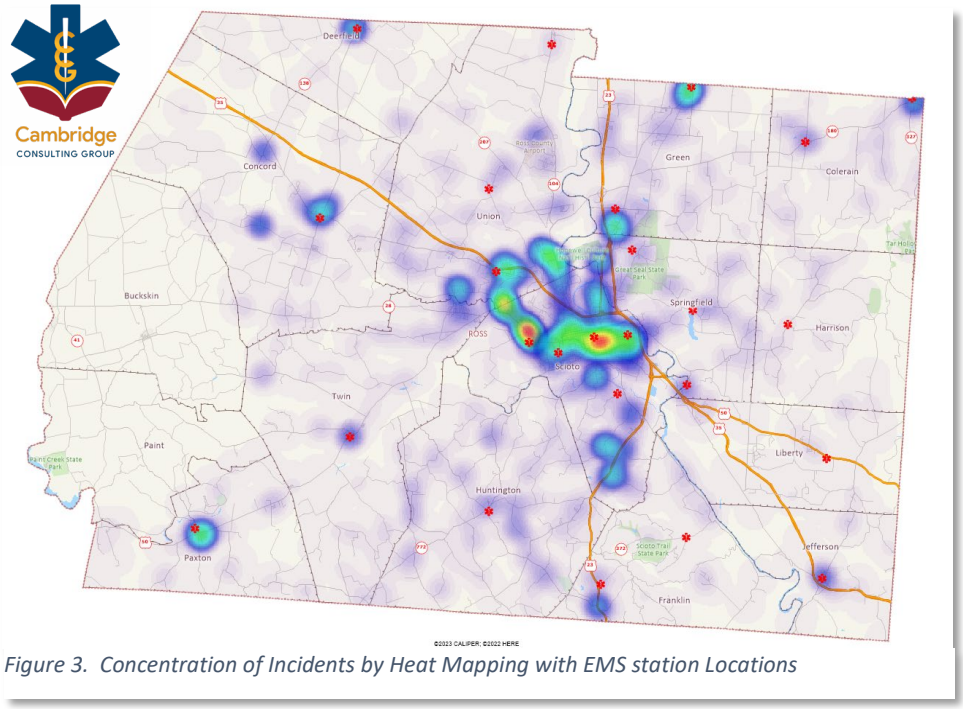

Figure 3. Concentration of Incidents by Heat Mapping with EMS station Locations

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This same pattern was identified in Ross County. Overlaying the location of EMS response stations is helpful in determining the appropriateness of their locale.

Countywide Activity Distribution

Not surprisingly, Chillicothe City showed the highest total volume of EMS activity in the County. In general, the lower the population of a town or township, the fewer EMS calls. Although, a few jurisdictions did not follow that trend and demonstrated higher per capita volume than would otherwise be expected. All data was for the year 2022.

Jurisdiction	% of All Cases, Countywide	% of Primary serviced, Countywide	% of Mutual Aid received, Countywide
Chillicothe	52.6%	63.1%	0
Colerain	2.0%	1.5%	4.5%
Concord	4.1%	1.3%	18.0%
Deerfield	1.0%	0.3%	4.4%
Franklin	1.9%	0.7%	7.9%
Green	4.0%	4.8%	0.5%
Harrison	0.7%	0.8%	0.3%
Huntington	4.0%	4.1%	3.1%
Jefferson	0.7%	0.6%	1.0%
Liberty	1.1%	0.3%	4.8%
Paxton	2.2%	1.9%	3.9%
Scioto	9.5%	9.4%	10.3%
Springfield	4.3%	1.6%	17.9%
Twin	4.1%	0.4%	22.5%
Union	7.8%	9.1%	0.9%

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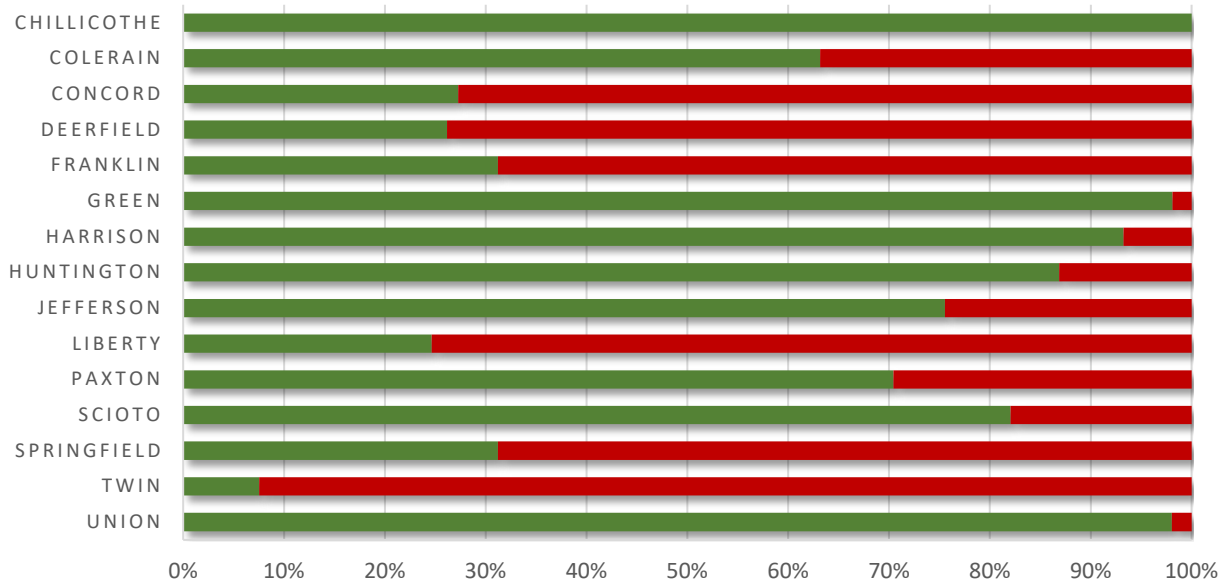
Mutual Aid Activity Countywide

Primary vs Mutual Aid Response



This chart shows the percentage of EMS volume in each jurisdiction which is handled by the primary agency versus mutual aid services.

Nature of EMS Cases

An analysis of the types of requests for EMS services was made. There appeared to be the opportunity for more detailed call-taking to occur. An inordinate number of calls were classified as “general illness”, “unknown emergency”, or “unknown medical” in nature. Use of a robust medical priority dispatching system would likely result in most of those cases being appropriately identified. This would allow for case type categorization, improved awareness of the communities’ health status, enhanced EMS planning, and better EMS resource management, especially during periods of surge demand.

The chart below shows the types of EMS calls classified by the dispatching center, in 2022. “Difficulty breathing”, “trauma” of some type, and “cardiac” were the most prevalent complaints recorded. This data can be used to advance the development of EMS capabilities more tailored to the community being served. Training of EMS practitioners can be honed to provide superior care for these types of emergencies. In addition, monitoring the breakdown of call nature can allow EMS services to identify opportunities to address surfacing trends that should be referred to the broad healthcare sector for attention.

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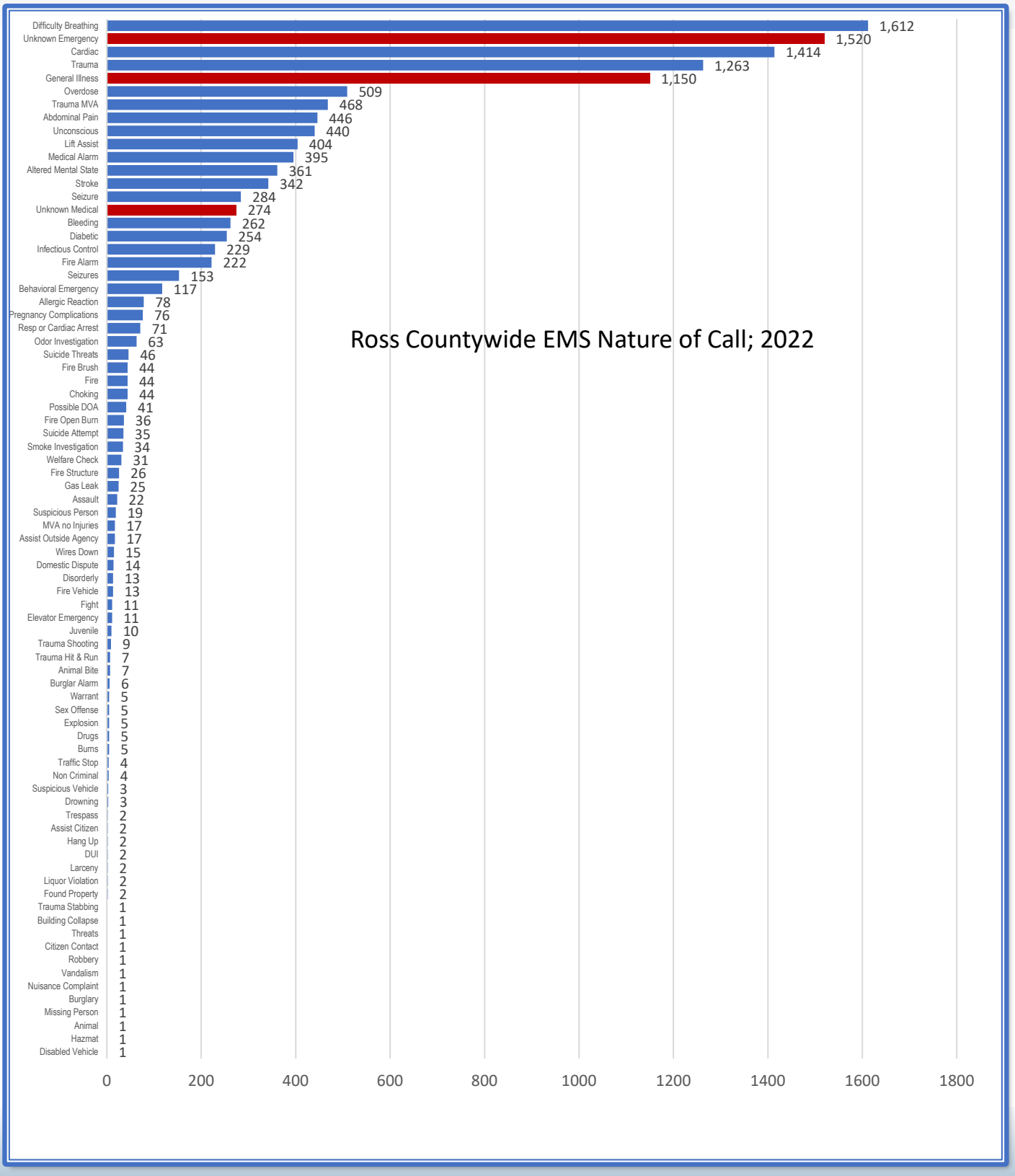

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Responses Exceeding Standards

Cambridge Consulting Group assessed the data supplied according to provider, as well as aggregate, and looked at measurable elements such as response time, volume distribution related to station locations, amount of mutual received and provided, type of calls, chronologic dispersal by day of week and hour of day, and use of private EMS agencies.

An analysis of the response data from a Countywide perspective showed a significant number of EMS cases where response times exceeded the 10-minute and 15-minute metric. Approximately 14% (1,519) of all responses took longer than 10 minutes, but less than 15, for EMS units to arrive at the scene. There were another 9% (971) of cases that took longer than 15 minutes for response.

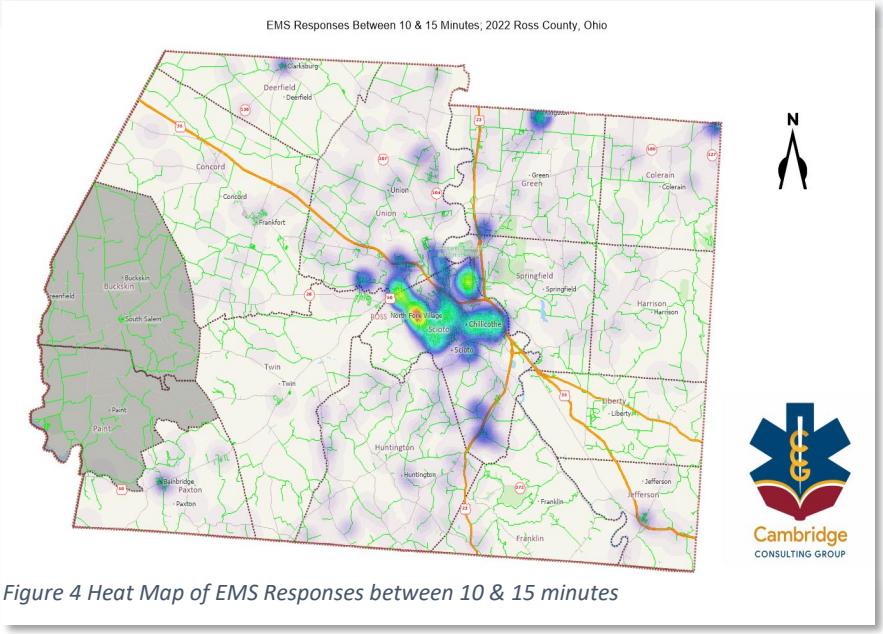

Figure 4 Heat Map of EMS Responses between 10 & 15 minutes

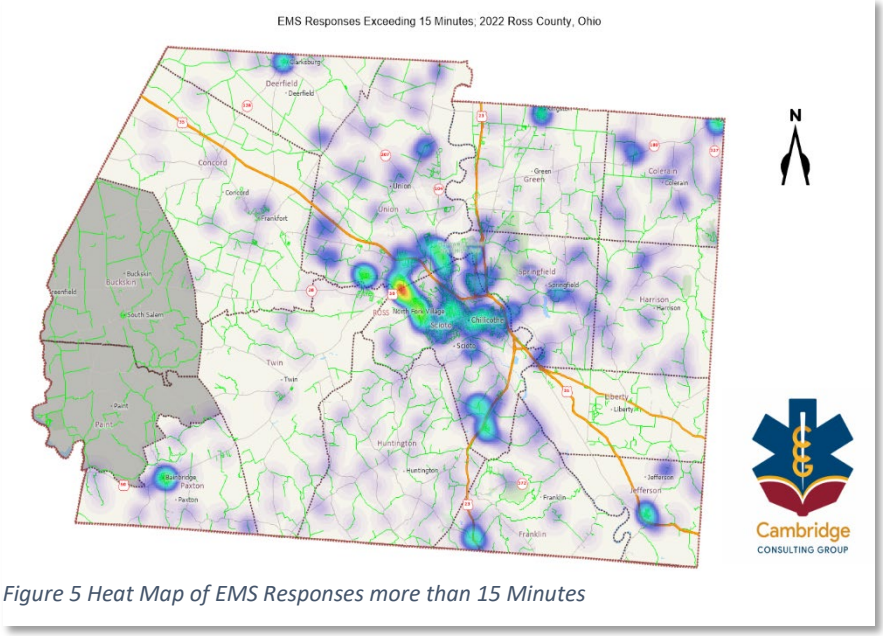

Figure 5 Heat Map of EMS Responses more than 15 Minutes

Therefore, almost a quarter of all EMS responses within the County took longer than 10 minutes for EMS units to arrive. These lengthy responses were spread throughout the County and were associated with all provider agencies. The following heat-maps provide a visual representation of the distribution within the County of these excessive response times.

Cambridge Consulting Group was able to identify the best EMS station locations for a consolidated EMS delivery system, which is presented later in this report. This will aid the County in future planning efforts and reduce excessive response times.

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EMS Comparative Statistics

Comparative EMS incident statistics were calculated to provide a relationship of activity between the townships within the County. Surprisingly, a few rural townships showed a higher level of EMS activity per capita than Chillicothe City, which is classified as urban and with the highest population density in the County. Paxton and Franklin, in particular, had significantly higher EMS activity per 1,000 population than the other rural areas and Chillicothe City, , but still represented a small portion the overall County volume. Four townships were unable to respond to more than 50% of their EMS calls and relied on mutual services excessively. As expected, nine townships experienced less than a single EMS call a day, on average, during 2022. This is normal for rural areas.

Ross County Comparative Data

	Square Miles	Total Incidents	% of County Total	Population	Population/Sq. Mi.	Population Class	Calls/1kK Pop.	Calls/Sq. Mi.	EMS Units/1kpop	Incidents/Day
Buckskin	50.3	No Data	No Data	2,047	41	Rural	No Data	No Data	No Data	No Data
Chillicothe	10.7	6,872	53%	21,868	2,044	Urban	314	642.1	0.09	18.8
Colerain	35.4	266	2%	2,017	57	Rural	132	7.5	0.50	0.7
Concord	75.7	409	3%	4,743	63	Rural	94	5.9	0.21	1.2
Deerfield	30.8	130	1%	1,481	48	Rural	88	4.2	0.34	0.4
Franklin	35.4	250	2%	1,656	47	Rural	150	7.0	0.60	0.7
Green	43.4	528	4%	5,192	120	Rural	102	12.2	0.39	1.4
Harrison	36.2	89	1%	1,263	35	Rural	70	2.5	0.79	0.2
Huntington	59.6	518	4%	6,155	103	Rural	84	8.7	0.16	1.4
Jefferson	24.9	90	1%	1,064	43	Rural	85	3.6	0.94	0.2
Liberty	34.6	138	1%	2,597	75	Rural	53	4.0	0.39	0.4
Paint	58.6	No Data	No Data	1,288	22	Rural	No Data	No Data	No Data	No Data
Paxton	31.8	291	2%	1,918	60	Rural	152	9.2	0.52	0.8
Scioto	41	1,248	10%	6,008	147	Rural	208	30.4	0.17	3.4
Springfield	30.8	567	4%	2,614	85	Rural	217	18.4	0.38	1.6
Twin	60.2	530	4%	3,492	58	Rural	152	8.8	0.14	1.5
Union	66.8	1,014	8%	12,561	188	Rural	81	15.2	0.16	2.8

County Data Aggregated without Chillicothe

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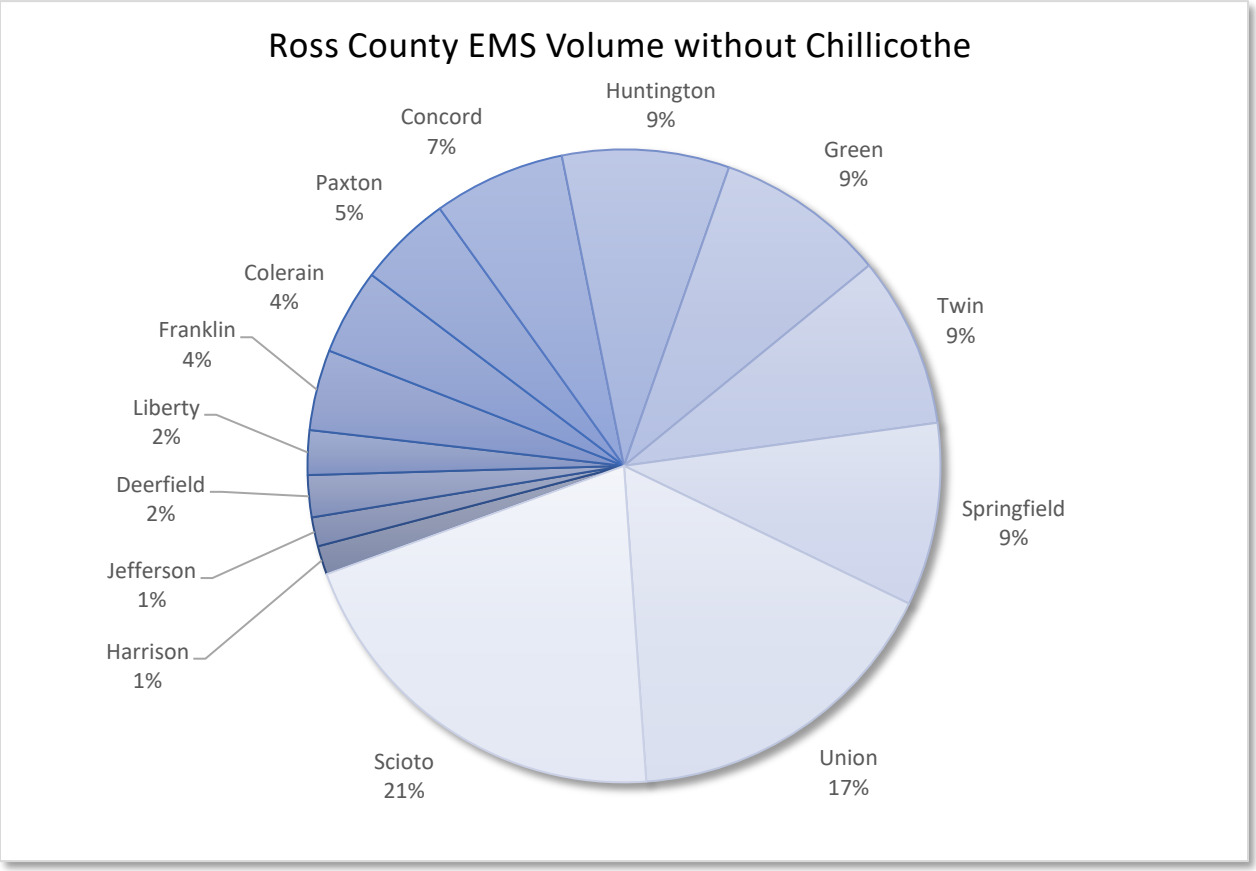
When the City of Chillicothe is excluded from the data aggregation, it provides a clearer picture of the remaining Ross County EMS situation. Scioto and Union make up more than a third of the volume balance.



Removing Chillicothe information, the following graphics demonstrate the geographical distribution of EMS volume in the remaining portions of Ross County. The maps show the prevalence of primary agency responses, mutual aid coverage, and both combined.

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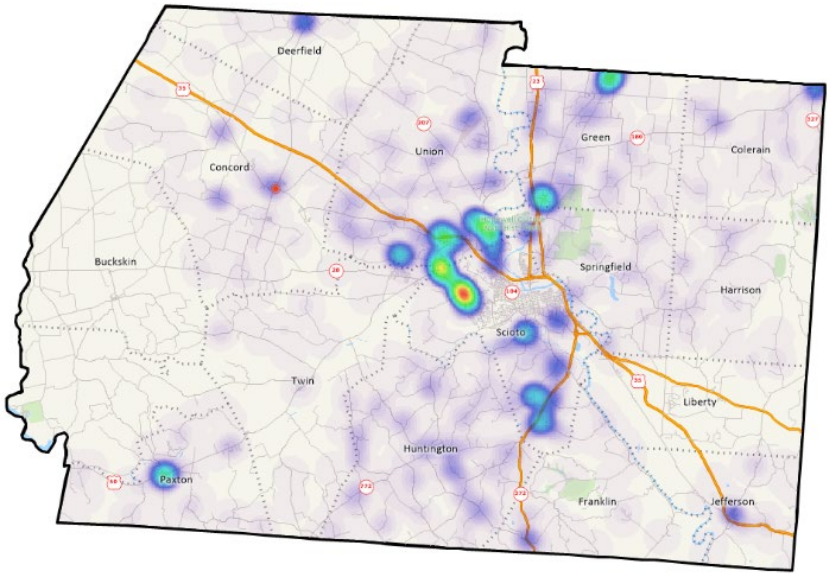
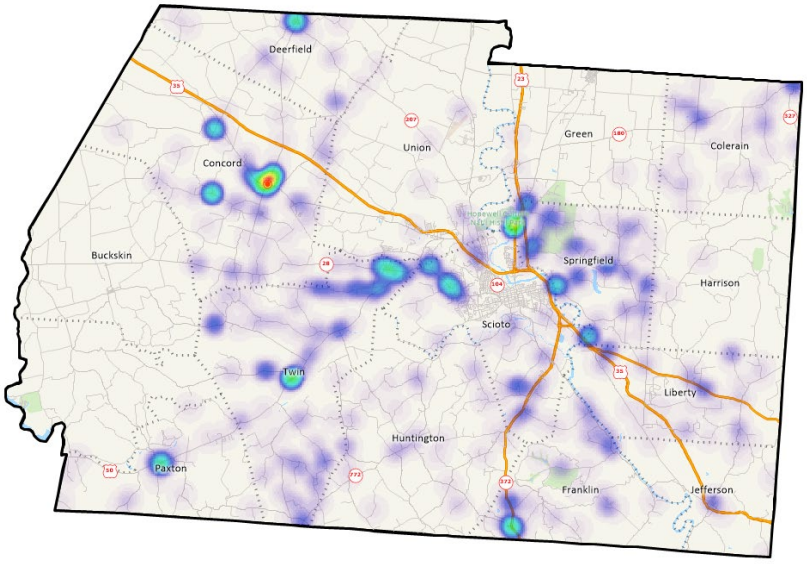
Ross County EMS Primary Agency Response Heat Map Excluding Chillicothe



Ross County EMS Mutual Aid Prevalence Excluding Chillicothe



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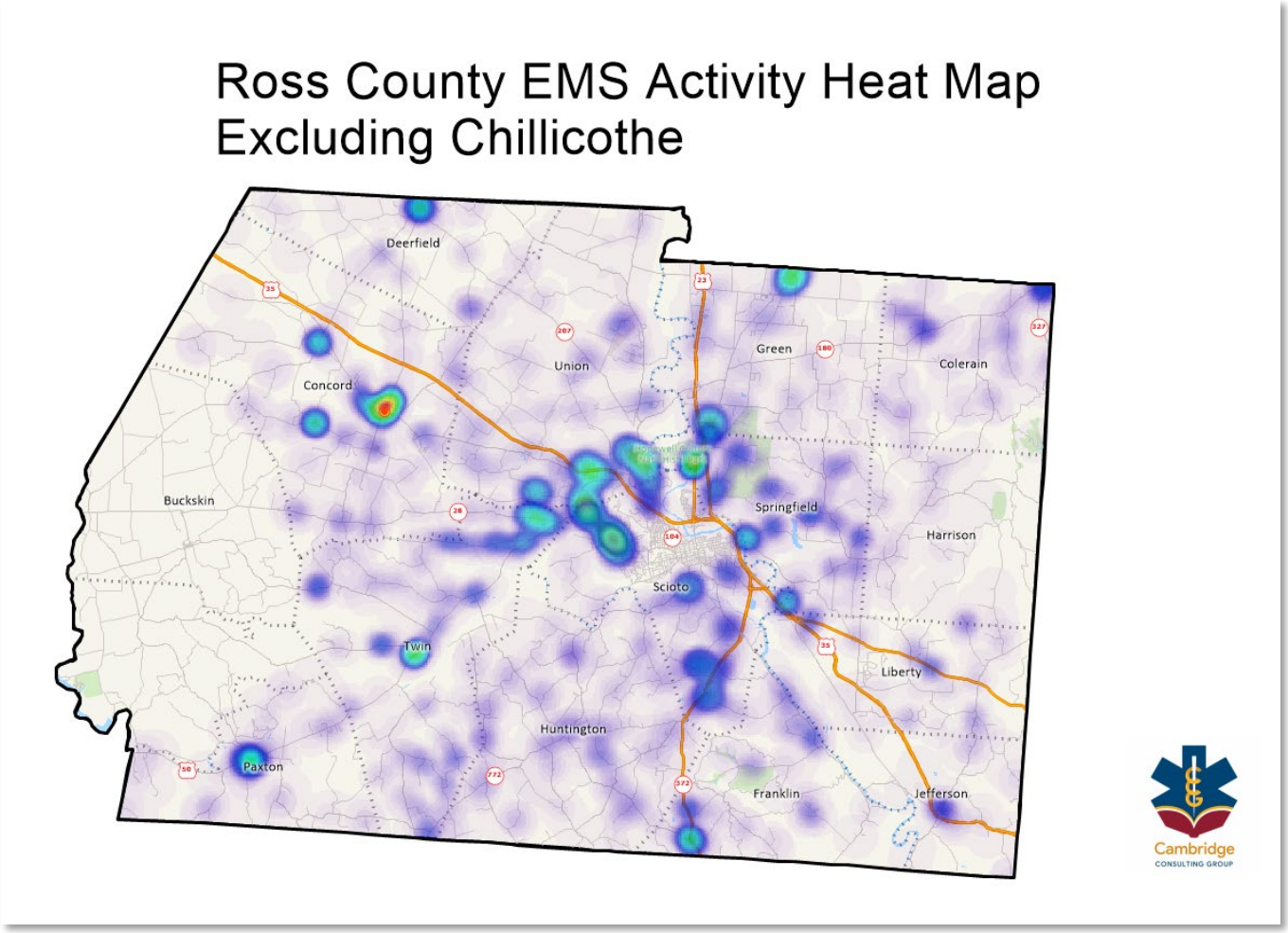

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Excluding Chillicothe, this chart reflects the average activity level of EMS incidents during the year by hour of day and day of week.

Average EMS Requests by Day of Week & Hour of Day Excluding City of Chillicothe							
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
12 AM	2	2	2	2	2	2	2
1 AM	2	2	2	2	2	2	2
2 AM	2	2	2	2	2	2	2
3 AM	2	2	2	2	2	2	2
4 AM	2	2	2	2	2	2	2
5 AM	2	2	2	2	2	2	2
6 AM	2	2	2	2	2	2	2
7 AM	2	2	2	2	2	2	2
8 AM	2	2	2	2	2	2	2
9 AM	2	2	2	2	4	2	2
10 AM	2	4	4	2	2	2	2
11 AM	2	2	2	2	4	5	2
12 PM	2	4	2	5	5	4	2
1 PM	2	2	5	4	5	5	2
2 PM	2	5	2	4	2	2	2
3 PM	2	2	5	5	5	4	2
4 PM	2	2	2	2	2	2	2
5 PM	5	2	2	2	5	4	2
6 PM	2	2	5	4	2	4	2
7 PM	5	2	2	2	5	4	2
8 PM	2	2	4	2	2	2	4
9 PM	2	2	2	2	2	2	2
10 PM	2	2	2	2	2	2	2
11 PM	2	2	2	2	2	2	2

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This series of charts shows the distribution of EMS volume for each jurisdiction for the entire year of 2022. While there are some similarities, subtle differences exist regarding the busiest hours.

Agency	DAY	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Colerain	Sunday								1		2		3	2	3	3	1	2	6	1	2	2		3	1
	Monday				2				3	4	2	3	1	2	2	3	1		1	1	3	1	3	3	4
	Tuesday	3						3	2	1	1	7	6		4	3	3	1	2	3	1		2	1	
	Wednesday		3		3				4	2	1			4				1	1	1	2	1	4		3
	Thursday	3					1			2	4		8	6	1	3	8		1	2	3		1		1
	Friday	2		2		3		3			3		1	1	3	1	1	1	4	3	5	1	1	7	
	Saturday			3	2	3	3		3	1	1	2		2	3	1		1	1	1	2			1	6
Concord	Sunday	2				3	2		4	3	6	4		2	2	5	4	2	5	3	2	5	4		
	Monday	3		1	1		1	1	3	1	2	3	2	5	3	5	1	3	3	4	3	1	2	4	2
	Tuesday	2		2	2	1	1	1	4	5	1	2	5	5	2	2	2	3	2	3	1	2	4	2	4
	Wednesday		1		3	2		1	3	1	3	1	4	2	4	7	2	4	6	6	3	6	1	3	
	Thursday	4	2	1		2		2	2	2	4		5	3	3	2	3	2	5	6	2	4	3	1	3
	Friday	1	1	4		2	1	3	5	1	5	1	2	2	5	2	6	3		4	2	3	5		4
	Saturday	2	3	1	2				1	3	2	5	4	1	2	4	3	5	1	2	2	4	2	4	
Deerfield	Sunday				2								2	3		1			1		1		1	1	
	Monday								2		2			4				3		2	1		1	2	
	Tuesday				2												2	1		2			2		
	Wednesday			2							4			2		4	3			1			4		
	Thursday					2	2		2	4				3			1	2	1		4			1	2
	Friday	1				2				2	2	1			2	2	2	2	1		4		2		
	Saturday			2							4	2	1			3	3		2		1	2	3		2
Franklin	Sunday	4		2			1				1	2	7	1	1	2		6	6		4	3			3
	Monday			1	4	2		2			2		2			2	1		3	3	1	2	1	2	1
	Tuesday	1	1	2				3		1		4	2	2	5		4	6	1	2		3		1	3
	Wednesday			4		2			1				2		6	2	2	1	3		3		4		2
	Thursday	2						4	2	2	2	6	2		2		3	3	1	4	4	3	5		
	Friday	2	1		1			2				2	4	9	7	1		1	2	1	1				3
	Saturday					2	2				1			2	3	2	2	1	2	3	1		1	1	
Green	Sunday	1		1	3			3		3	2	6	3	2	5	3	4		2	2	3	1	1	1	3
	Monday	1			1	1	1	3	6		9	6	4	5	5	11	6	6	6	2	4	4	3	3	1
	Tuesday		3	3				3	3	2	10	3	3	5	12	4	3	3	7	5	6	5	4	1	1
	Wednesday	1	1		1	2	2	2	4	2	4	3	6	9	2	6	5	7	2	3	1	7	2	3	2
	Thursday		2	3		1		2	5	1	5	6	5	8	7	2	10	5	3	6	4	3	2	6	
	Friday	2	2	2	1	1		5	1	7	4	10	9	8	6	10	5	6	4		3	5	1	2	3
	Saturday	4	1					1	1	4	1	3	3	2		3	2	3	3	4	1	5	2	2	

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Agency	DAY	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Harrison	Sunday	1	1						1		2					2		1	3	1			2	1	
	Monday							1			1	2	1	1		2		4	1			1			1
	Tuesday	1				1		1		1			4			1	1	1	1		1	1		1	
	Wednesday								1					2	1		2			2		1		1	
	Thursday						1			1	2	2							3			2		1	
	Friday															2			1	1	1	2	2	1	
	Saturday			1					1		1		1	1				1				1	2		3
Huntingto	Sunday	4	4	1	4	1	2	1		4	4	3	2	1	3	5	2		4	7	5	5	4	5	5
	Monday	4	1	3		1	1	2	1	4	4	2	4	1	5	4	5	6	1	8	5	4	3	2	2
	Tuesday	1		1	1	1		3	2	2	6	8	4	3	4	4	8	2	2	2	6	3	4	2	2
	Wednesday		2	2		7	2	1	2	6	3	6	3	5	7	1	4	9	5	9	4	5	2		1
	Thursday	3		1	1		1	1		5	2	3	3	3	6	3		3	3	8	2	3		2	2
	Friday	1	4	1	3	1	3	1	3	3	2	8	3	3	5	2	5	1	3	10	6	4	5	5	2
	Saturday	2		2	2	2	2	2	2	2	4	3	2	2	2	6	6	2	4	6	3	6	3	5	3
Jefferson	Sunday										1			4		1	2		1				1		
	Monday					3			1			1	1		1		1	1			1	1			1
	Tuesday												1		3	1				1	1				
	Wednesday	2		1												1			2	2			2		
	Thursday		1		1			1					1					3		1	1				
	Friday								1	1		1	1			2			1		3	1	4	1	1
	Saturday			1			1	1	1		4	1	2					3	4	3	1	3			
Liberty	Sunday									2	4			3		1			3		1		1	1	
	Monday	2				2				2				4		2		3		2	1		1		
	Tuesday						4	6				2	6				4	1		2					
	Wednesday	2		2				2				2		2			1		2	1					
	Thursday			2		2		2		4	2		2	3			1		1		2		2	1	
	Friday	3									2	1	2	2		2			3		4			2	
	Saturday	2		2		2				2	2		1	2		1	1		2		1		1		

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Agency	DAY	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Paxton	Sunday	1	2	3			3				1		1		1	1	1	2	3	3	4	2	1		2
	Monday			1		2	1		3		1	4	3	2	2	1	5			1	2	1	3		2
	Tuesday					3	3	2	1	1	1	1	1	4	1	4	2	1	3	2	4	8	1		
	Wednesday	3	1		4	1	3		1	7	4	4	3	3	1	4	4		7	2	1			3	1
	Thursday	2	4			2			7		6	2	2	5	2	4		3	10	2	6	1		4	1
	Friday						1	1	2		2		1	1	3	1	4		5	3		1	4		3
	Saturday	1									1	2	3	2		2	3	4	3		1	1	3	1	4
Scioto	Sunday	4	5	4	2	1	5	7	9	3	1	11	12	4	11	8	4	13	11	13	13	12	6	11	8
	Monday	7	4	5	4	4	4	4	15	6	8	11	6	10	5	10	8	5	9	9	11	11	16	13	10
	Tuesday	6	5	4	5	1	8	3	7	8	7	10	5	1	12	5	5	6	8	10	12	9	9	1	6
	Wednesday	2	3	4	3	3	8	8	5	6	6	12	10	7	11	6	17	5	6	7	8	11	13	6	3
	Thursday	3	8	5	8		4	3	6	12	9	11	8	8	7	16	12	16	10	3	11	12	5	5	4
	Friday	3	5	1	5	1	5	8	8	12	6	6	12	5	16	6	14	4	6	14	11	10	9	10	8
	Saturday	5	8	5	3	6	7	5	7	5	5	6	10	4	9	11	6	12	6	15	11	8	12	8	7
Springfield	Sunday	3		5				6	6		8	7	3		3	1	6	1			12	2	3	10	
	Monday						4	3	3	6	9	12	5	15	6	3			3		2	3	6		3
	Tuesday			2	2		3			7	7	2	5	2		2	4	3	10	4	4	2	3		5
	Wednesday	2	3			3	5				5	3	2	10	3	8	6	3	6		8	7	4	3	4
	Thursday	2		6				2	6	2	6	4	5	10	15	3	4		12	1	8	6	3	6	5
	Friday		2	3	3	3			6	2	3	4	4	6	4	10	6	9	5				7	5	
	Saturday	2	5		5		3			2		6	4	2	1	5	4	4	6	6	2	6	3		2
Twin	Sunday	2			2	2					2		4	2	3	2	8	4	9	9	4	2	4	4	4
	Monday				2					4	2	2	4			9	11	6	7	2		2	4	7	2
	Tuesday	1	4	2	2	4	2	8	2		2	8	2	9	4	2	9	2	1	11	2	6	2	7	4
	Wednesday		4				4	4	2	6		2	2	3	5	4	4	11	2	10	7		2	1	
	Thursday	2	2	6	2		2	2	4		2	2	9	2	14	6	5	2		6	2	7		4	
	Friday	2	1	4			4	2	4	2	9	6	2	8		2	3	6	2	3	4	1	3	2	6
	Saturday	5	5		2				2	8	4	6	5	8	4	1	5	2	3		5		4	2	2
Union	Sunday	5	4	2	4	1	5	1	9	4	5	9	10	6	8	4	8	5	13	8	6	12	13	6	5
	Monday	3	3	5	3	1	4	1	3	6	5	4	11	7	4	9	8	9	3	5	12	7	3	10	7
	Tuesday	2	5	2	4	4	2	2	5	6	6	7	6	14	8	10	12	4	8	17	7	12	6	6	3
	Wednesday	5	2	3	5	2	2	5	2	4	4	3	6	9	11	9	11	4	7	6	7	10	5	3	3
	Thursday	3	3		7	4	1	6	6	5	6	9	4	7	8	4	9	4	11	8	5	8	6	6	2
	Friday	5	1	2	3	5	2	2	4	5	4	10	14	8	8	8	5	8	13	12	7	14	6	3	9
	Saturday	5	6	4	1	3	6	4	4	4	11	6	6	10	8	7	6	5	5	6	8	12	13	6	6

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BUCKSKIN

No EMS activity information was provided for Buckskin Township.
Buckskin Township is served by the Paint Creek Joint EMS/Fire District.

The Paint Creek Joint EMS/Fire District is a large public safety district in the State of Ohio, which provides fire suppression and/or EMS services to several jurisdictions in three counties; Highland, Ross, and Fayette. It covers approximately 360 square miles and includes 10 townships, the Village of Greenfield, the City of Hillsboro, and several other smaller municipalities.

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CHILLICOTHE

The Chillicothe, Ohio Fire Department is a full-time paid fire/EMS department that operates within the city limits of Chillicothe. The firefighters of the Chillicothe Fire Department are represented by the International Association of Firefighters Local 300. They provide full-service fire, rescue, and EMS transport services. While they have a history of challenges with staffing and funding, they also have a history of providing high level professional response to the community.

For the City of Chillicothe, an assessment of the data allowed Cambridge Consulting Group to determine the average number of EMS incidents by day of week and hour of day. This review also allowed the analysis of concurrent incidents, when multiple requests for EMS were before previous assignments were completed.

Chillicothe EMS Activity by Day of Week and Hour of Day; Annually for 2022							
Hour Block	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
00	28	31	25	25	17	25	35
01	36	23	18	23	26	20	20
02	25	16	17	14	13	26	21
03	19	16	19	16	18	12	18
04	19	16	14	22	20	20	17
05	16	18	17	21	15	12	26
06	34	23	29	25	21	25	17
07	34	33	39	25	30	19	20
08	33	38	39	44	44	36	36
09	42	48	47	56	46	50	40
10	40	43	50	44	65	51	45
11	55	65	51	65	63	60	48
12	40	68	69	60	55	56	57
13	64	50	65	53	44	66	62
14	62	68	73	51	65	65	45
15	44	66	66	74	58	57	57
16	48	61	66	41	64	44	49
17	57	70	65	54	51	45	46
18	48	63	51	56	52	55	66
19	54	41	52	44	54	53	62
20	44	42	57	46	53	49	60
21	40	36	44	47	33	53	41
22	34	26	37	32	38	48	41
23	33	35	25	42	32	28	30

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The "Average EMS Incidents by Day and Hour" table presented above is based on a mathematical calculation of the average number of incidents that occurred over the year analyzed, by hour of day and day of week. It is derived from the data provided to Cambridge Consulting Group regarding dispatched EMS cases in 2022. Sixty minute increments were used because when all dispatches were averaged, the length of cases was determined to be less than an hour.

The table is meant to provide a visual representation of the average periods of peak demand for dispatching EMS resources. It should be used only as an adjunct to other information when planning the actual number of units that should be deployed and how staffing should be made.

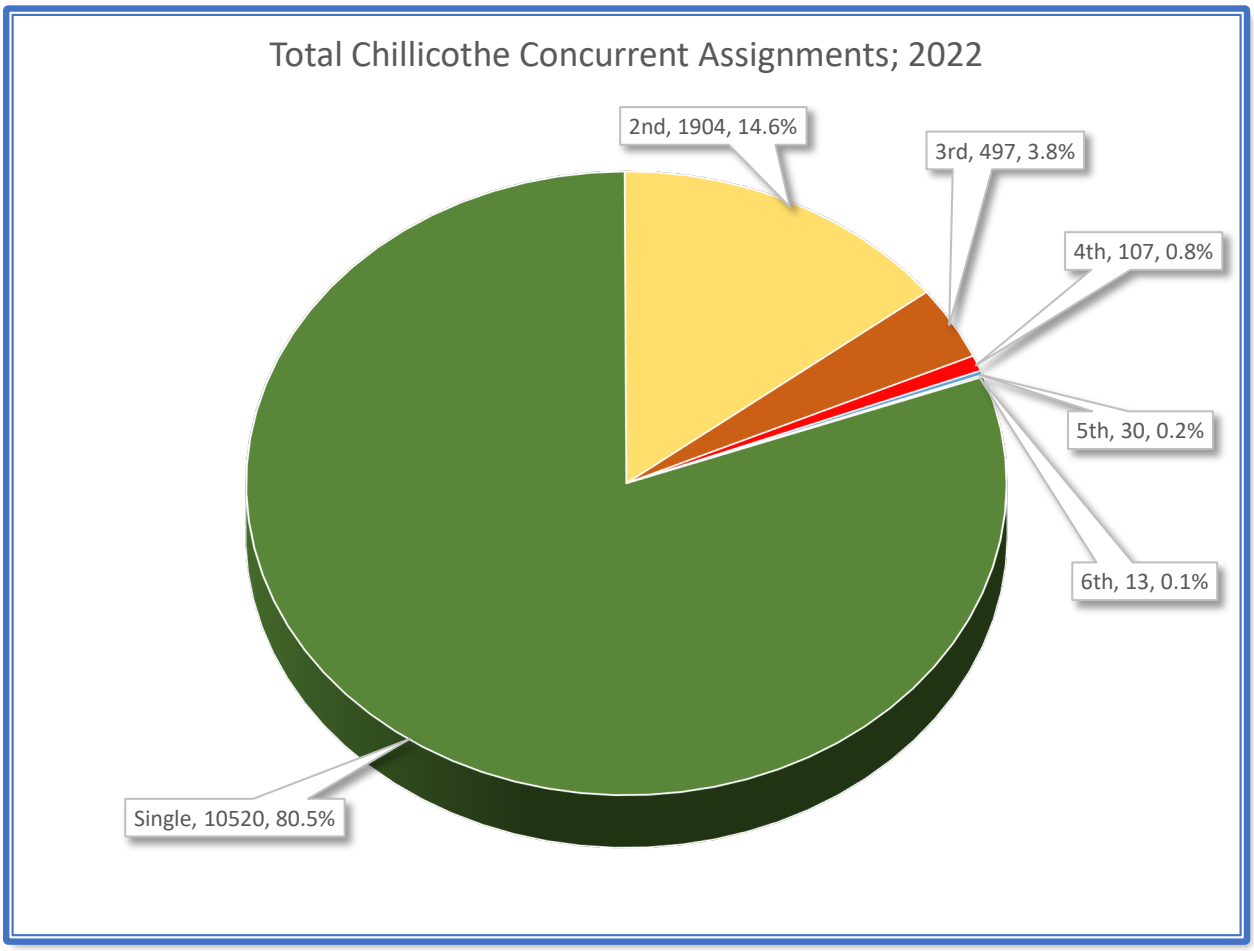

Figure 6 Chillicothe EMS Concurrent Cases; 2022

The data also allowed for the calculation of the likelihood for either of Chillicothe's two EMS units to receive a dispatch on any given day of the week and hour of the day.

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Percentage Chance for Any EMS Unit to Receive a Dispatch							
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0	27%	30%	24%	24%	16%	24%	34%
1	35%	22%	17%	22%	25%	19%	19%
2	24%	15%	16%	13%	13%	25%	20%
3	18%	15%	18%	15%	17%	12%	17%
4	18%	15%	13%	21%	19%	19%	16%
5	15%	17%	16%	20%	14%	12%	25%
6	33%	22%	28%	24%	20%	24%	16%
7	33%	32%	38%	24%	29%	18%	19%
8	32%	37%	38%	42%	42%	35%	35%
9	40%	46%	45%	54%	44%	48%	38%
10	38%	41%	48%	42%	63%	49%	43%
11	53%	63%	49%	63%	61%	58%	46%
12	38%	65%	66%	58%	53%	54%	55%
13	62%	48%	63%	51%	42%	63%	60%
14	60%	65%	70%	49%	63%	63%	43%
15	42%	63%	63%	71%	56%	55%	55%
16	46%	59%	63%	39%	62%	42%	47%
17	55%	67%	63%	52%	49%	43%	44%
18	46%	61%	49%	54%	50%	53%	63%
19	52%	39%	50%	42%	52%	51%	60%
20	42%	40%	55%	44%	51%	47%	58%
21	38%	35%	42%	45%	32%	51%	39%
22	33%	25%	36%	31%	37%	46%	39%
23	33%	34%	24%	40%	31%	27%	29%

The data provided did not specifically identify if any EMS incidents in the City of Chillicothe required mutual aid assistance from any other agency. However, an overview of the dispatch information seemed to indicate little, if any, mutual aid was required by the Chillicothe Fire Department. In the map below, carefully examining the plotted EMS incidents of primary (blue) and mutual aid (red) agency service provision in the immediate Chillicothe region, showed that apparently all 2022 cases were handled by the Chillicothe Fire Department EMS. In some cases, the CFD can be seen providing mutual aid assistance to neighboring EMS agencies.

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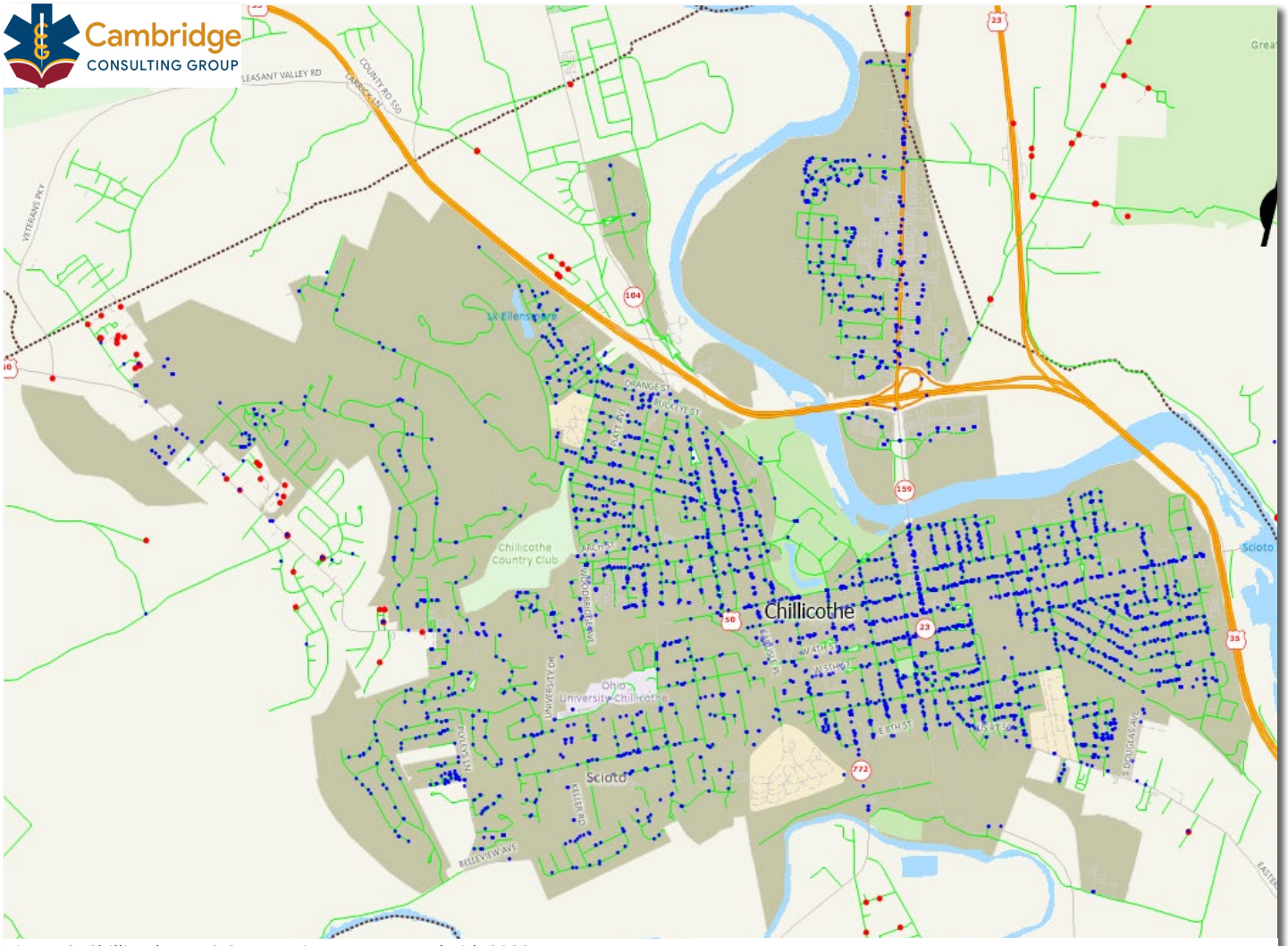

Figure 9 Chillicothe EMS Cases: Primary vs Mutual Aid; 2022

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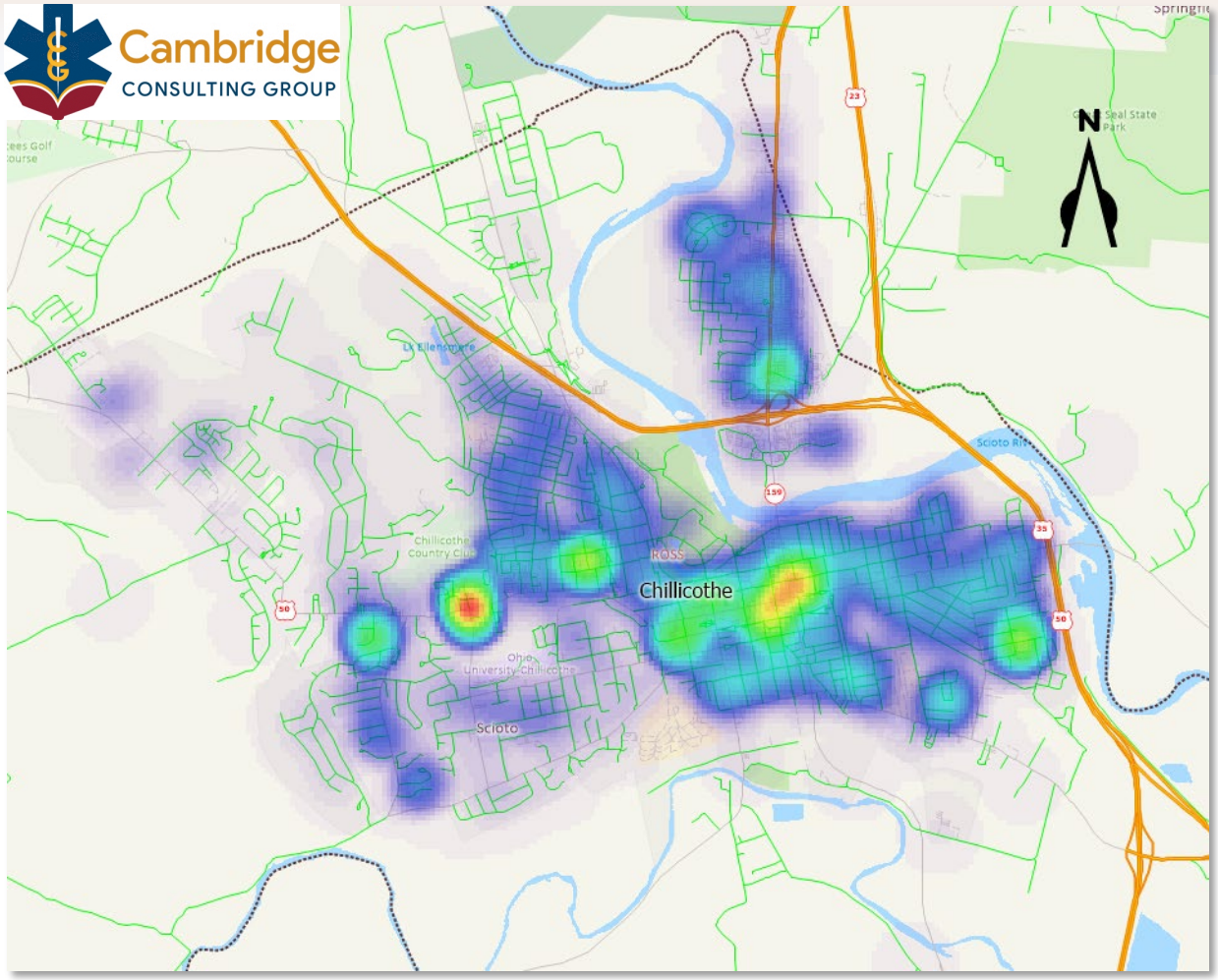

Figure 8 Chillicothe FD EMS Cases Response Heat Map; 2022

The CFD, as a career EMS agency with all paid staff, would be expected to demonstrate quick "out-of-chute" and response times. As the charts below show, while overall response times were within expected parameters, "out-of-chute" times revealed a significant number of cases that exceed NFPA recommendations.

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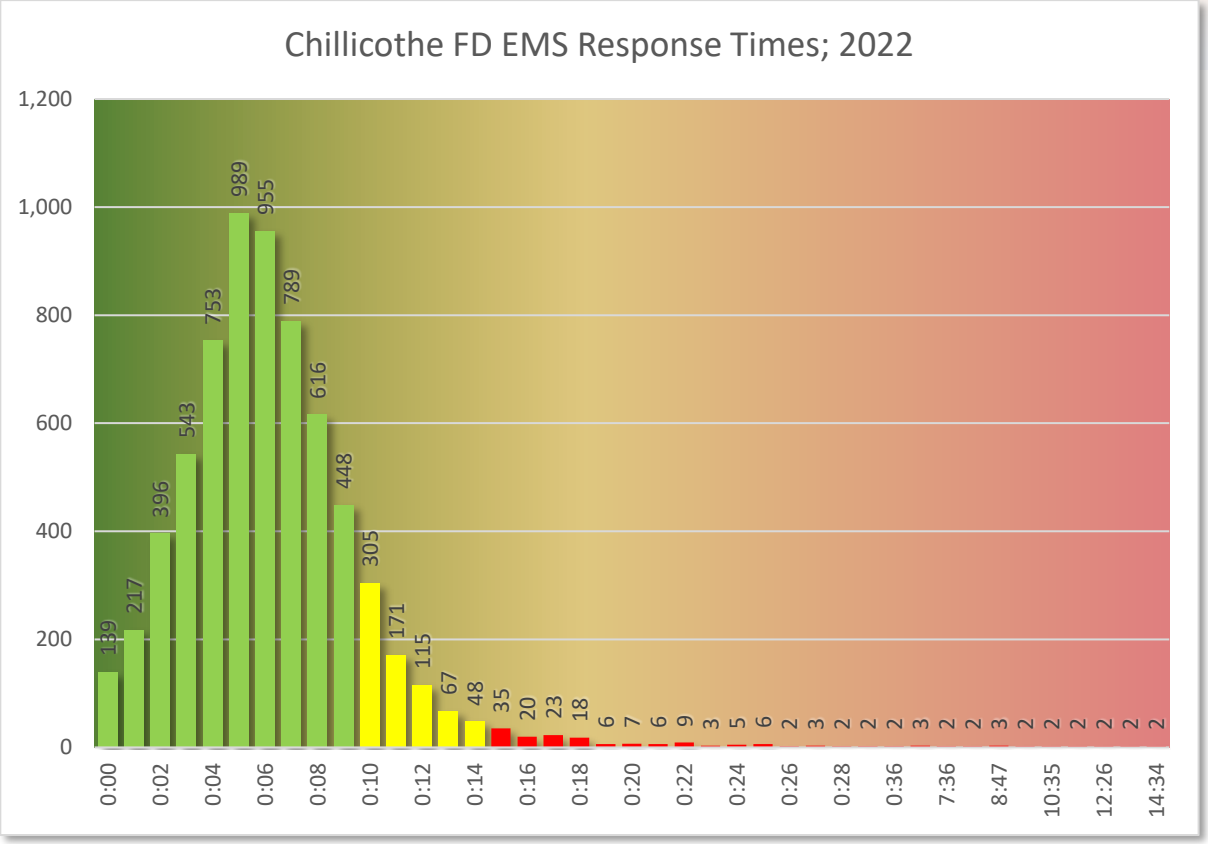

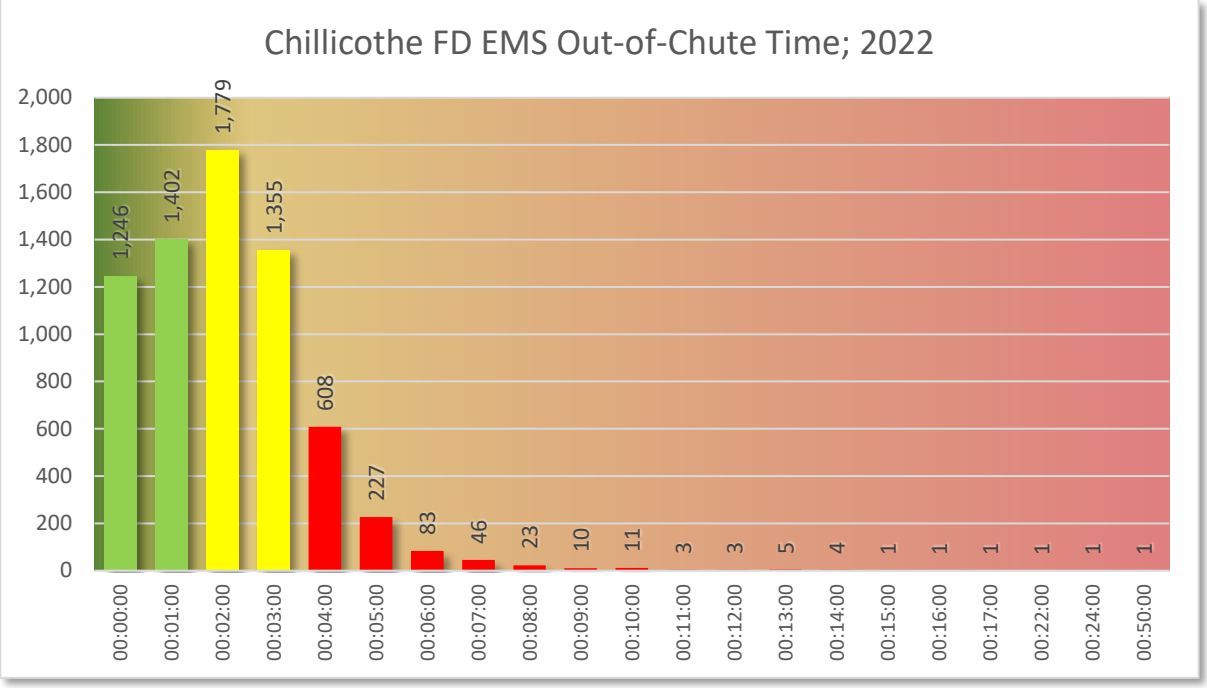

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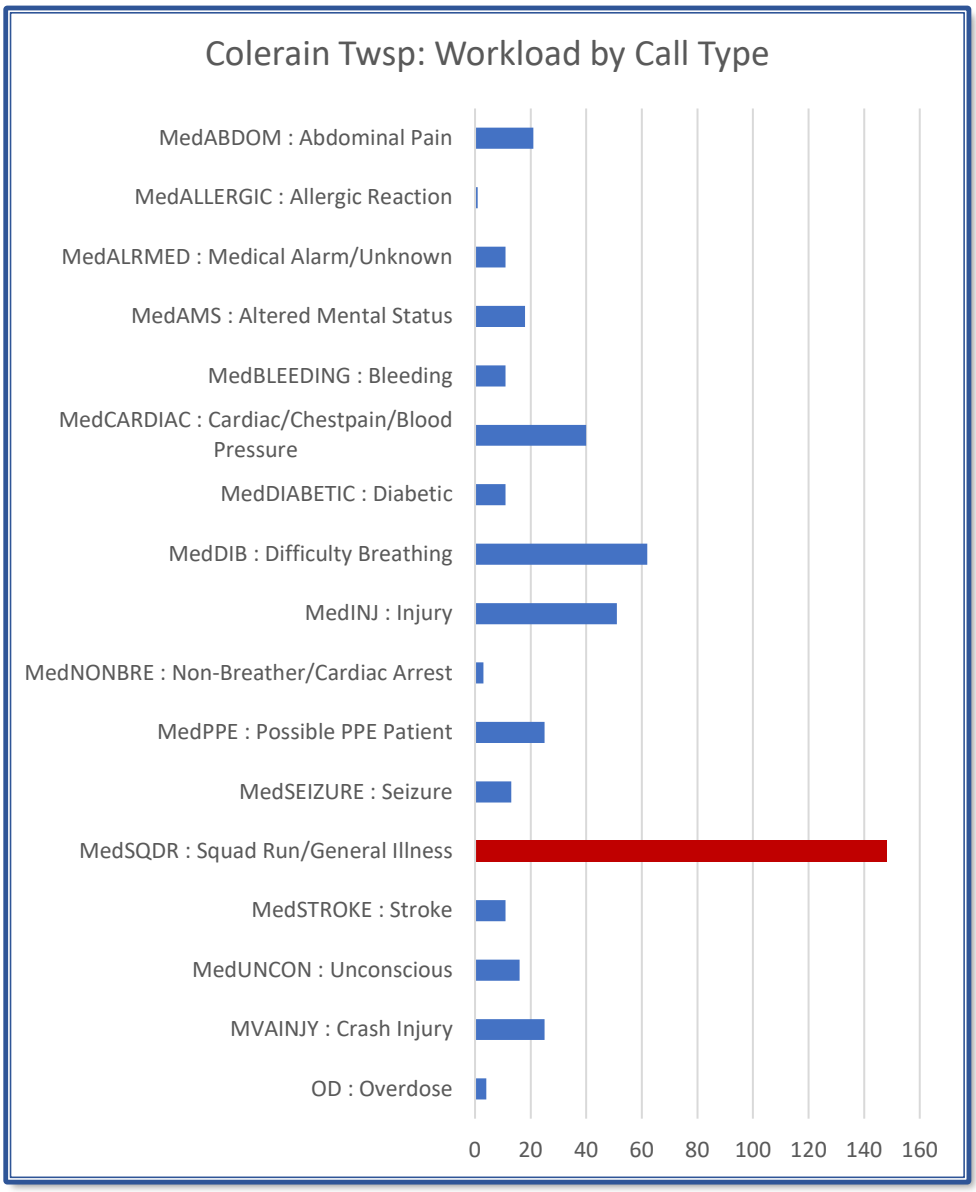
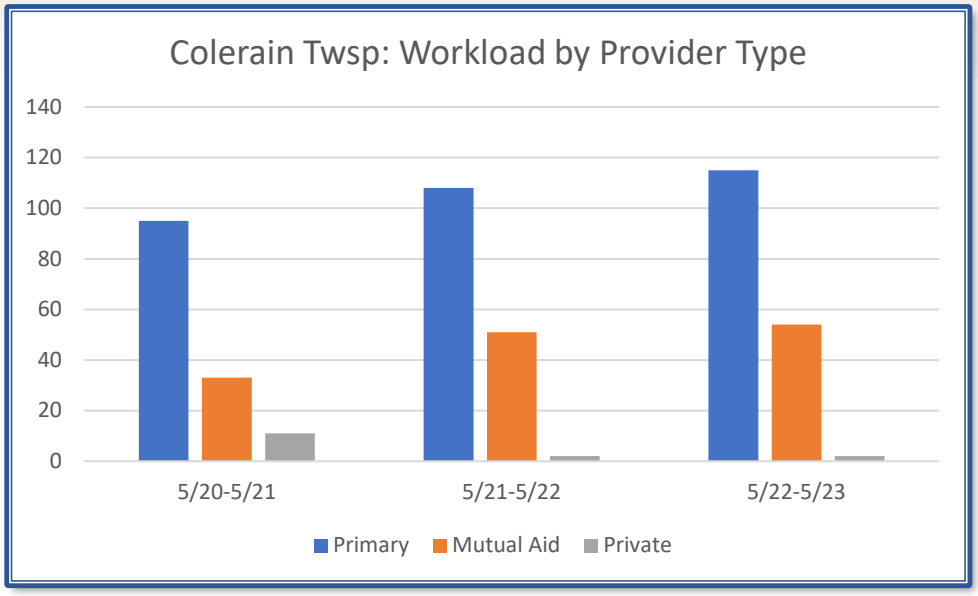
COLERAIN

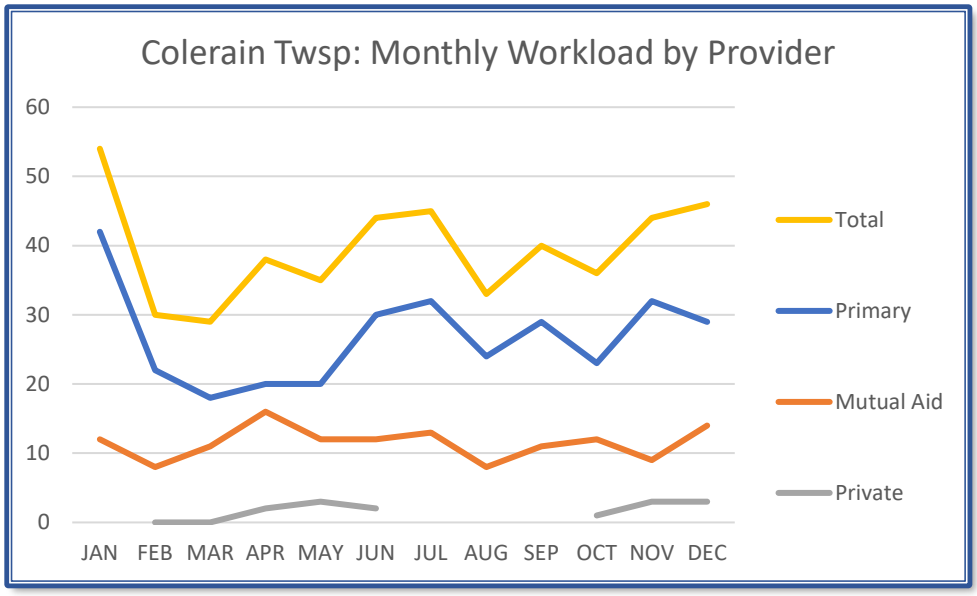
Colerain Fire Department has two fire stations in the township, but only has EMS service from one. It is the primary response for emergency medical incidents in the Township. The workload in the township over the three years of data includes over 450 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 31.4% of the volume.



For the three-year data period, 33% of the incidents were handled by either mutual aid or private providers. The following chart shows the workload level by full year and by provider in relation to the total.



When the data is examined on a monthly basis, January and December have higher volumes than the rest of the year. Mutual aid assistance is generally stable, highest in April.



On a daily trend basis, the weekends are busier but mutual aid responses are higher during the weekdays.

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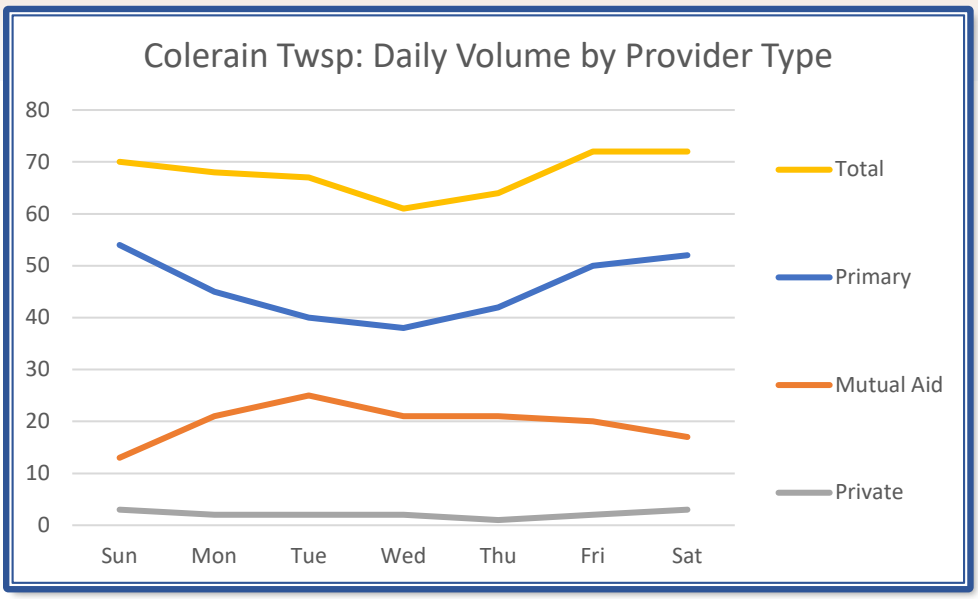
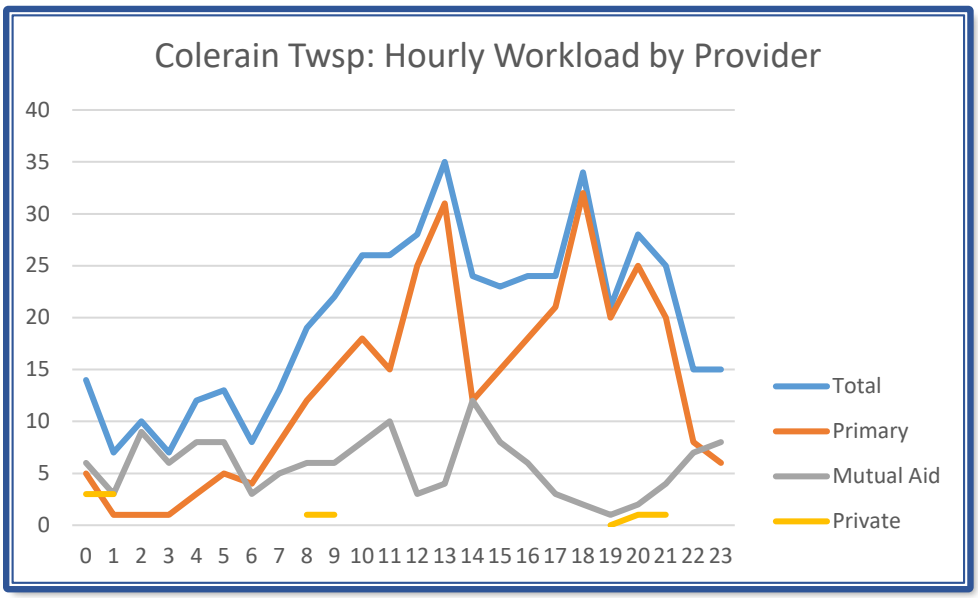


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 7AM and increases until noon, tapering in the afternoon until the early evening hours.



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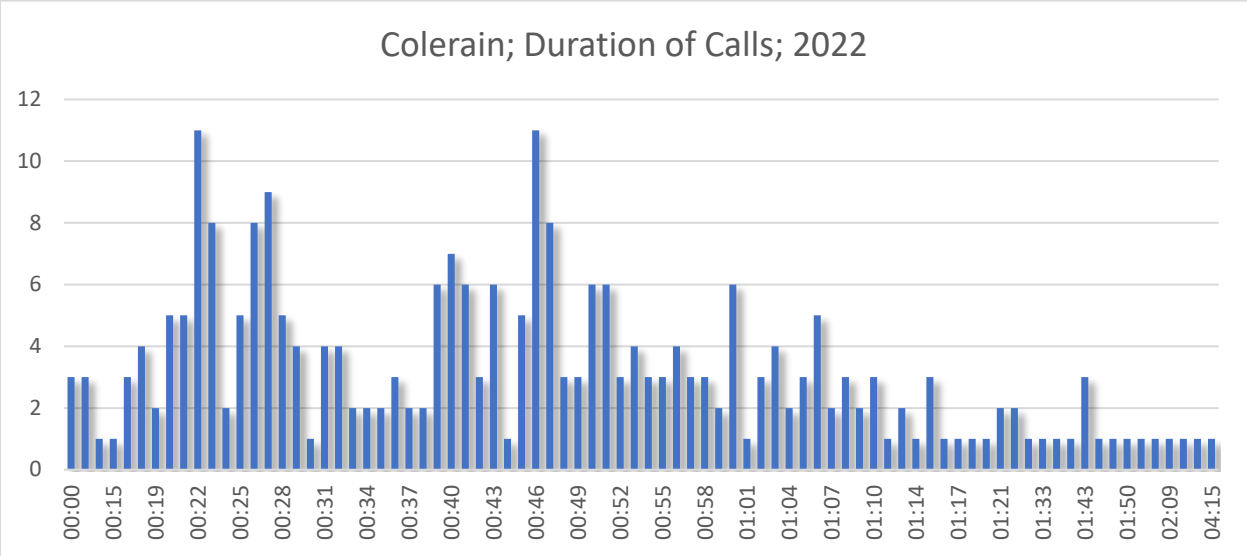
In n2022, Colerain experienced three times when there was a second assignment before the first call was completed, and one time when a third case occurred before the first a second call were completed.

Colerain's duration of assignments showed no particular pattern.



Lastly, Colerain saw no EMS activity on 222 days (61%) of the 2022 year.

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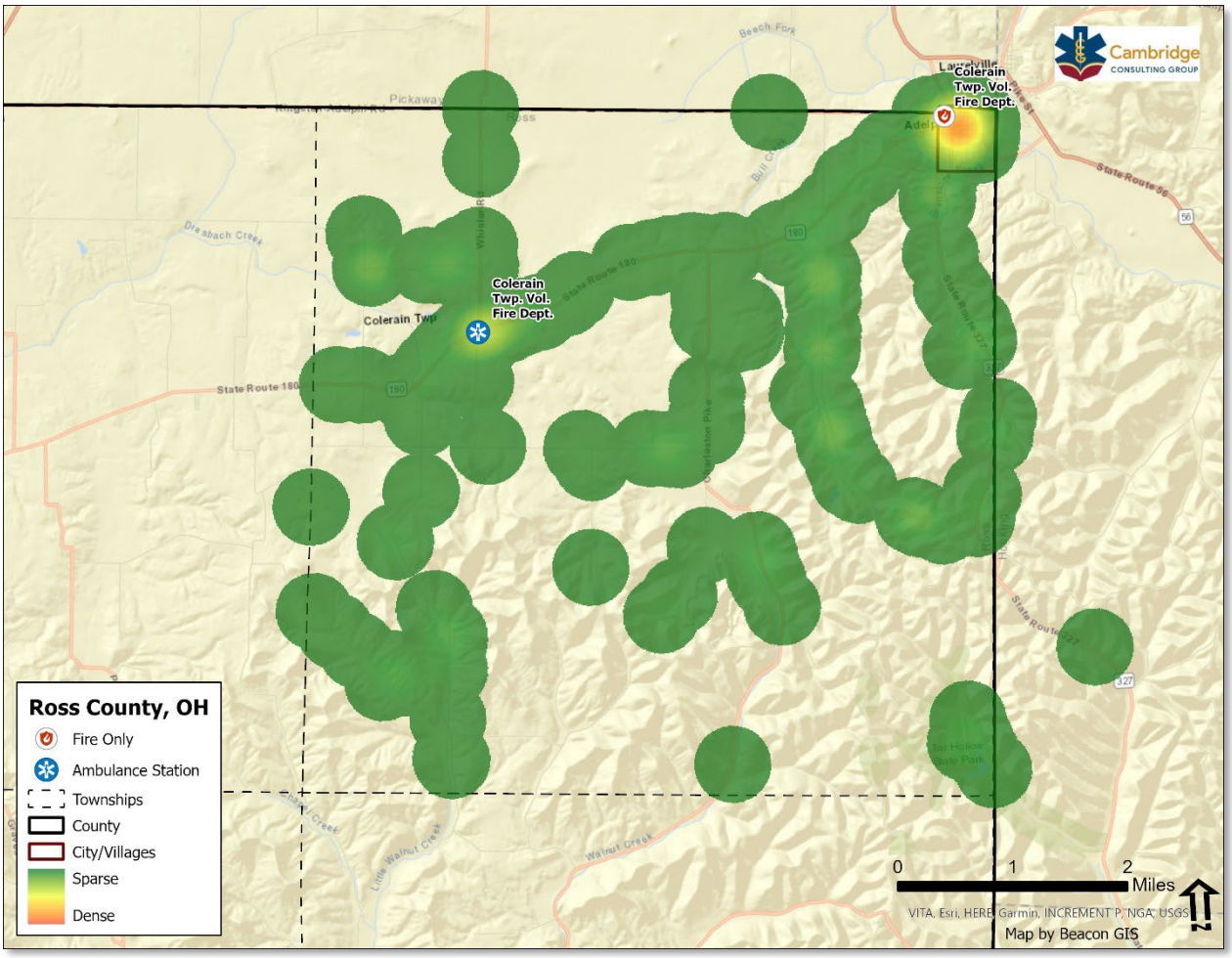
Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:15:44	0:25:56	No Data
80th Percentile	0:19:33	0:32:16	No Data

The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are within the Village of Adelphi and a moderate amount near another a fire station.

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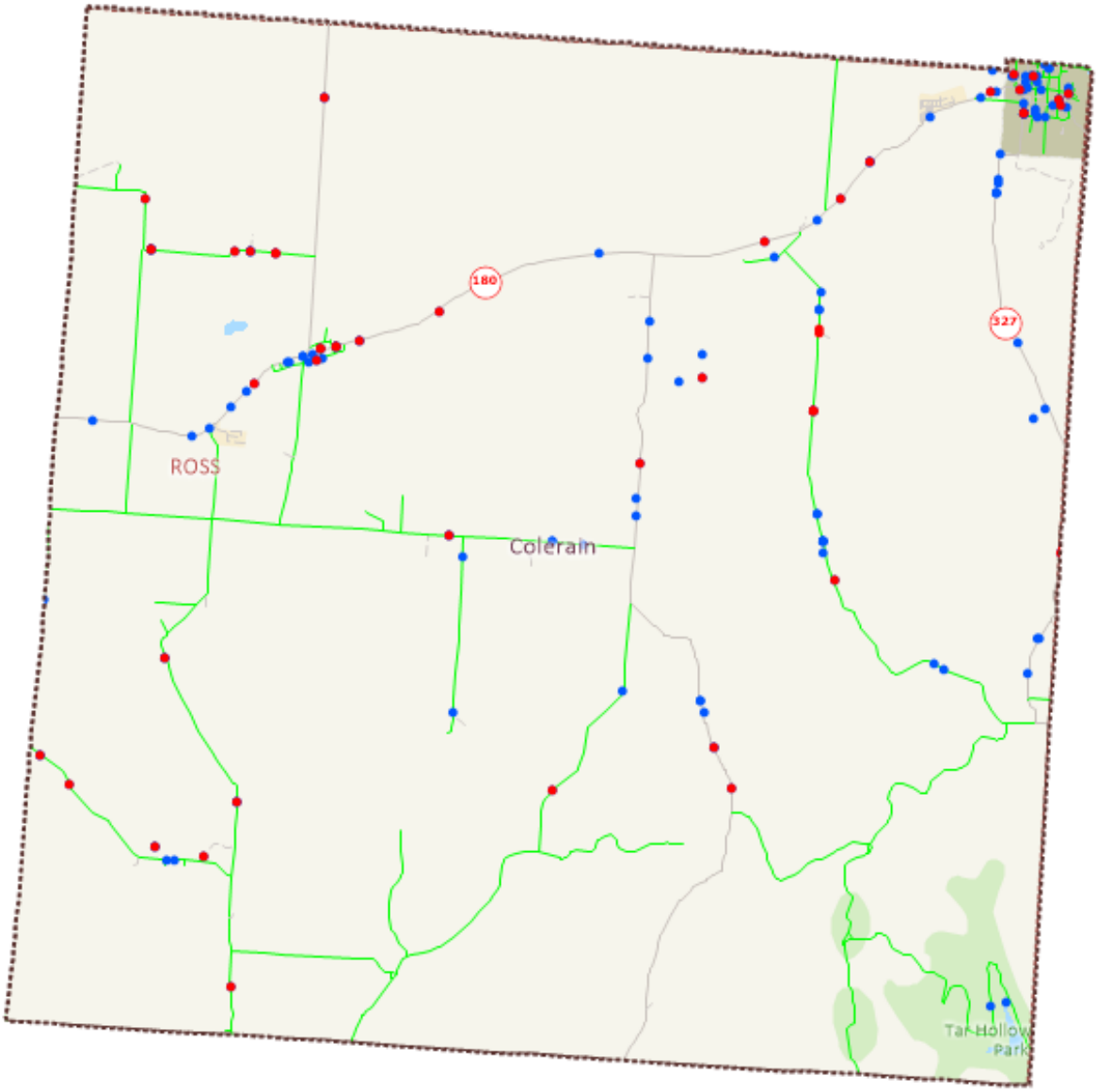
Agency: Primary (Blue) Mutual Aid (Red)



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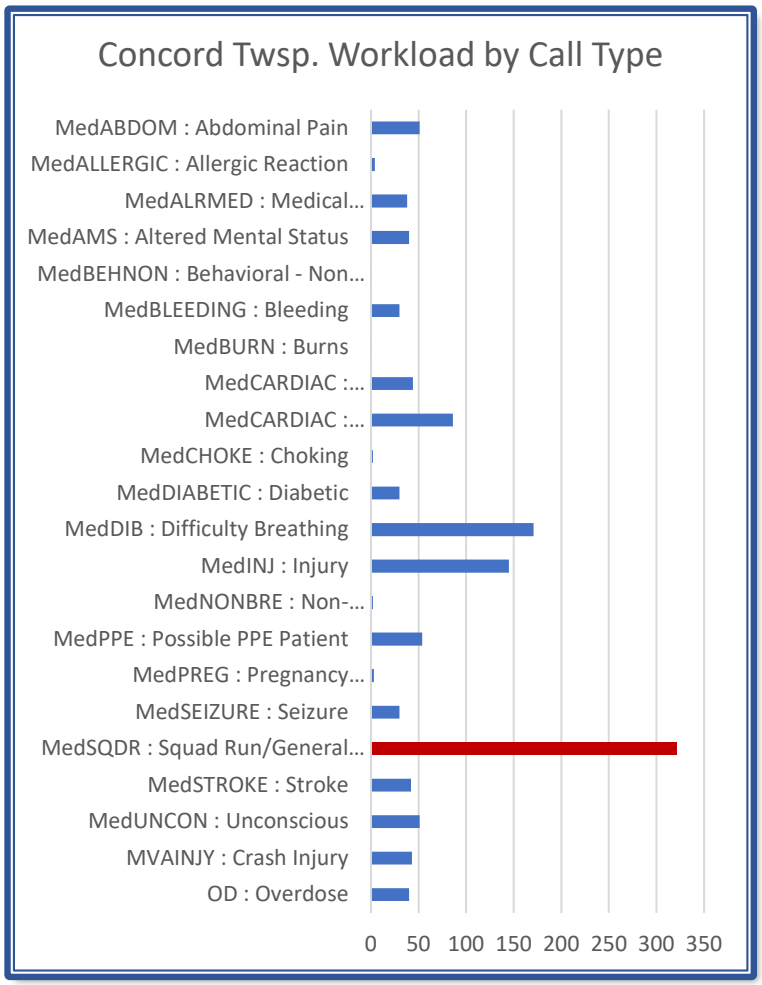
CONCORD

Concord Fire Department has two fire stations in the township and is the primary response of emergency medical incidents in the Township. The workload in the township over the three years of data includes over 1,200 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 26% of the volume.



For the three-year data period, 57% of the incidents were handled by either mutual aid (Majority Union Twp.) or private providers. The following chart shows the workload level by full year and by provider in relation to the total. Note that total volume decreased in Year 2 but rebounded in Year 3.

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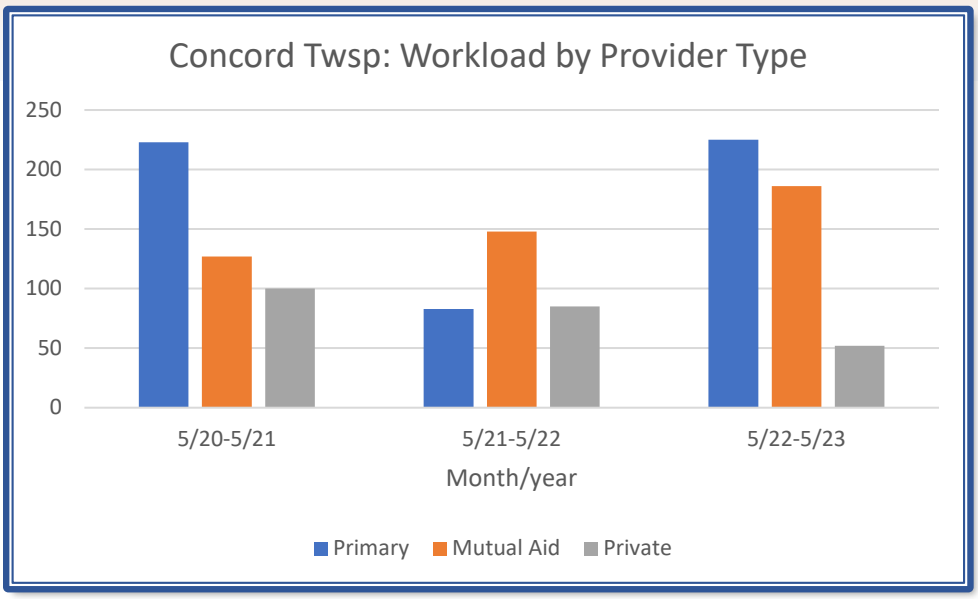
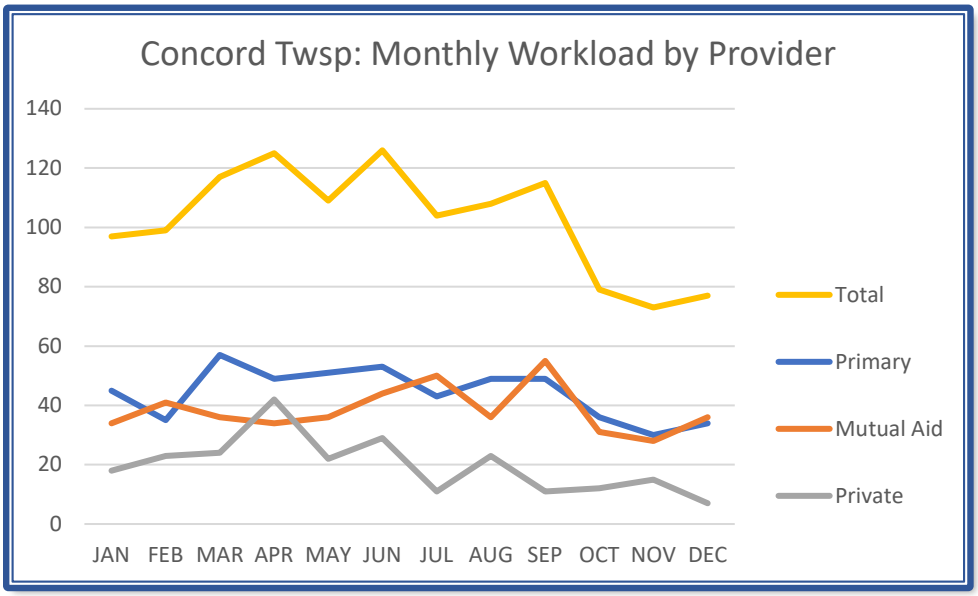


When the data is examined on a monthly basis, The late autumn and early winter months have lower volumes than the rest of the year. Mutual aid assistance exceeded primary responses in several months while the private runs were consistently lower than primary or mutual aid except in April (Year1).



On a daily trend basis, the middle of the week is busier. Mutual aid responses match the number of primary responses on Sundays, Tuesdays, and Saturdays.

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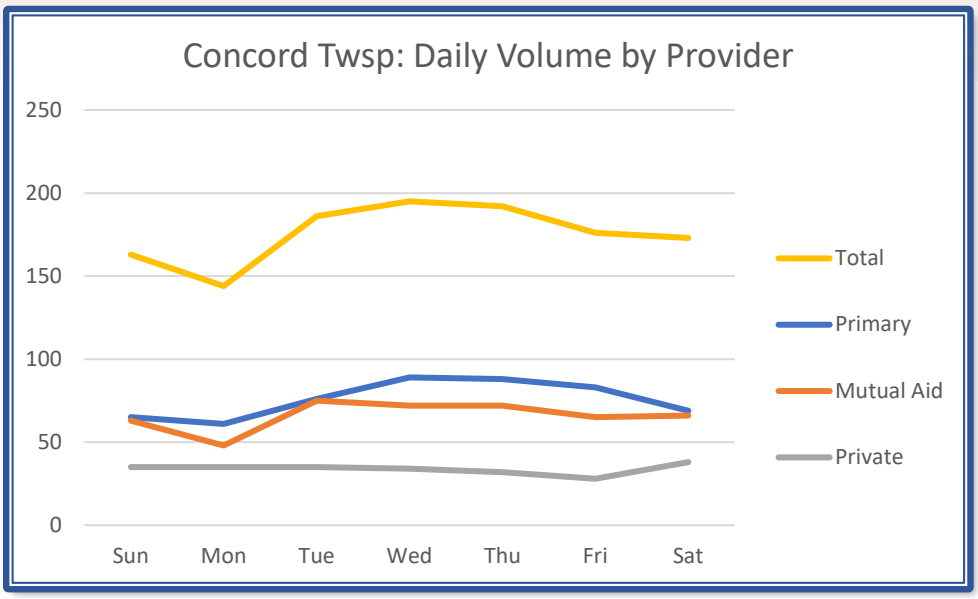
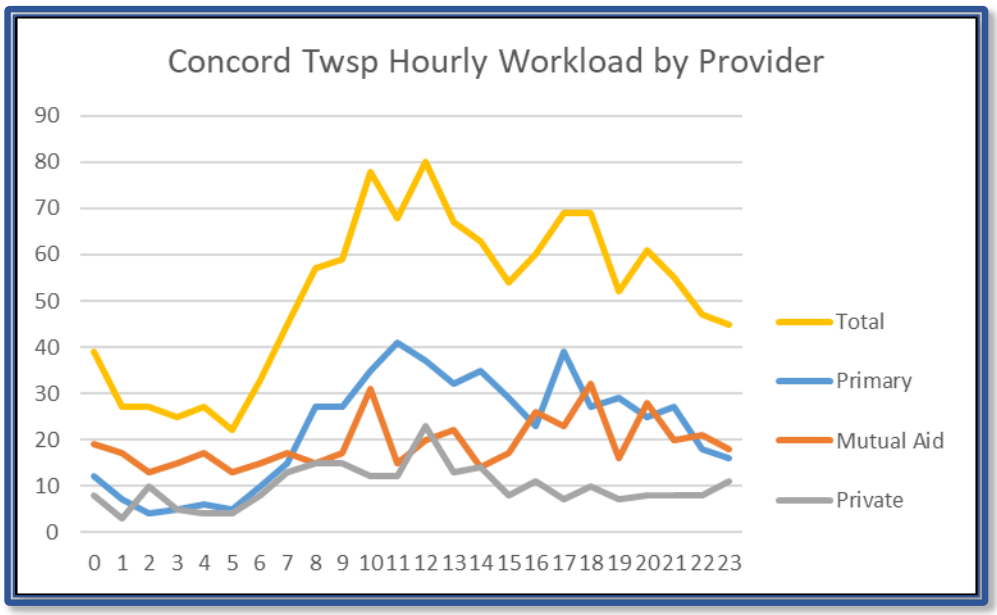


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 6AM and increases until noon, tapering in the afternoon until the early evening hours. Mutual aid volume is consistently higher than the primary provider volume during the earliest morning hours.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

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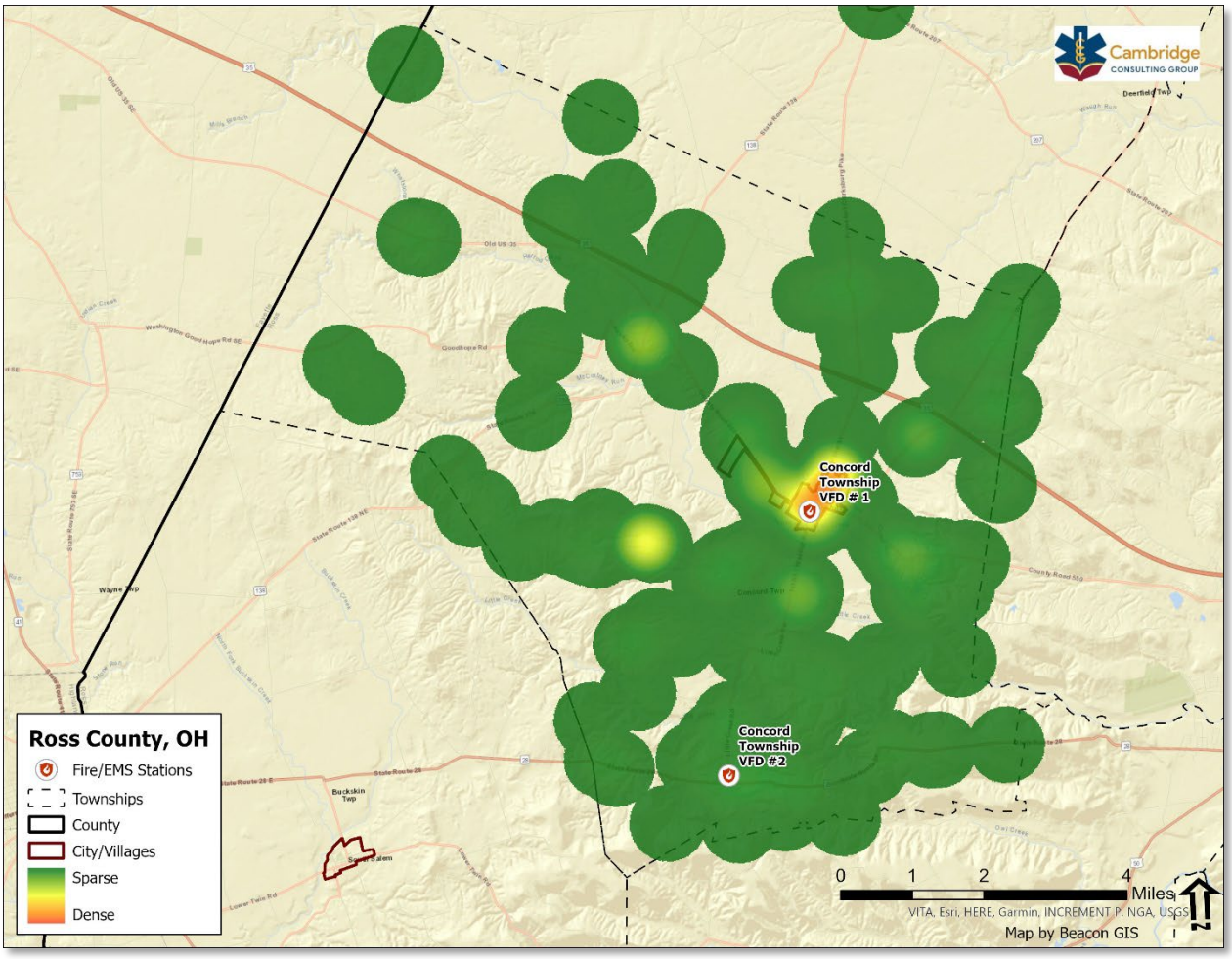
Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:12:32	0:24:45	No Data
80th Percentile	0:17:21	0:33:08	No Data

The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are within the Village of Frankfort near the main fire station. Union Township is to the east.

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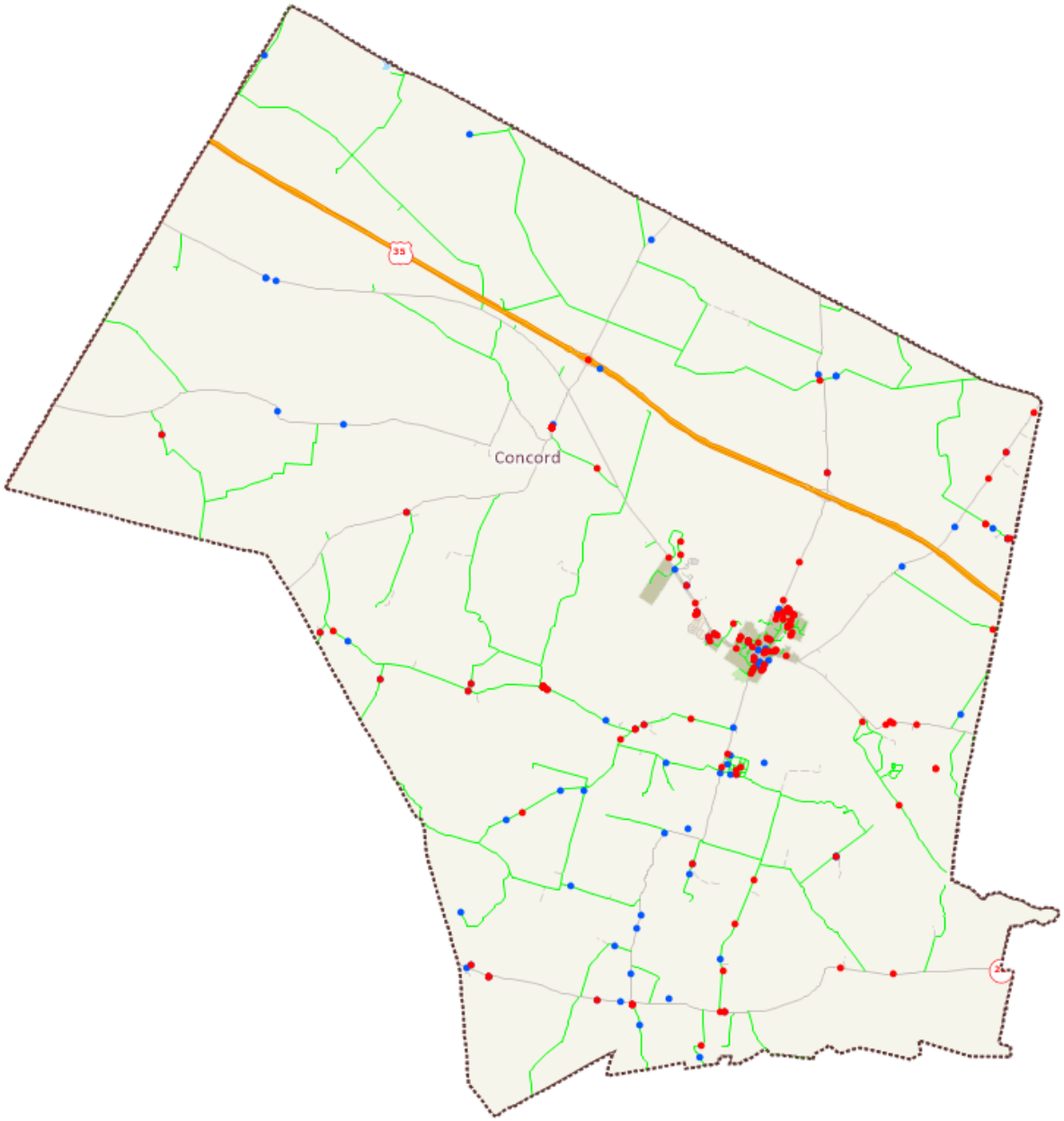
Agency: Primary (Blue) Mutual Aid (Red)



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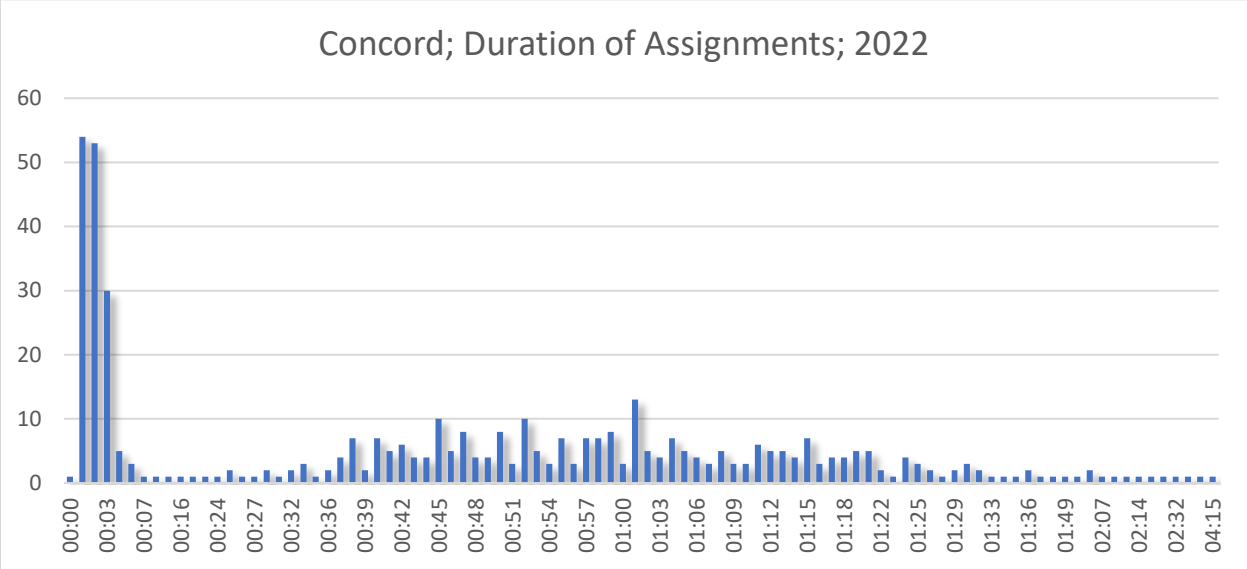
Concord experienced 17 times when a second call was received during a first assignment and twice when a third case was dispatched during the first two.

Concord demonstrated a typical pattern of assignment duration. There were a significant number of cases that were very short in duration. These were most likely calls that were cancelled for some reason. The bulk of their calls lasted between half an hour and an hour and a half.



Lastly, Concord saw no EMS activity on 121 days (33%) of the 2022 year.

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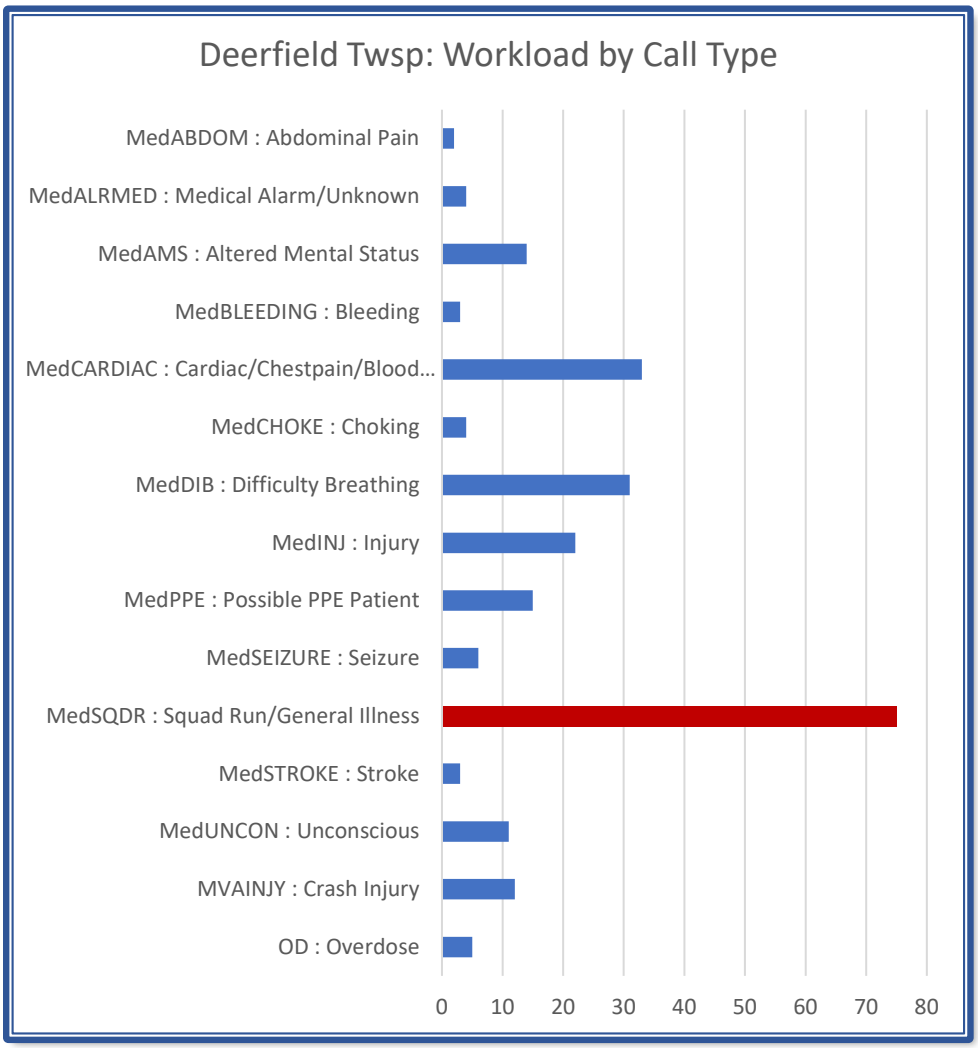
DEERFIELD

The Deerfield Fire Department has one fire station in the township and has been the primary response of emergency medical incidents in the Township. The workload in the township over the three years of data includes 240 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 31% of the volume.



For the three-year data period, 55% of the incidents were handled by either mutual aid (Majority Union Twp.) or private providers. The following chart shows the workload level by full year and by provider in relation to the total. Note that the total volume has been stable, averaging 80 calls per year. It appears that primary provider response has decreased while mutual aid response has increased over the data period.

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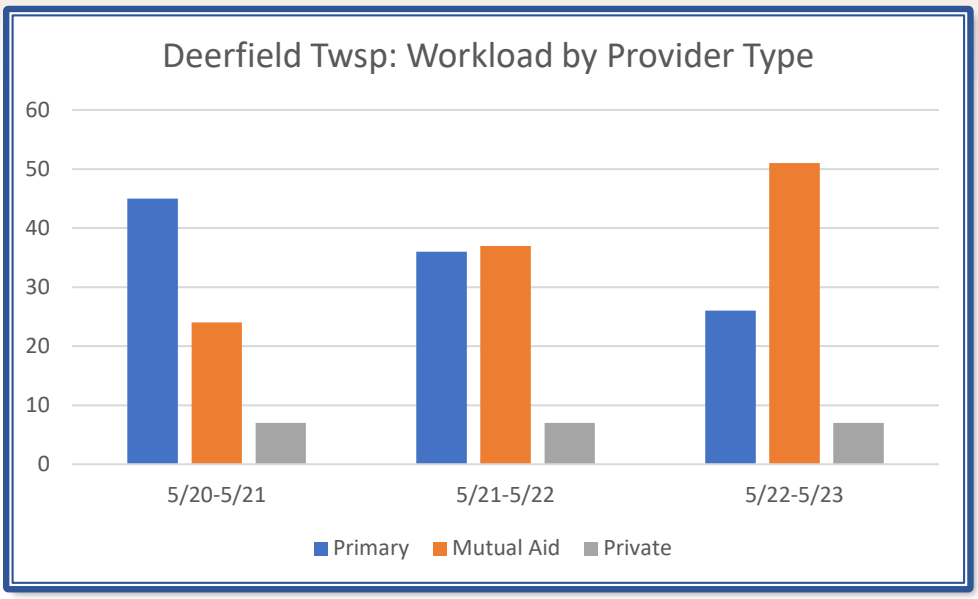
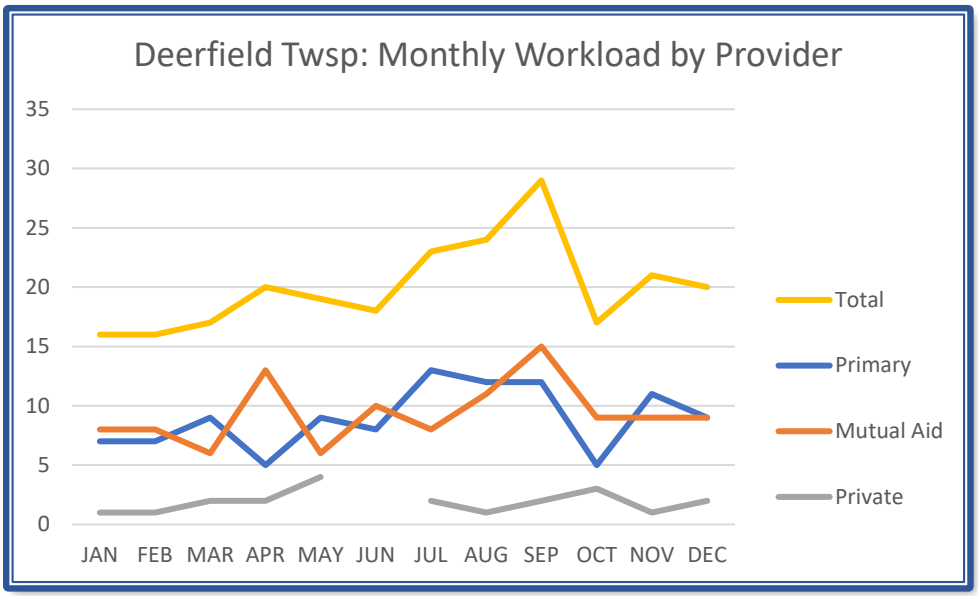


When the data is examined on a monthly basis, The summer months have higher volumes than the rest of the year. Mutual aid assistance exceeded primary responses in several months.



On a daily trend basis, the end of the week is busier. Mutual aid responses exceed the number of primary responses during weekdays.

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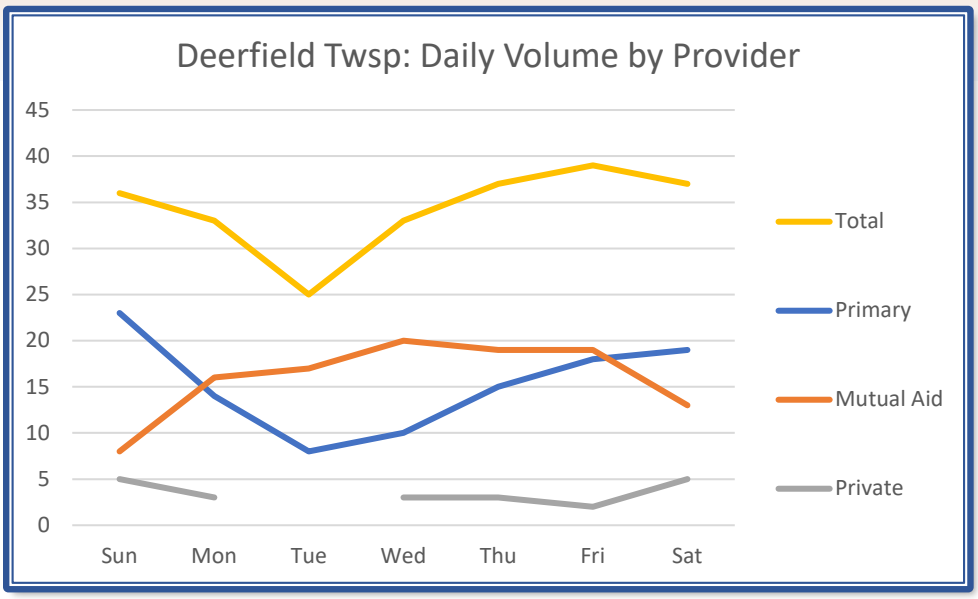
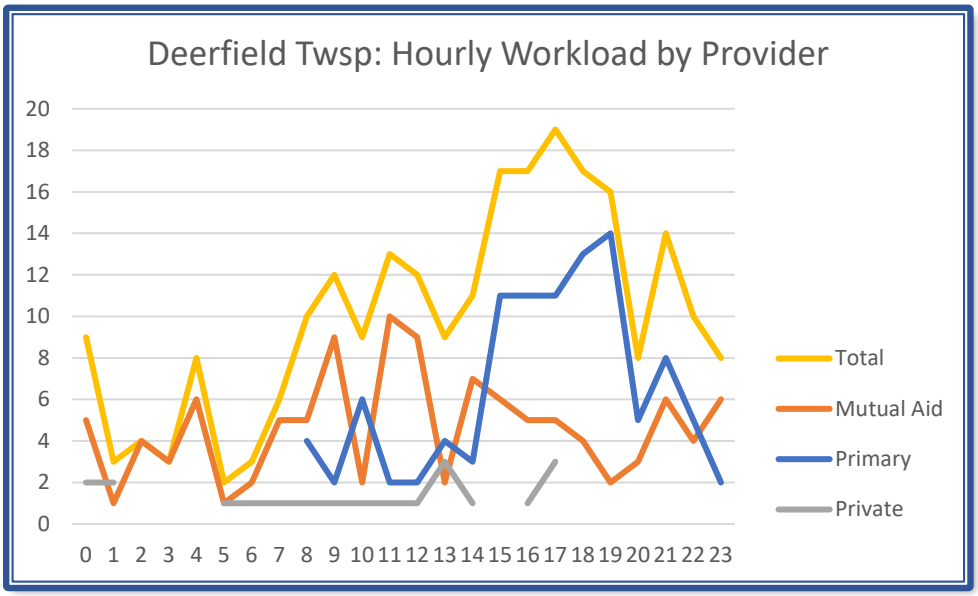


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 6AM and increases until the late afternoon, tapering in early evening hours. Mutual aid volume consistently is higher than the primary provider volume during the morning hours.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

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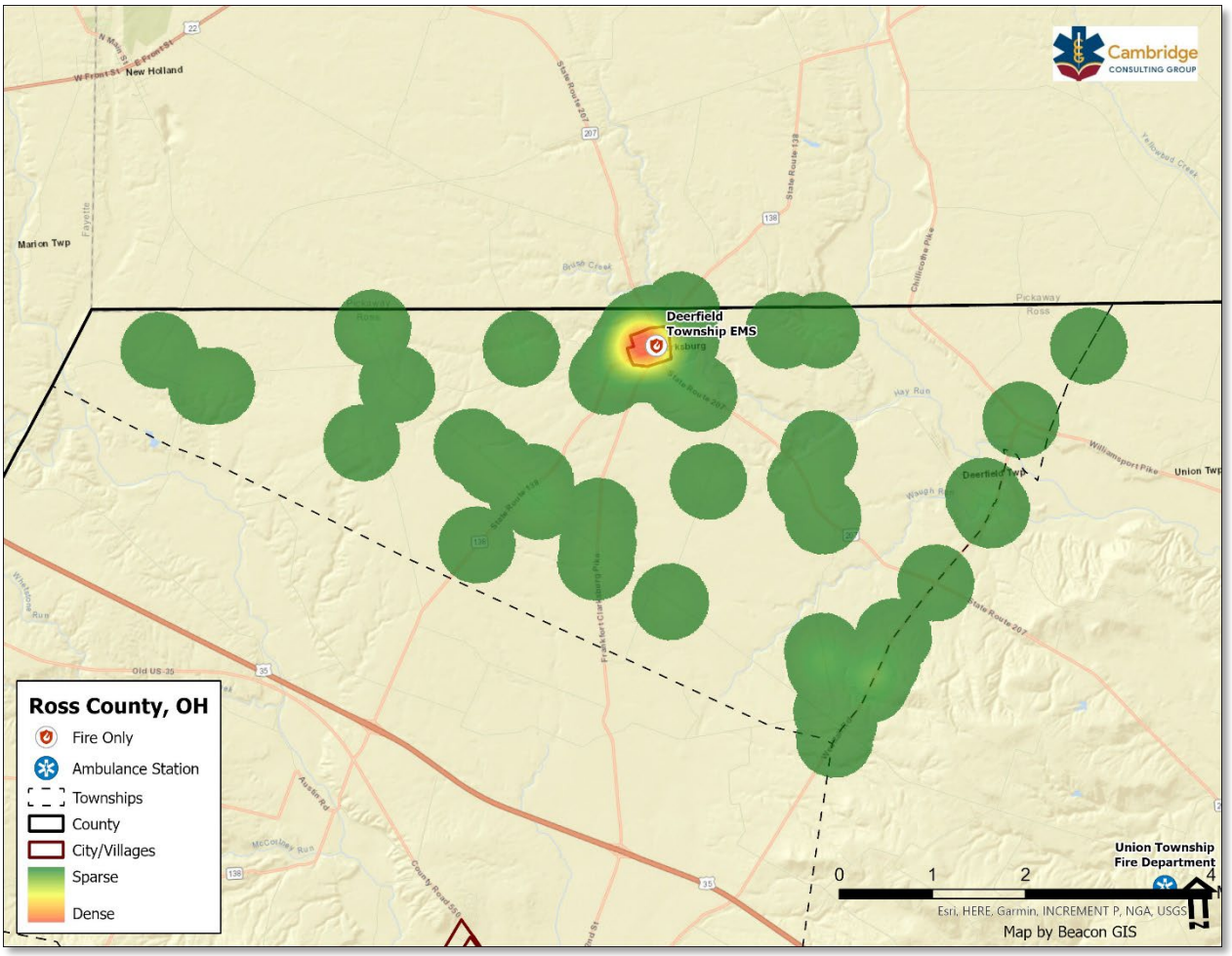
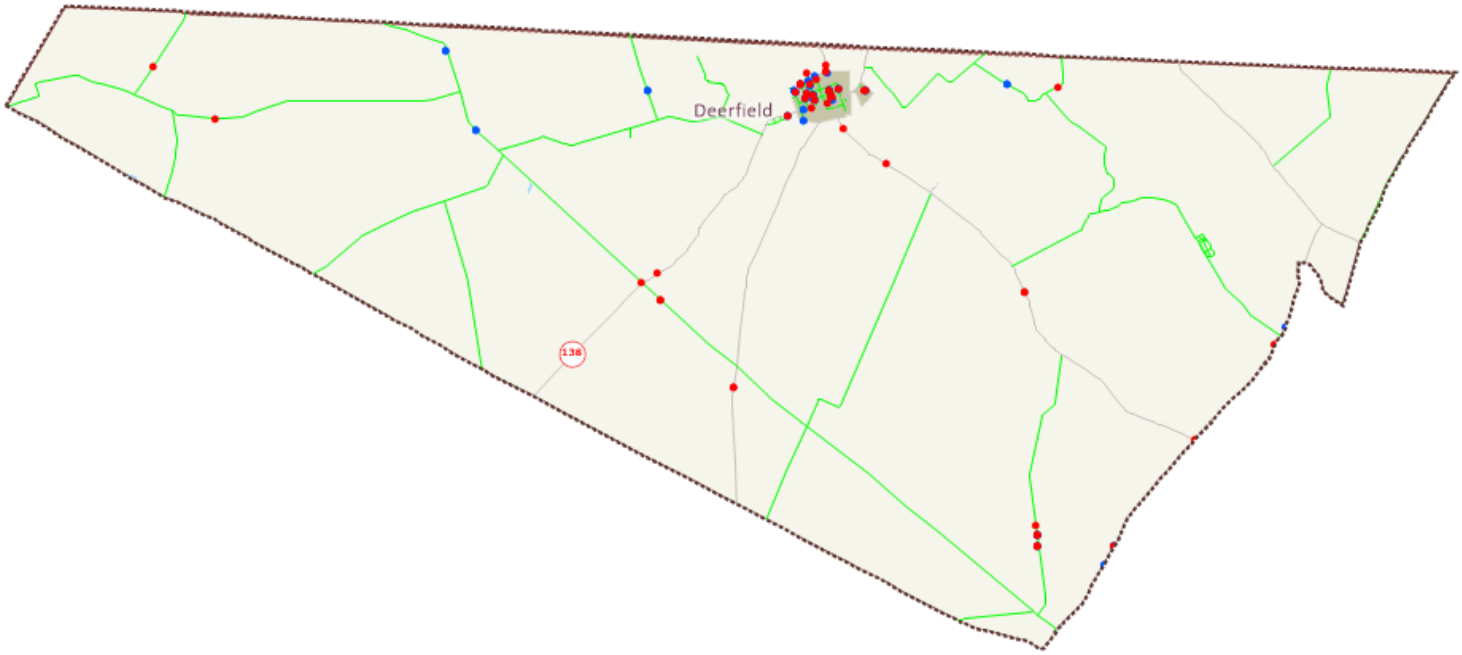
Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:14:58	0:25:20	No Data
80th Percentile	0:17:32	0:31:33	No Data

The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are within the Village of Clarksburg near the main fire station. Union Township is to the east.

Agency: Primary (Blue) Mutual Aid (Red)



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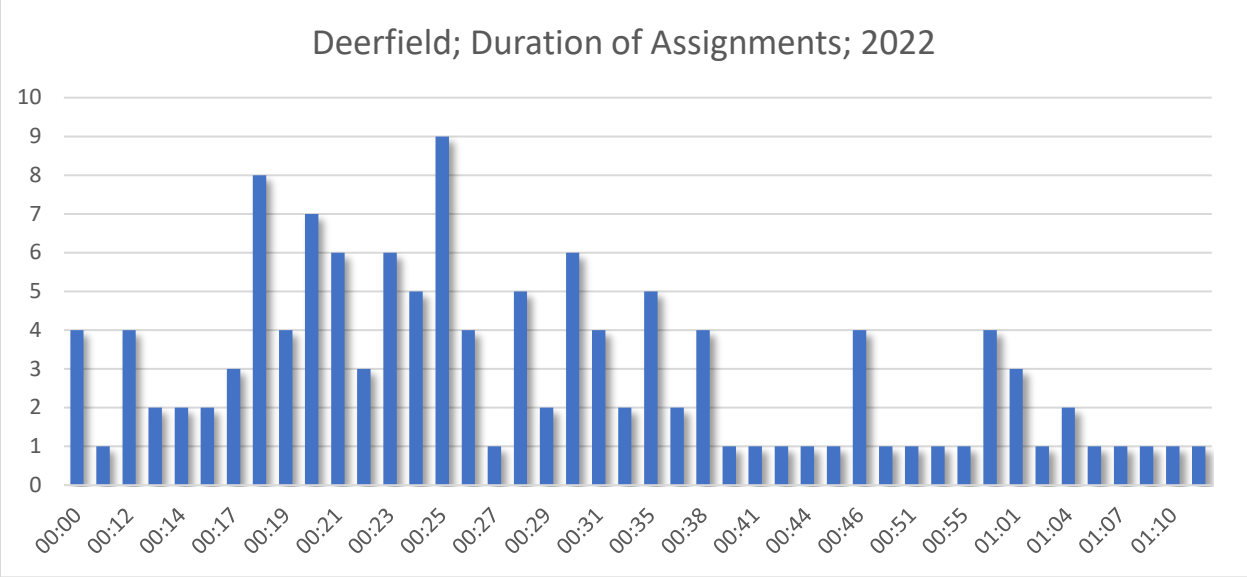
Deerfield, in 2022, had no calls that were concurrent.

The duration of Deerfield's EMS cases dis[played a typical pattern, with most incidents taking between 15 and 45 minutes.



Lastly, Deerfield experienced no EMS activity on 294 days (81%) of the year 2022.

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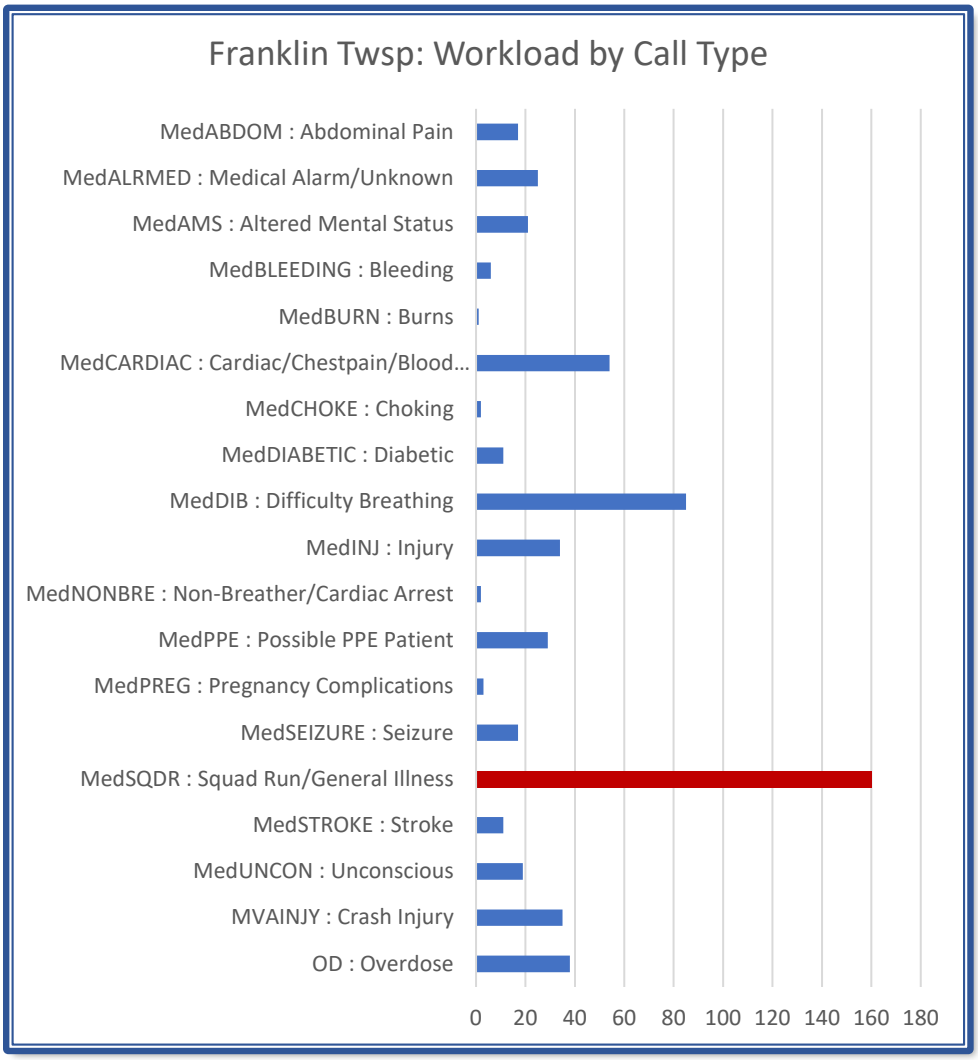
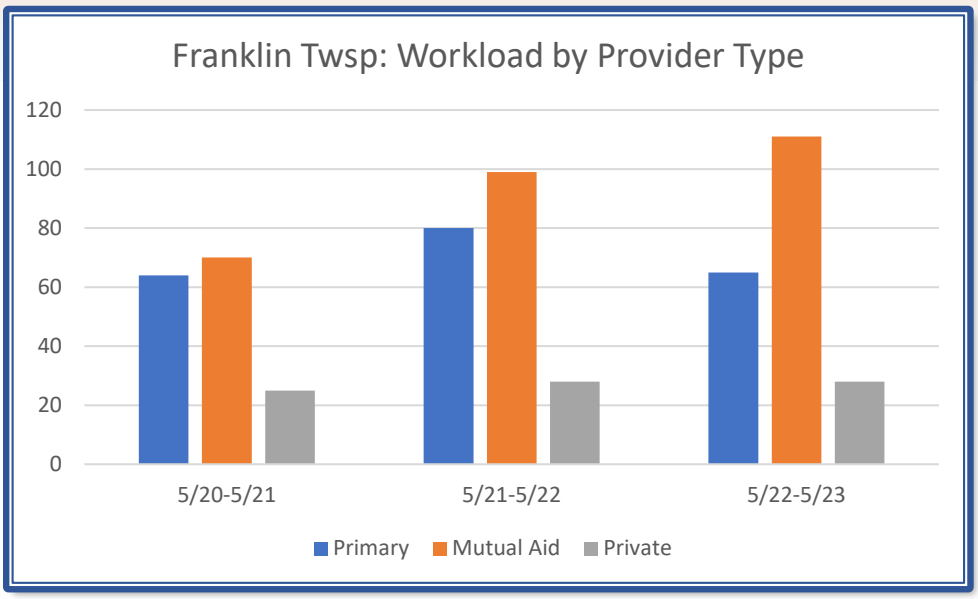
FRANKLIN

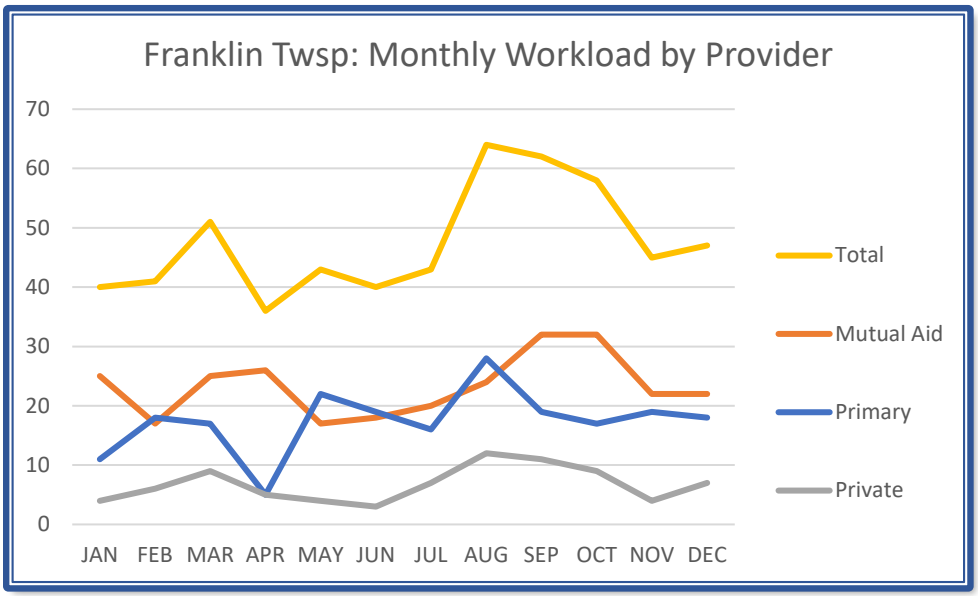
The Franklin Fire Department has one fire station in the township and has been the primary response of emergency medical incidents in the Township. The workload in the township over the three years of data includes over 500 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 28% of the volume.



For the three-year data period, 63% of the incidents were handled by either mutual aid or private providers. The following chart shows the workload level by full year and by provider in relation to the total.



When the data is examined on a monthly basis, the autumn months have higher volumes than the rest of the year. Mutual aid assistance exceeded primary responses in several months.



On a daily trend basis, Thursdays are the busiest day of the week. Mutual aid responses exceed the number of primary responses during weekdays and Saturdays.

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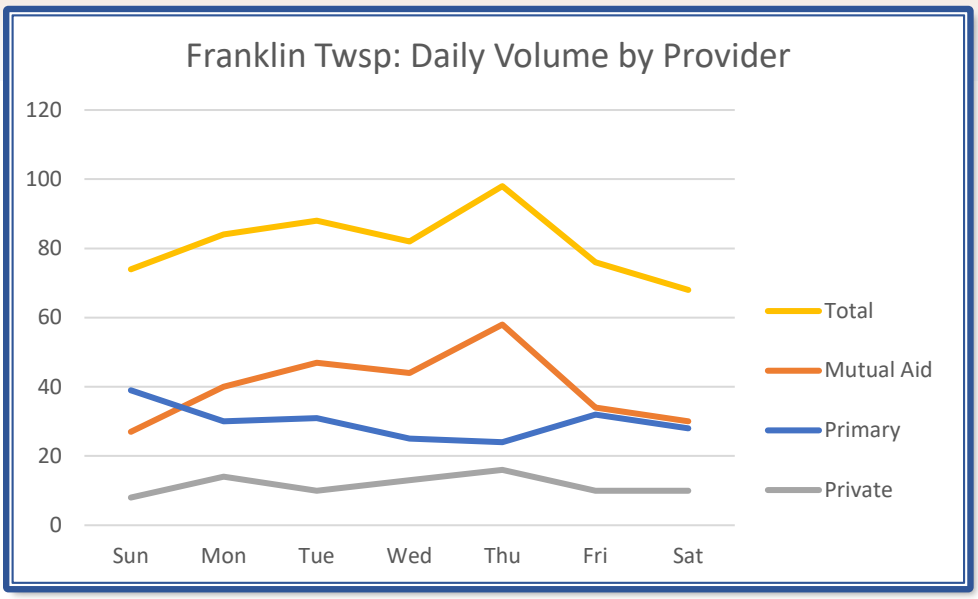
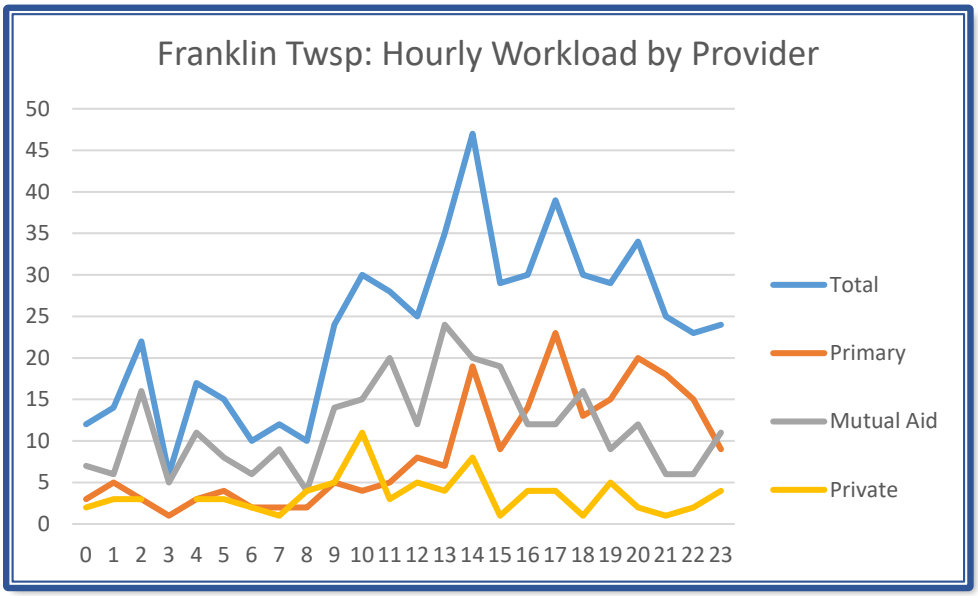


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 8AM and increases until the late afternoon, tapering in early evening hours. Mutual aid volume consistently is higher than the primary provider volume except in the late afternoon and evening hours.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

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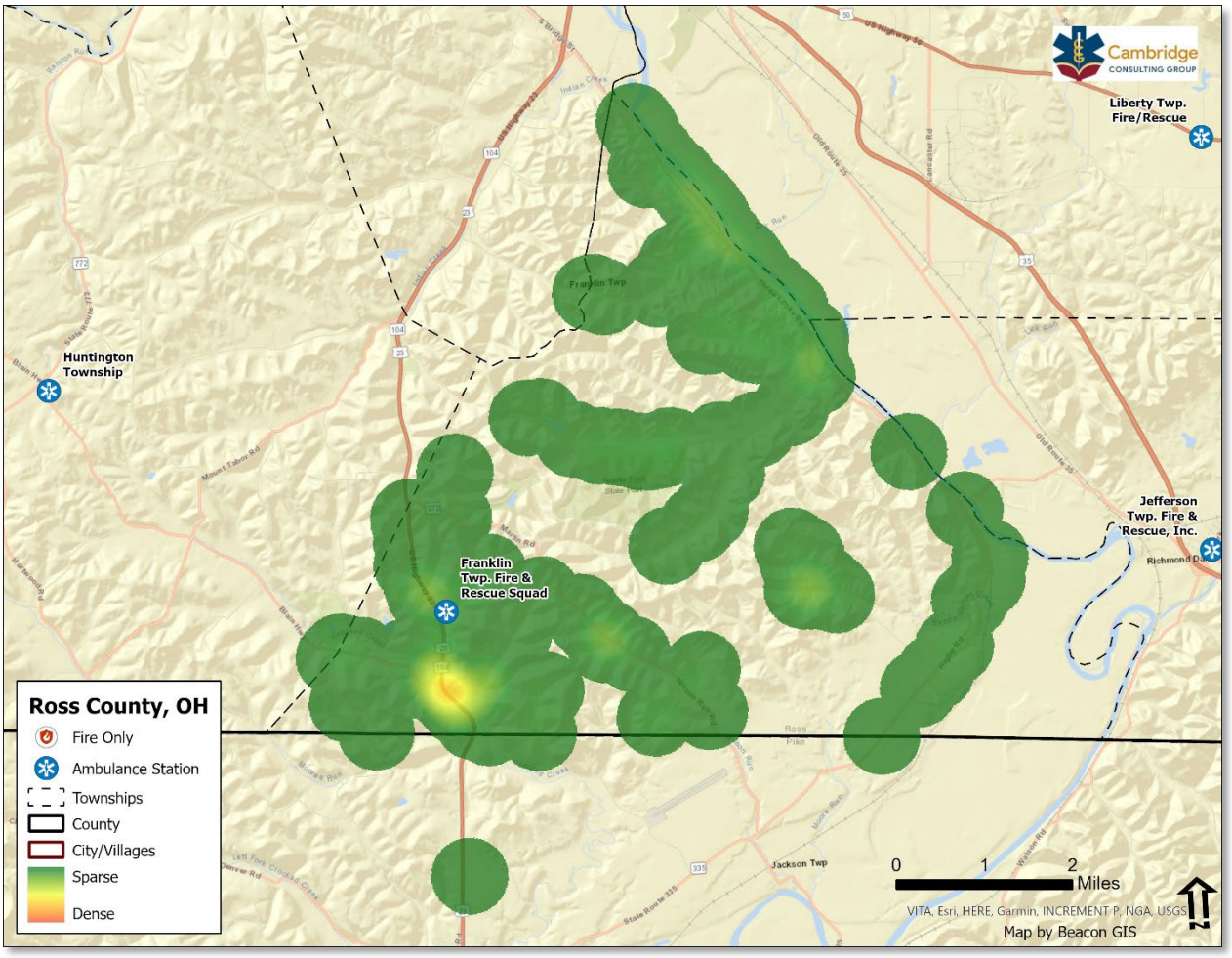
Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:22:48	0:22:18	No Data
80th Percentile	0:30:22	0:30:13	No Data

The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are south of the fire station and along major roadways.

Agency: Primary (Blue) Mutual Aid (Red)

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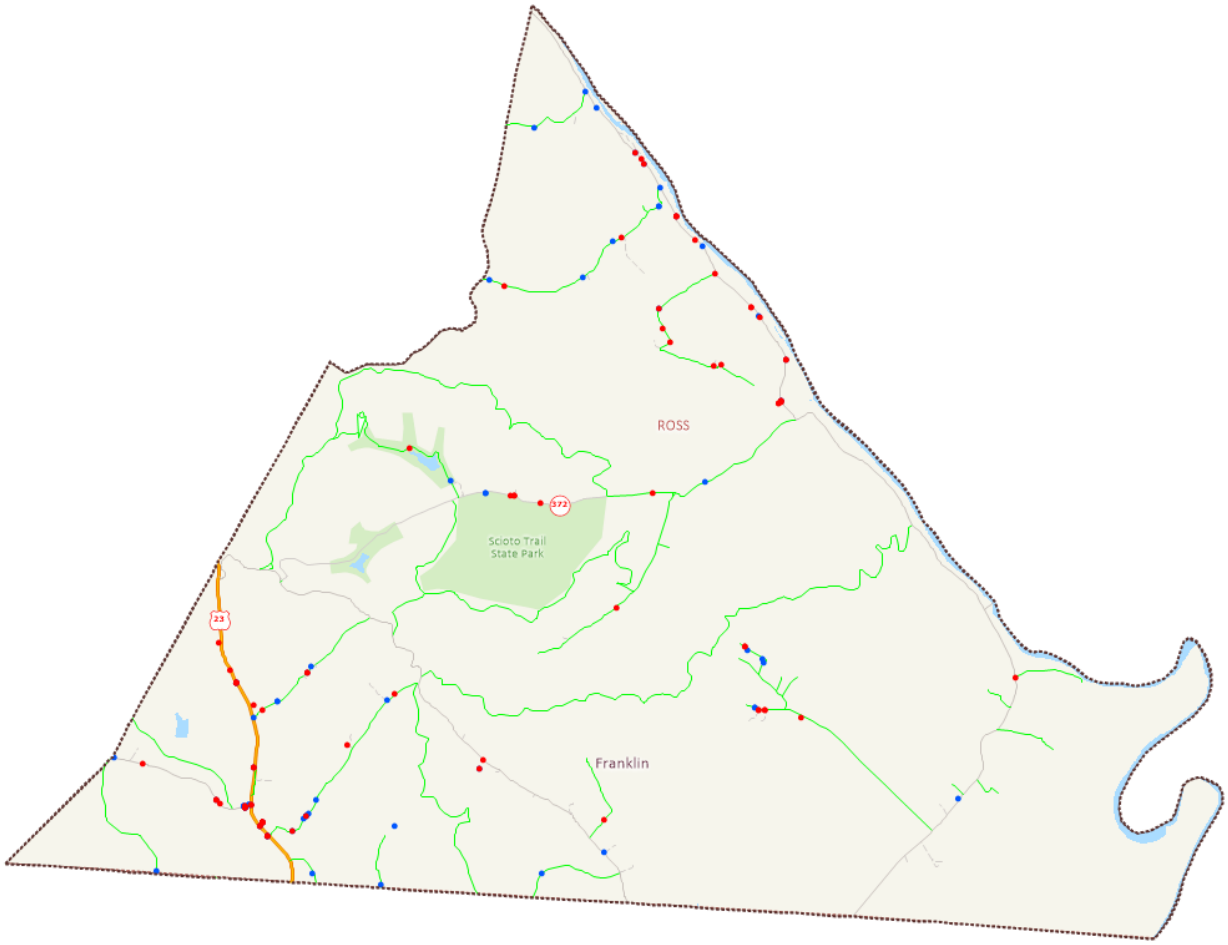

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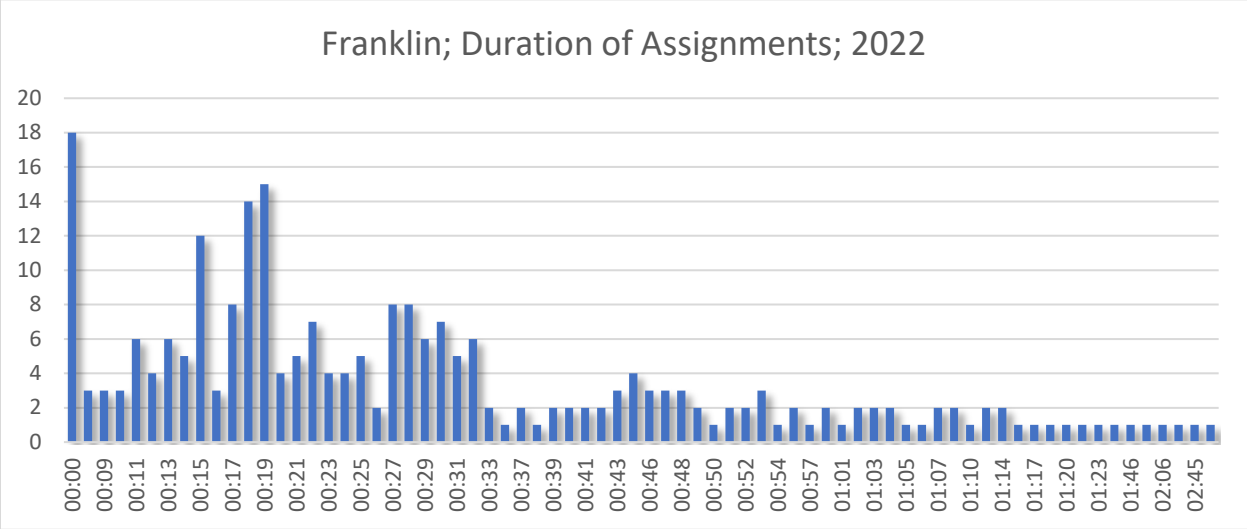
Franklin had only one call that occurred concurrently with another assignment in 2022.

Franklin showed a pattern of call duration that is not uncommon. An initial large volume of cases with very short duration, mostly likely attributable to cancelled assignments. Then the bulk of active calls lasting from 10 minutes to half an hour.



Franklin saw no EMS activity on 233 days (64%) of 2022.

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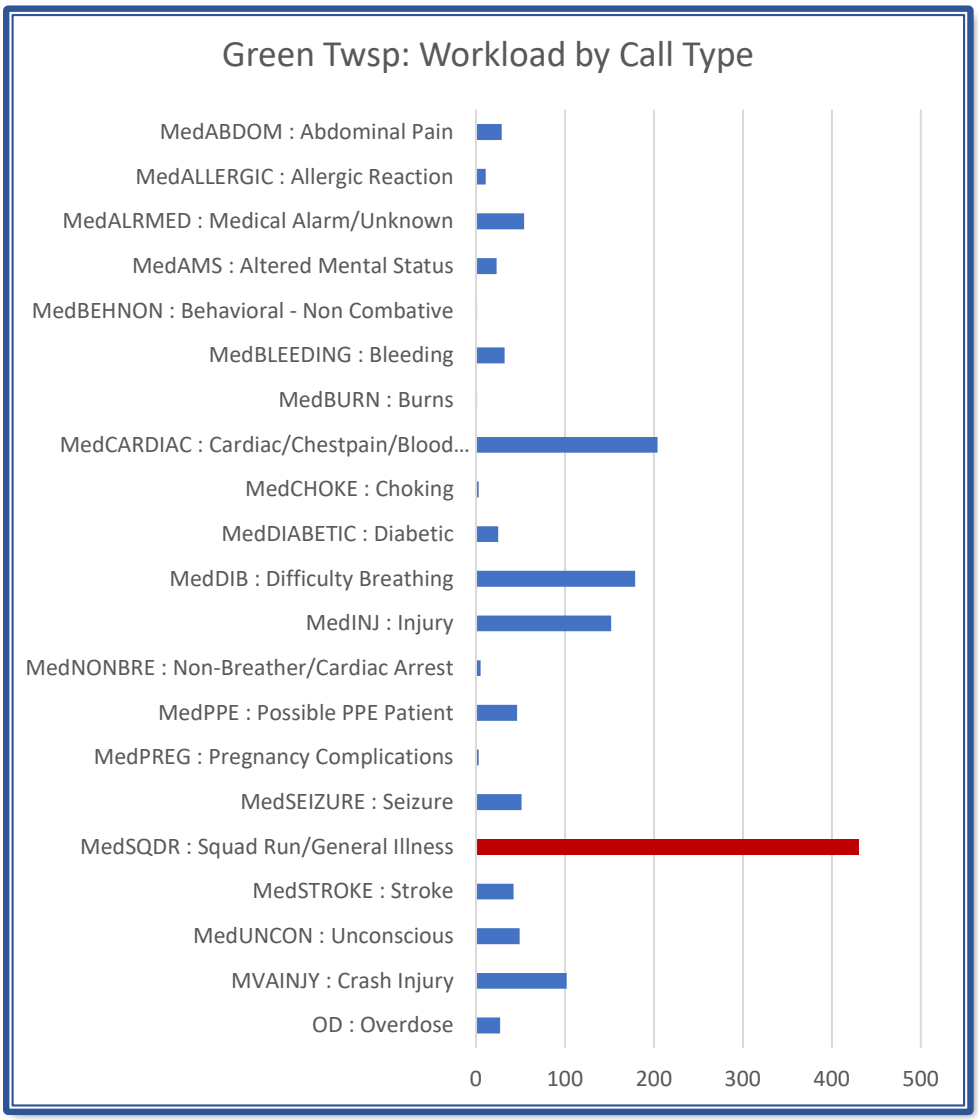
GREEN

The Green Fire Department has two fire stations in the township and has been the primary response of emergency medical incidents in the Township. The workload in the township over the three years of data includes 240 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 29% of the volume.



For the three-year data period, 95% of the incidents were handled by the Green Twp. Fire Department. The following chart shows the workload level by full year and by provider in relation to the total. Note that the total volume has been stable, averaging 500 calls per year. It appears that primary provider response has increased while mutual aid response has decreased over the data period.

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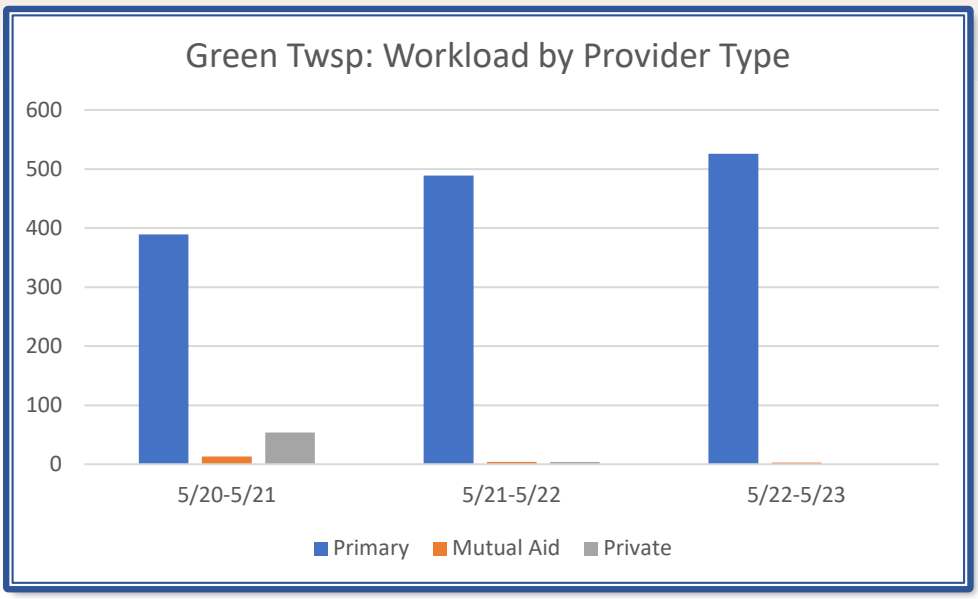
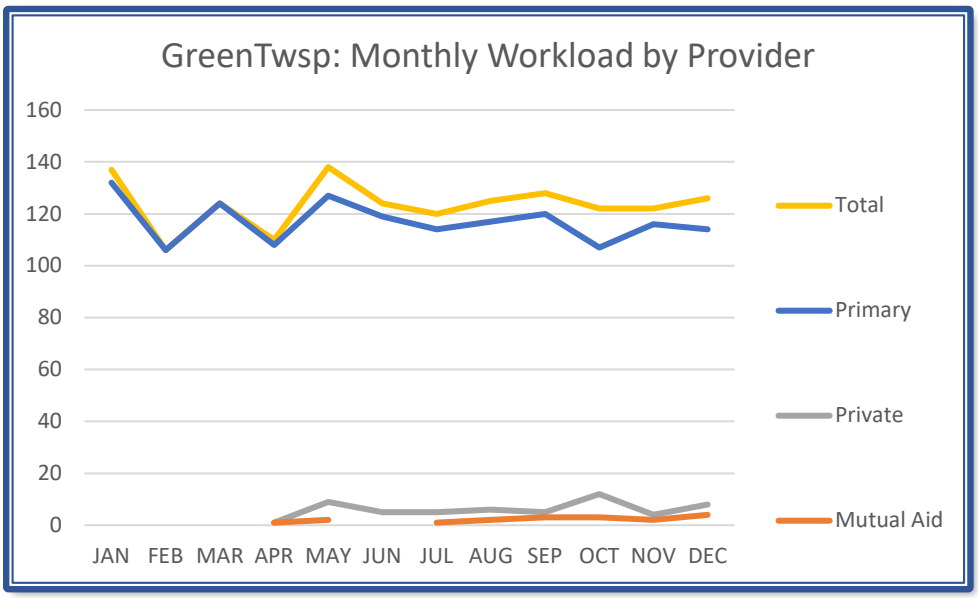


When the data is examined on a monthly basis, The volumes are generally stable. Mutual aid assistance and private service use is low and speaks to the reliability of the primary provider's ability to respond.



On a daily trend basis, the weekdays are busier than the weekend.

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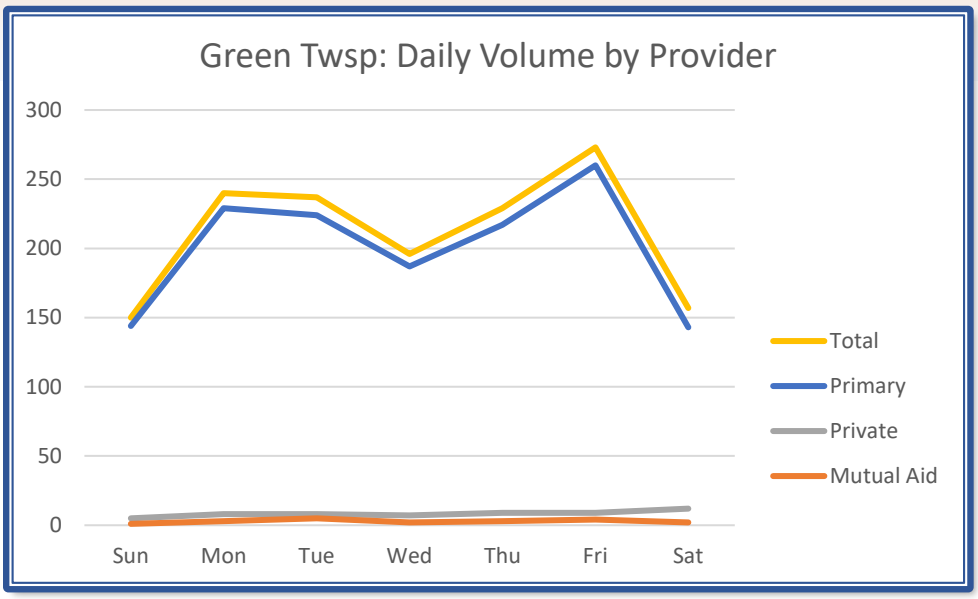
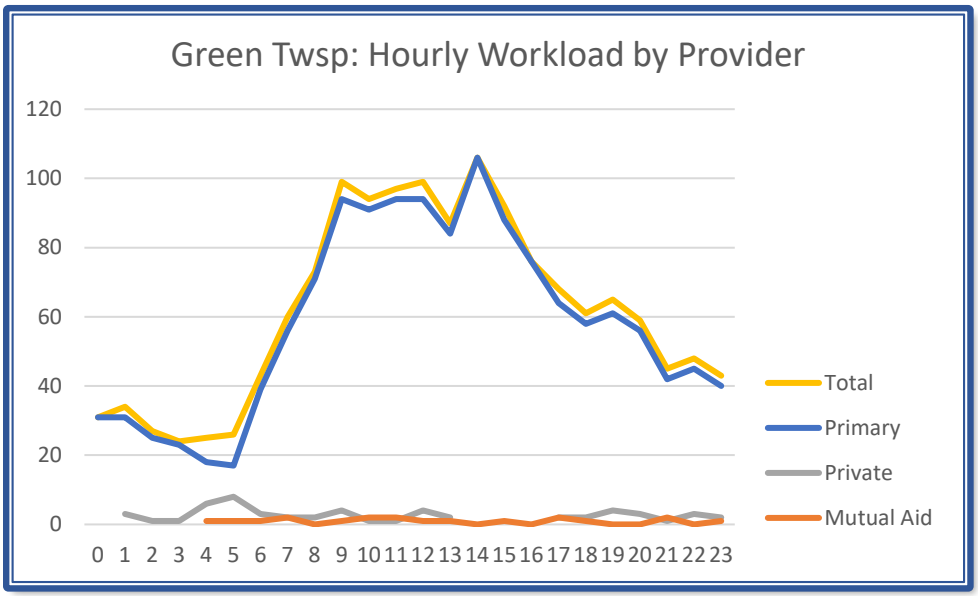


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 6AM and increases until the early afternoon, tapering off afterwards.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:09:41	0:22:38	No Data
80th Percentile	0:11:53	0:34:44	No Data

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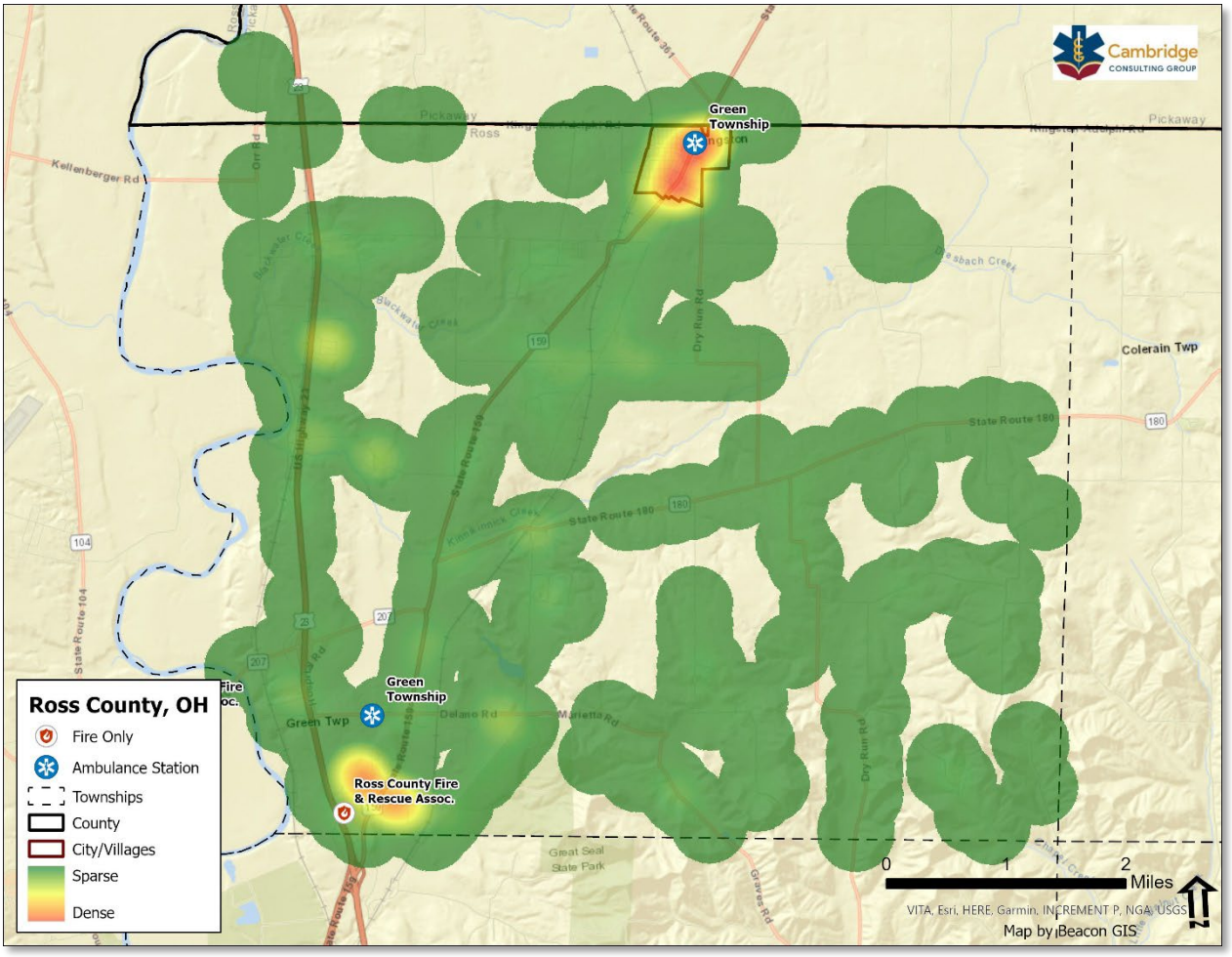
The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are within the Village of Kingston near a fire station in the north and near the hospital in the south. Union Township is to the west.

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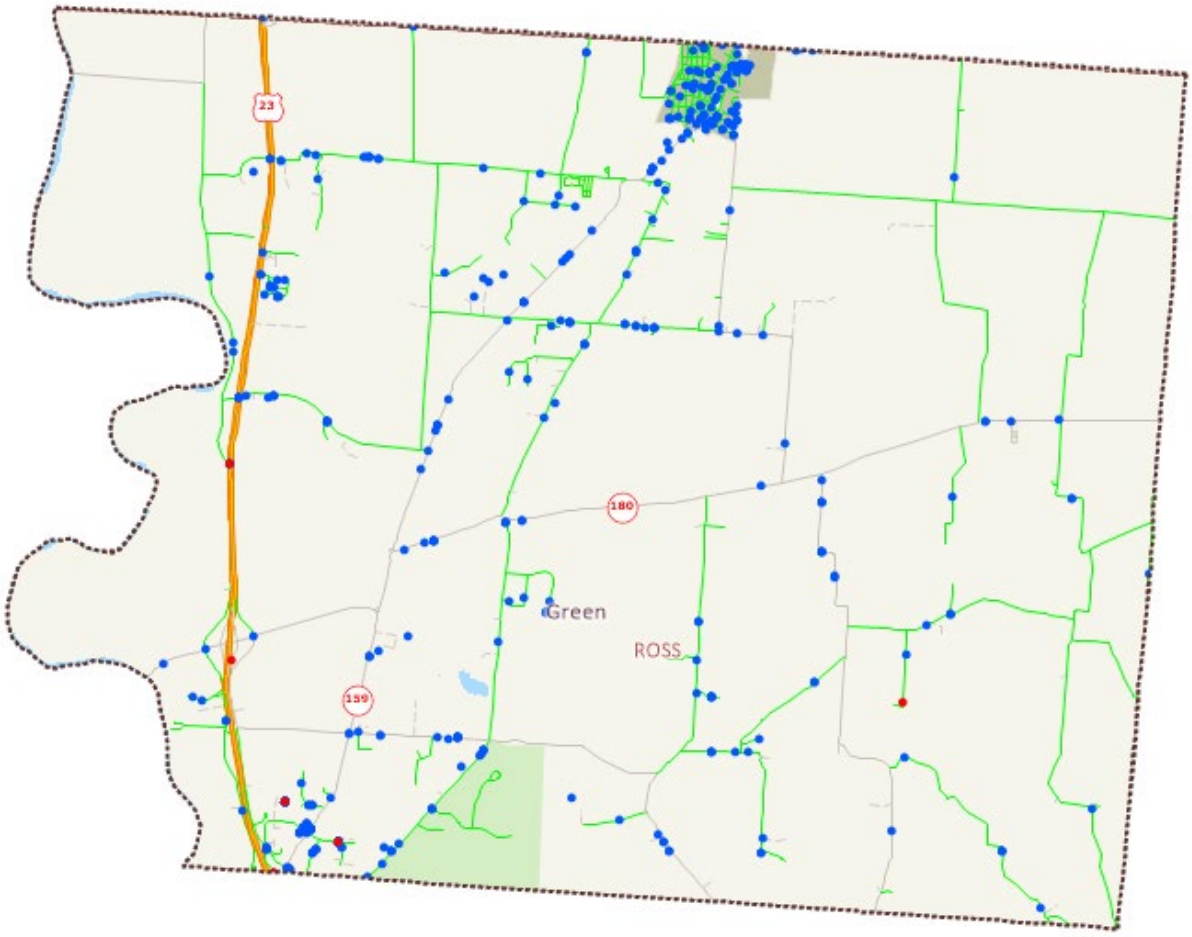
Agency: Primary (Blue) Mutual Aid (Red)



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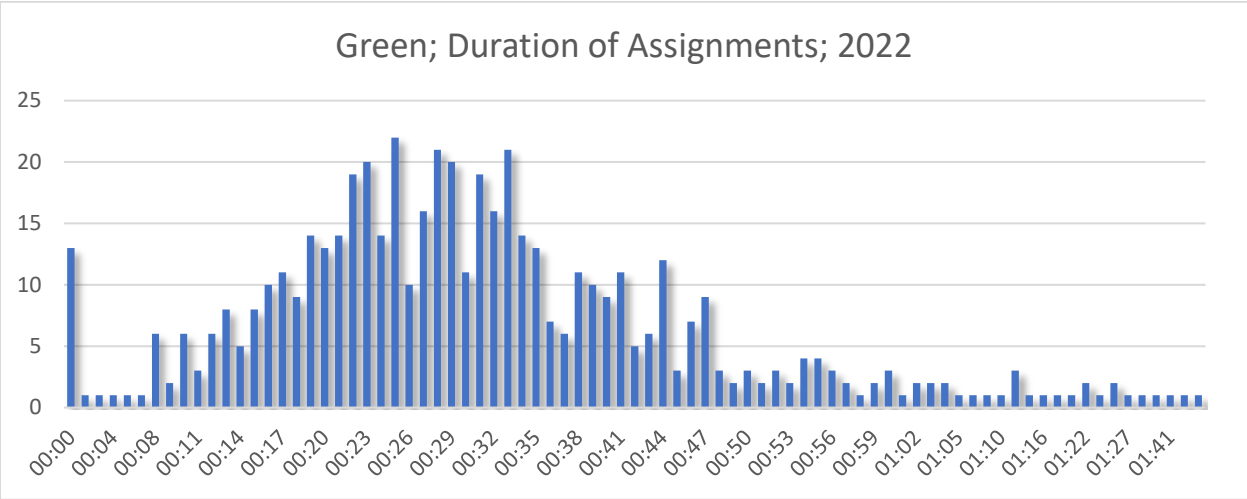
According to the data provided, Green Township experienced no concurrent calls in 2022.

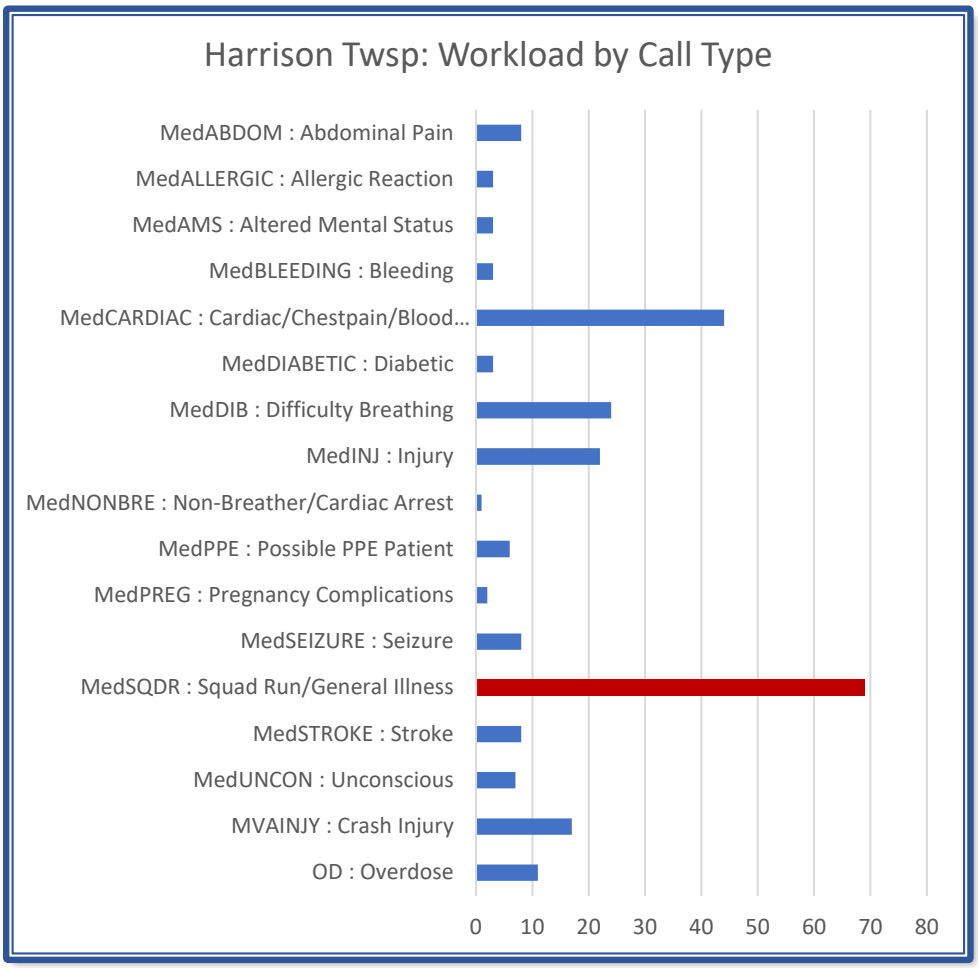
Green displayed a typical pattern of call duration.



Green saw no EMS calls on 93 days (25%) of the year 2022.

HARRISON

The Harrison Fire Department has one fire station in the township and has been the primary response of emergency medical incidents in the Township. The workload in the township over the three years of data includes 247 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 29% of the volume.



For the three-year data period, 93% of the incidents were handled by the Harrison Twp. Fire Department. The following chart shows the workload level by full year and by provider in relation to the total.

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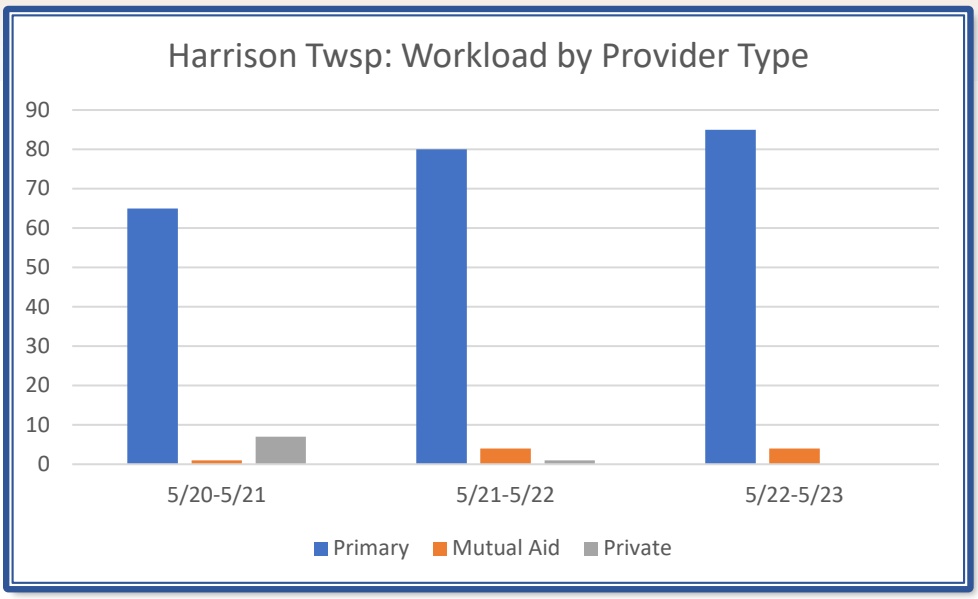
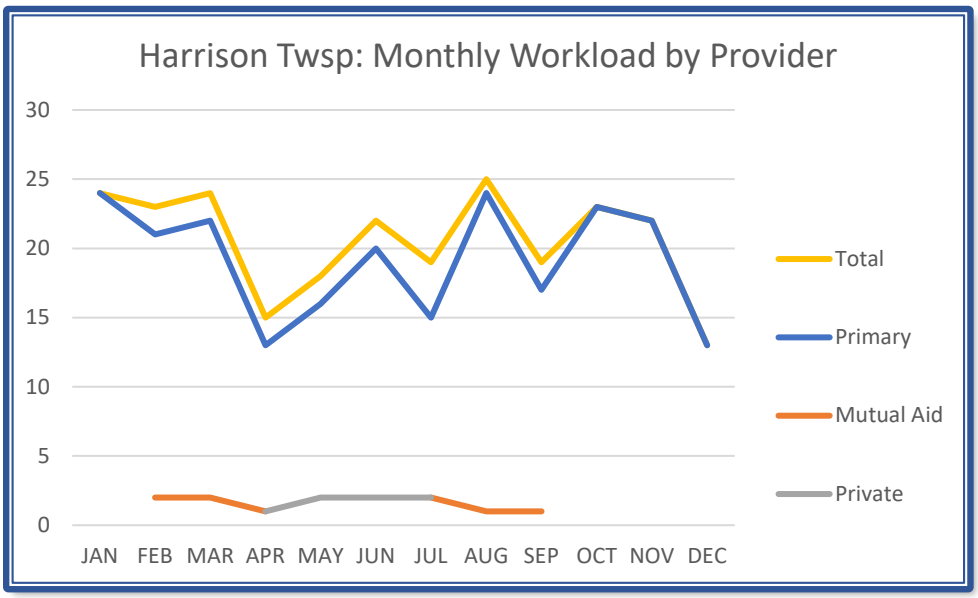


When the data is examined on a monthly basis, The volumes vary. Mutual aid assistance and private service use is low and speaks to the reliability of the primary provider's ability to respond.



On a daily trend basis, the weekends are busier than the weekdays.

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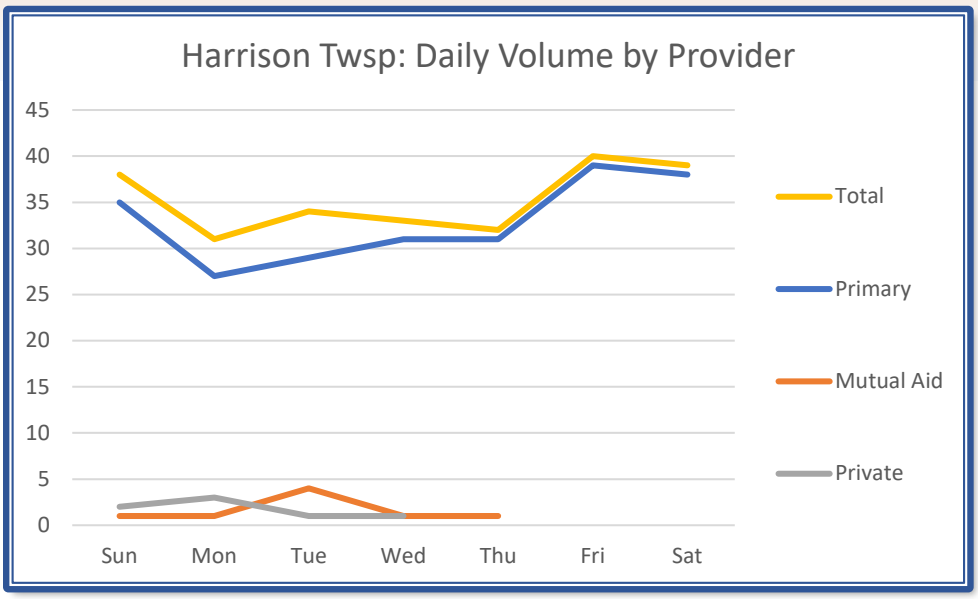
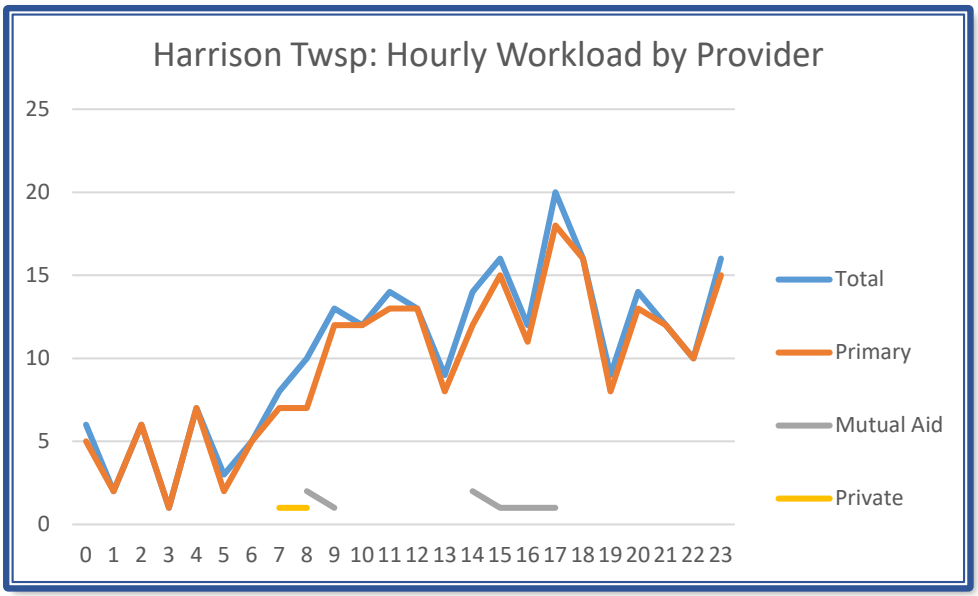


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 6AM and increases until the early afternoon, tapering off afterwards.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:16:21	0:23:01	No Data
80th Percentile	0:23:16	0:28:49	No Data

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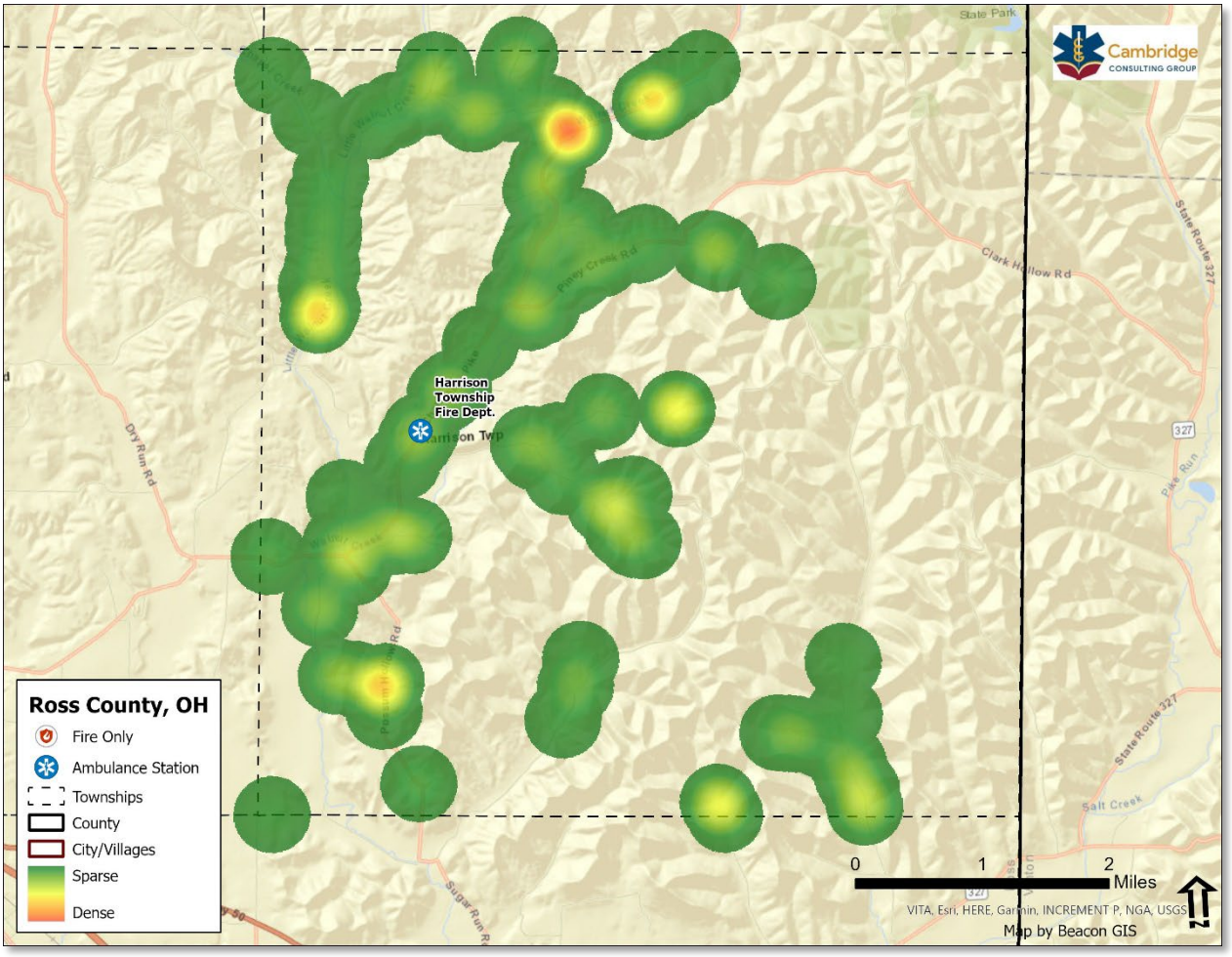
The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are scattered within the Township.

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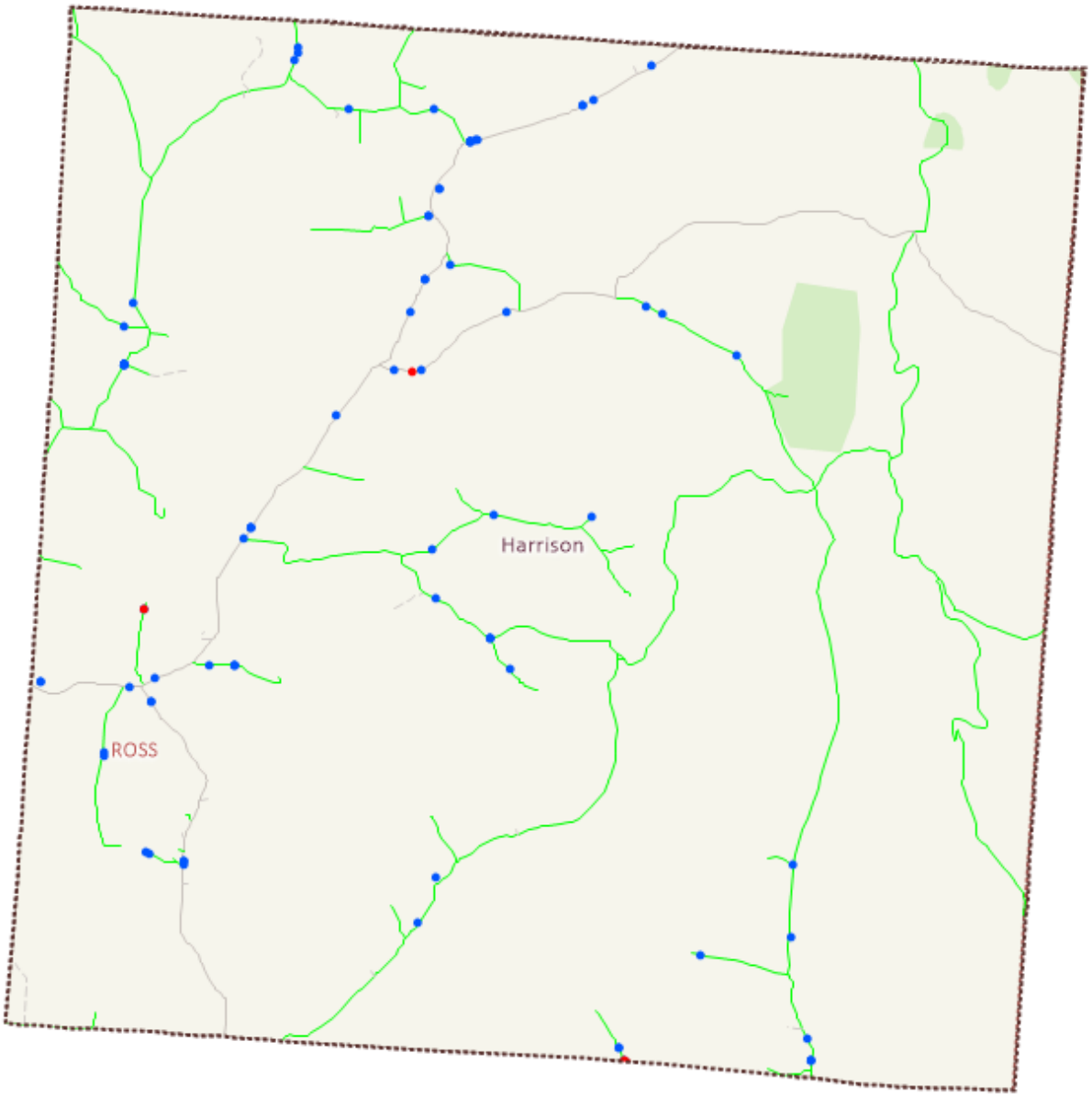
Agency: Primary (Blue) Mutual Aid (Red)



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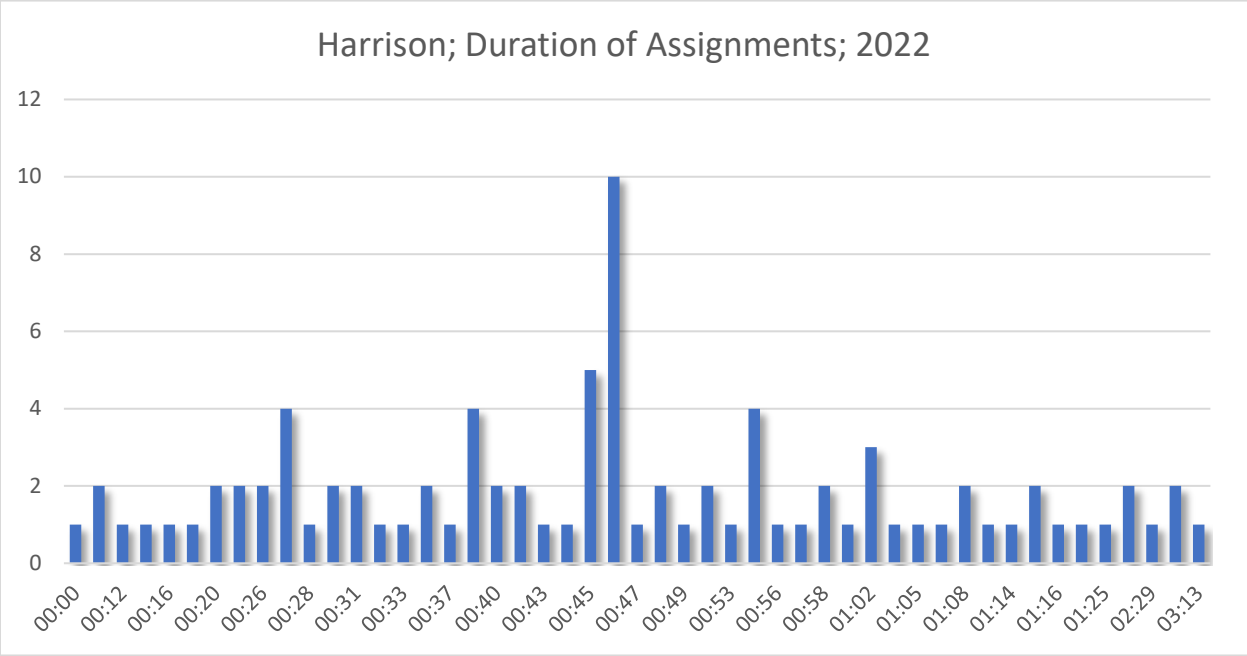
Harrison experienced no concurrent assignments in 2022.

There was no discernable pattern to Harrison's EMS activity duration. This is probably due to the low volume of calls.



Harrison had 292 days (80%) without any EMS activity.

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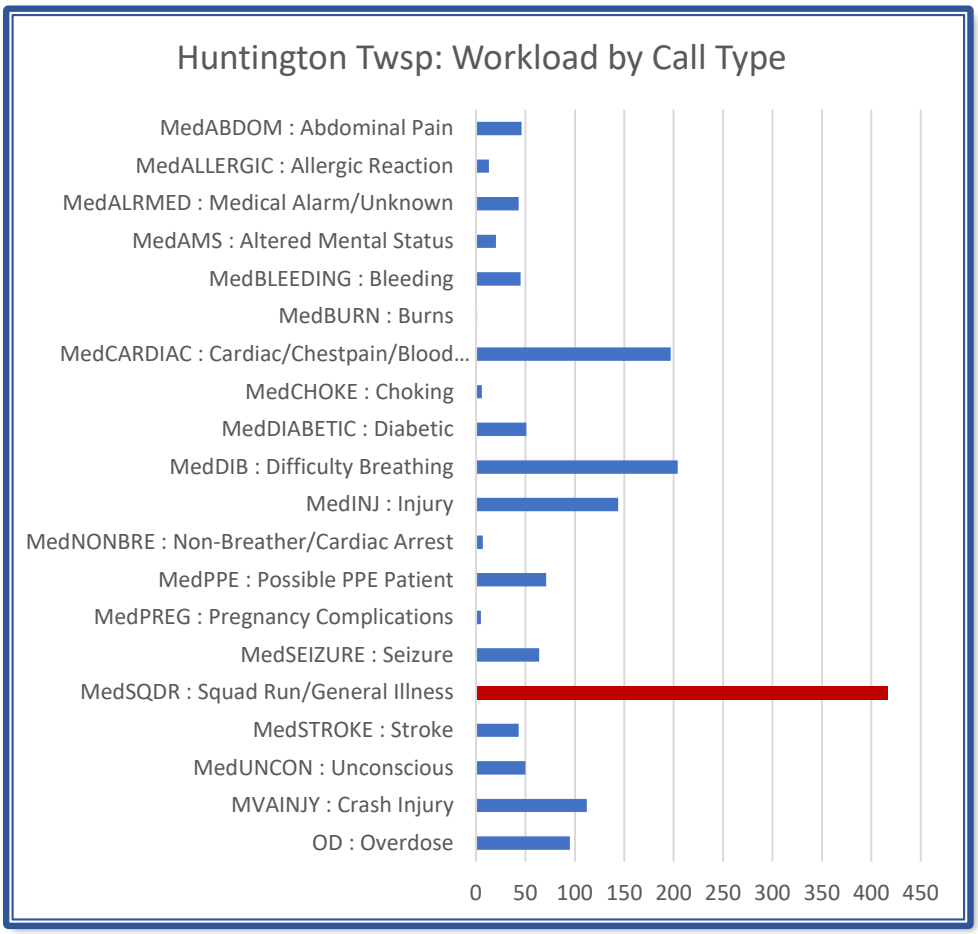
HUNTINGTON

The Huntington Fire Department has a single fire station and has been the primary response of emergency medical incidents in the Township. The workload in the township over the three years of data includes 1633 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 25.5% of the volume.



For the three-year data period, 95% of the incidents were handled by the Huntington Twp. Fire Department. The following chart shows the workload level by full year and by provider in relation to the total. Note that the total volume has been relatively stable, averaging 515 calls per year. It appears that primary provider response has decreased while mutual aid response has increased over the data period.

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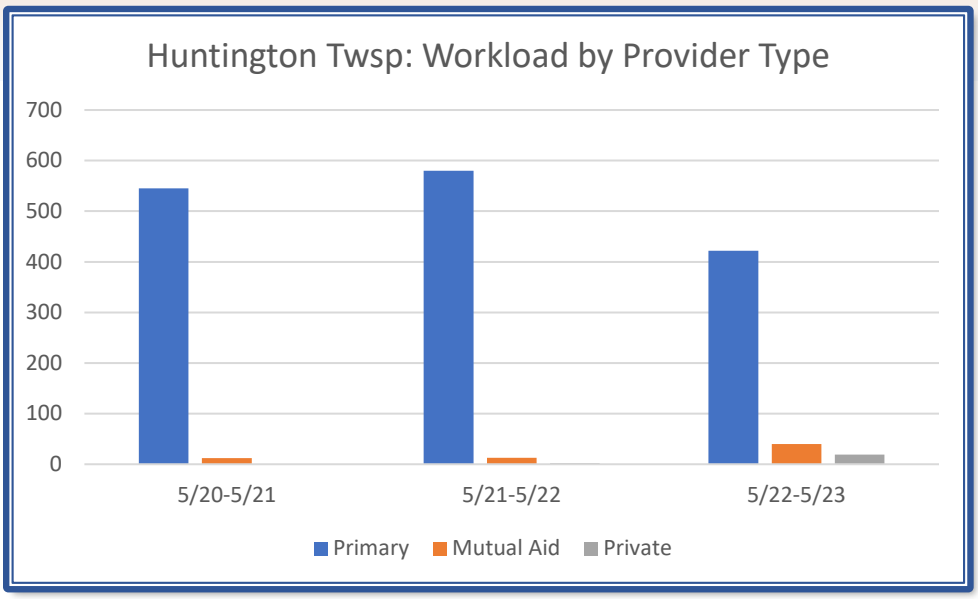
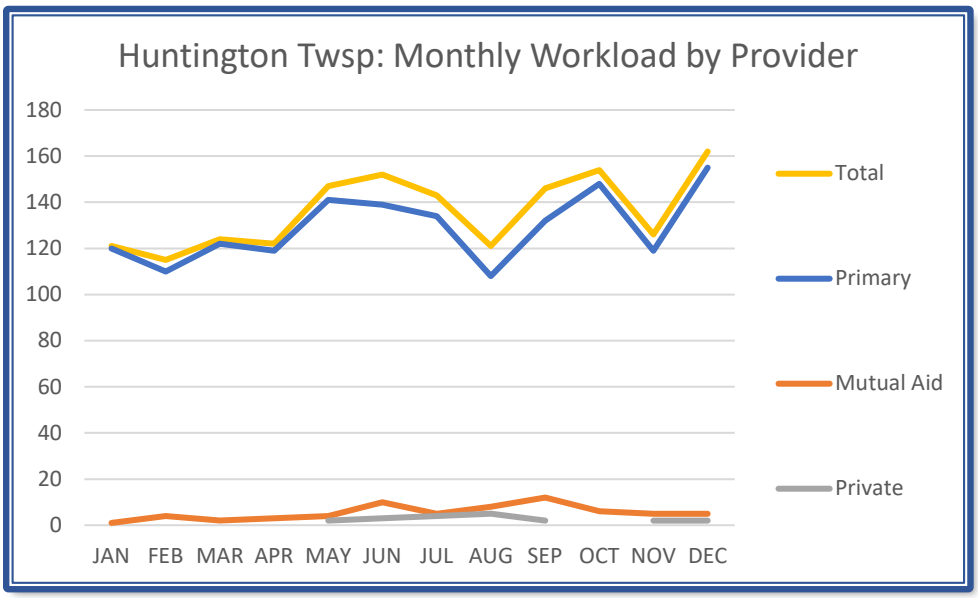


When the data is examined on a monthly basis, The volumes are varied over the year with higher volumes noted in Spring, fall and highest in December. Mutual aid assistance and private service use is low and speaks to the reliability of the primary provider's ability to respond.



On a daily trend basis, Wednesdays are the busiest than the rest of the week. Note mutual aid rises then as well.

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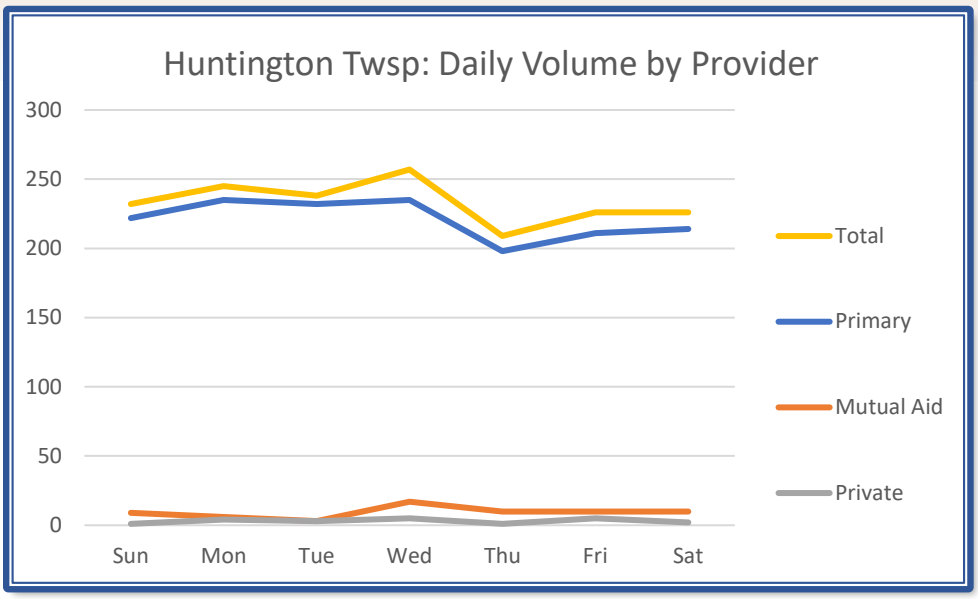
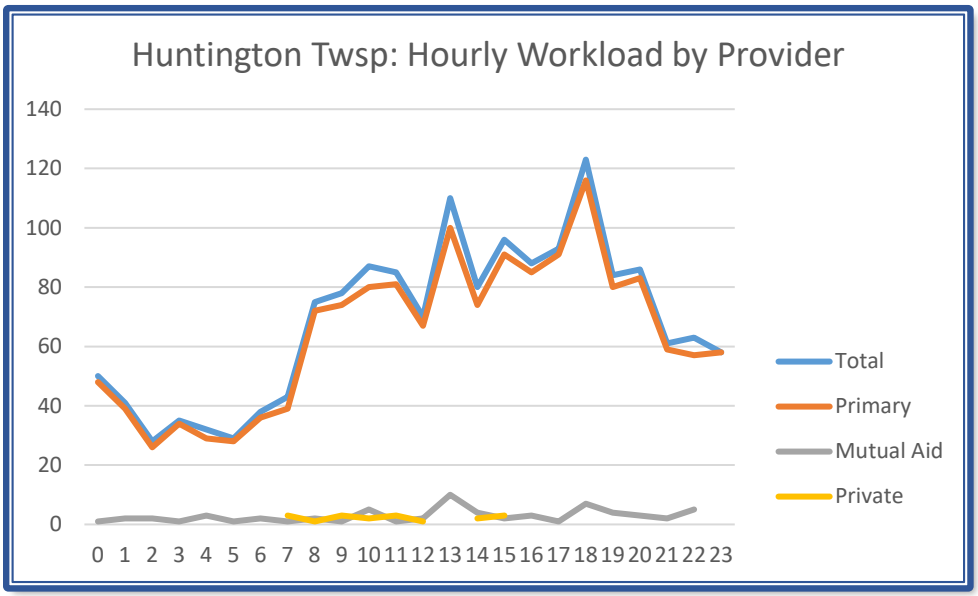


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 7AM and increases until the early evening, tapering off afterwards.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:10:02	0:19:31	No Data
80th Percentile	0:12:07	0:27:54	No Data

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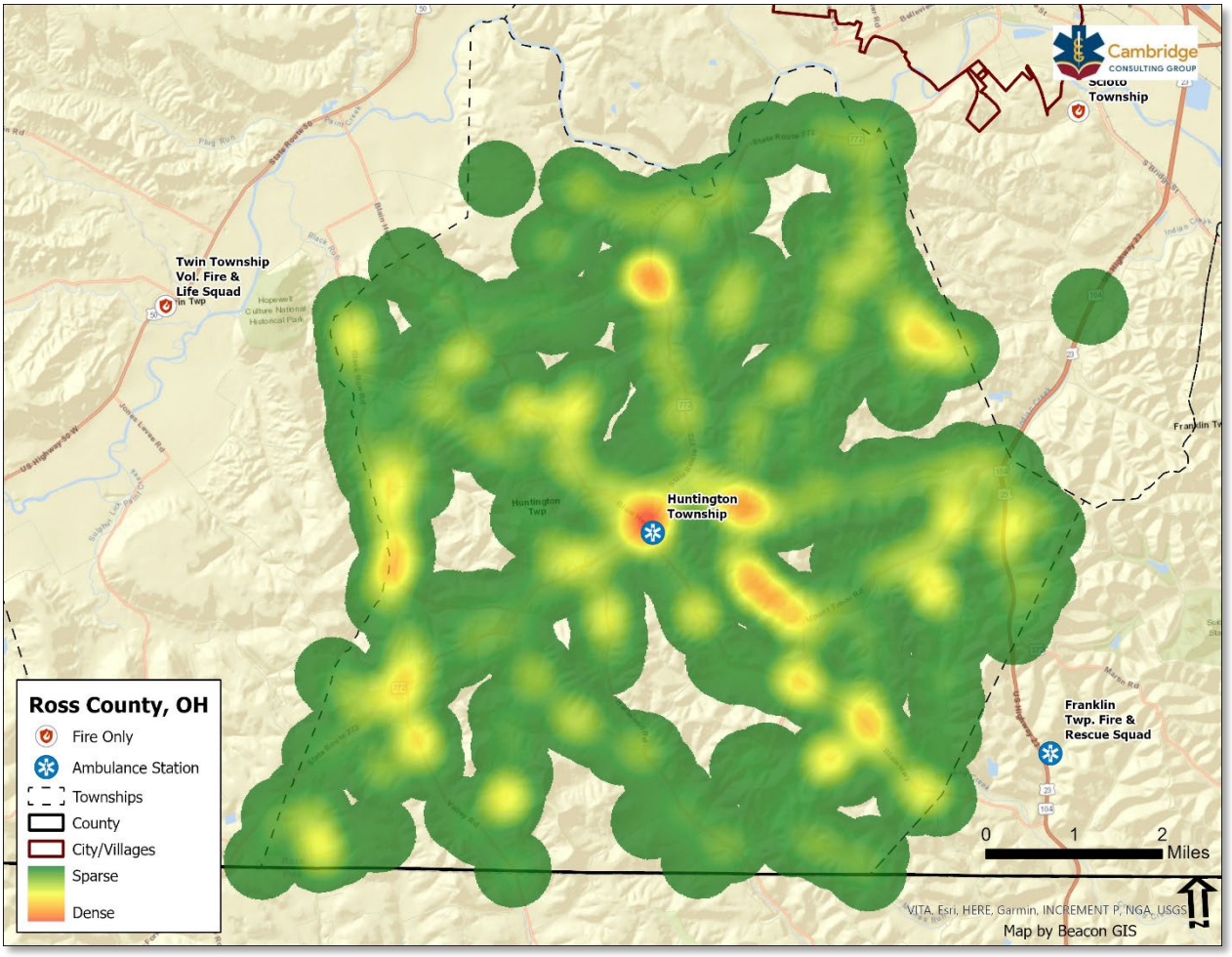
The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are scattered throughout the township. The central location of the fire station along major arterial route serves the area well.

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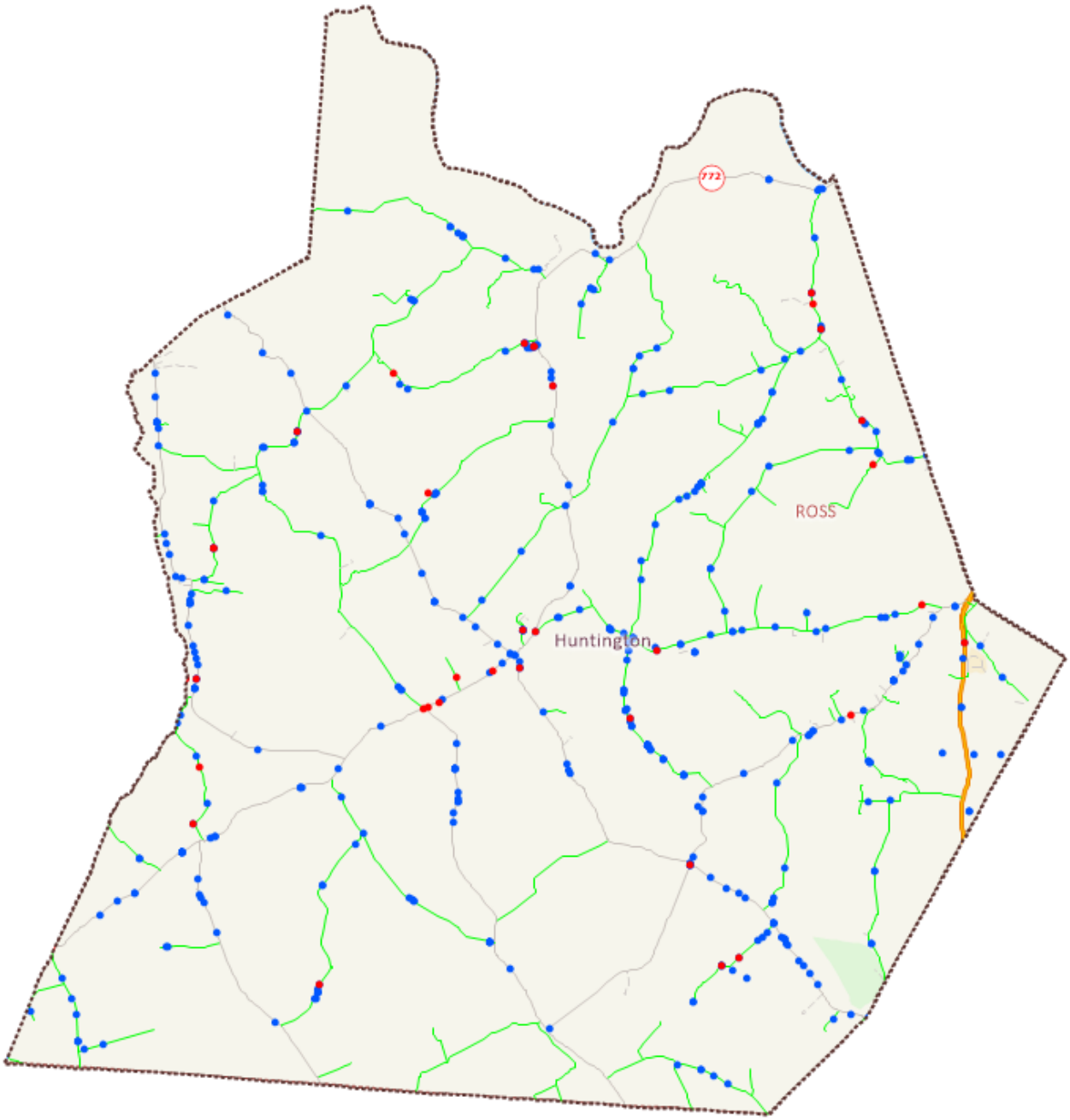
Agency: Primary (Blue) Mutual Aid (Red)



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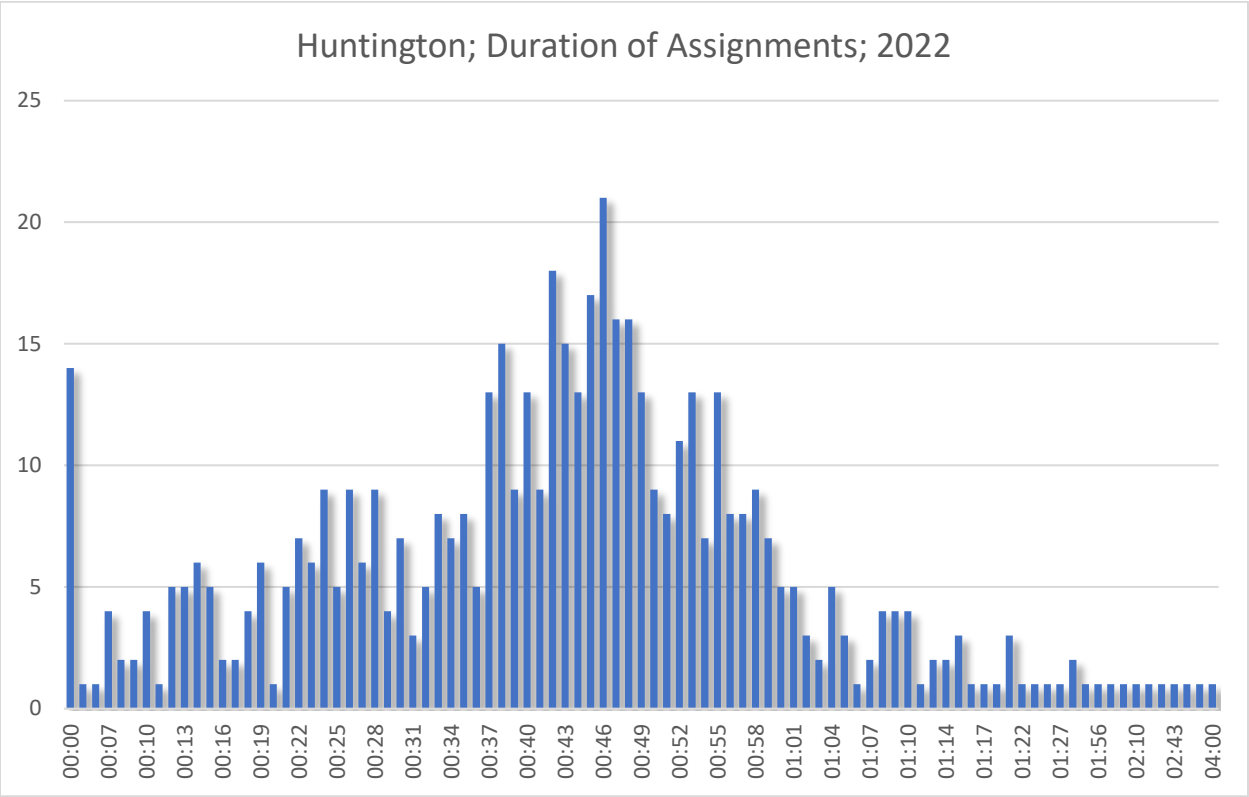
Huntington showed no concurrent dispatches in 2022.

Huntington showed a typical pattern of call duration. Their non-cancelled cases lasted between 20 minutes and just over an hour.



Huntington had no EMS activity for 89 days (24%) of 2022.

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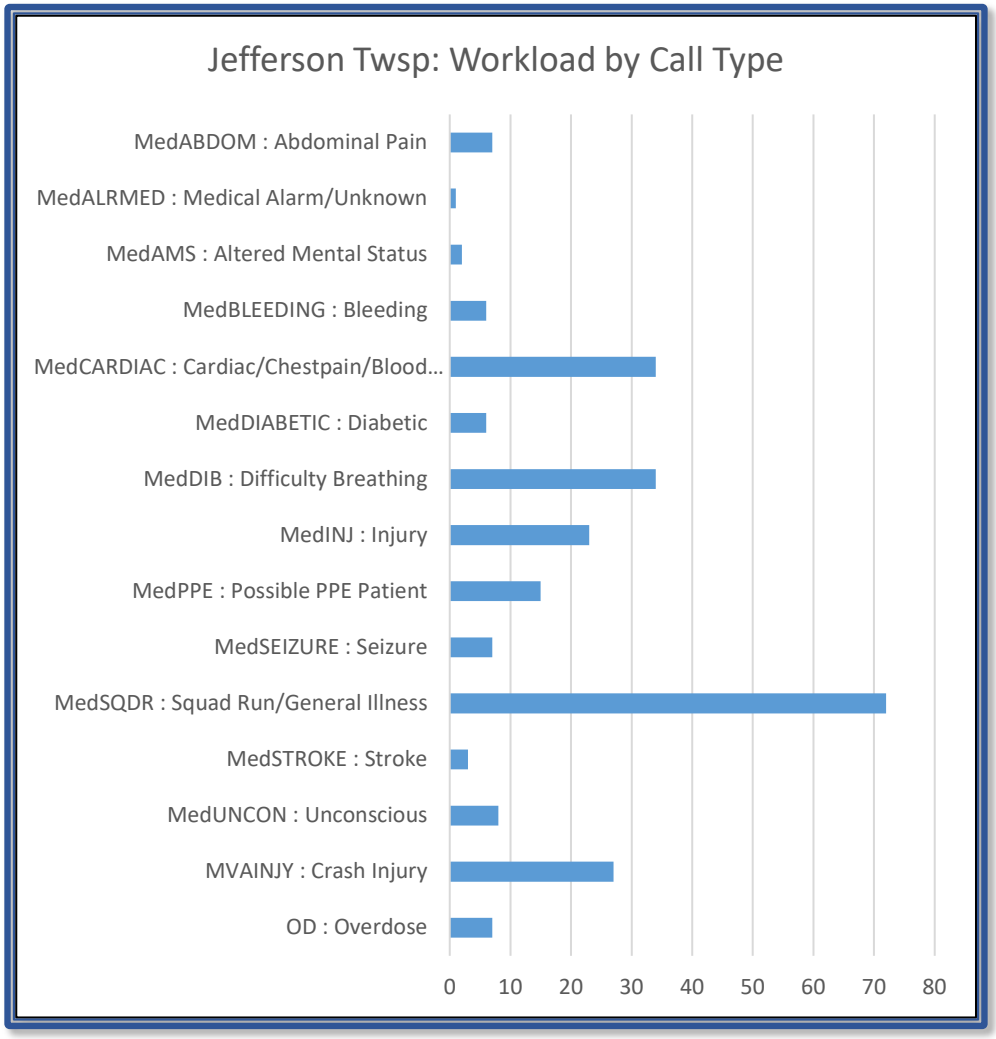
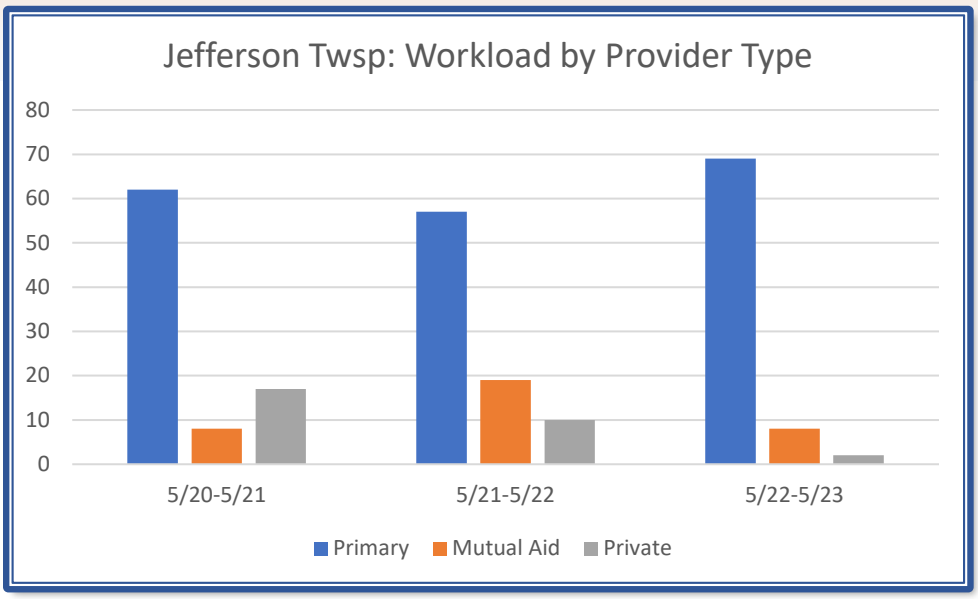
JEFFERSON

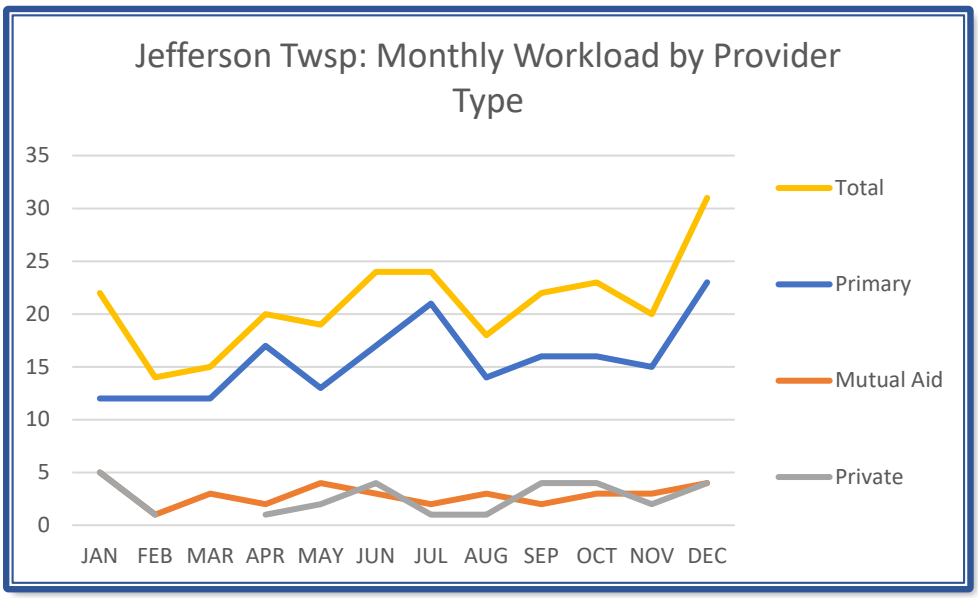
The Jefferson Fire Department has one fire station which is the primary response to emergency medical incidents in the Township. The workload in the township over the three years of data includes 252 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 28.5% of the volume.



For the three-year data period, 75% of the incidents were handled by the Jefferson Twp. Fire Department. Harrison and Liberty were the two most responding mutual aid departments. The following chart shows the workload level by full year and by provider in relation to the total. Note that the total volume has been stable, averaging 62 calls per year. It appears that mutual aid increased midperiod have increased while private response has decreased over the data period.



When the data is examined on a monthly basis, the volumes increase in December and January. Mutual aid assistance and private service use is lower and speaks to the general reliability of the primary provider's ability to respond.



On a daily trend basis, the weekends are busier than weekdays. Tuesdays are tougher days for the host provider to muster a crew response as mutual aid increases generally that day of the week.

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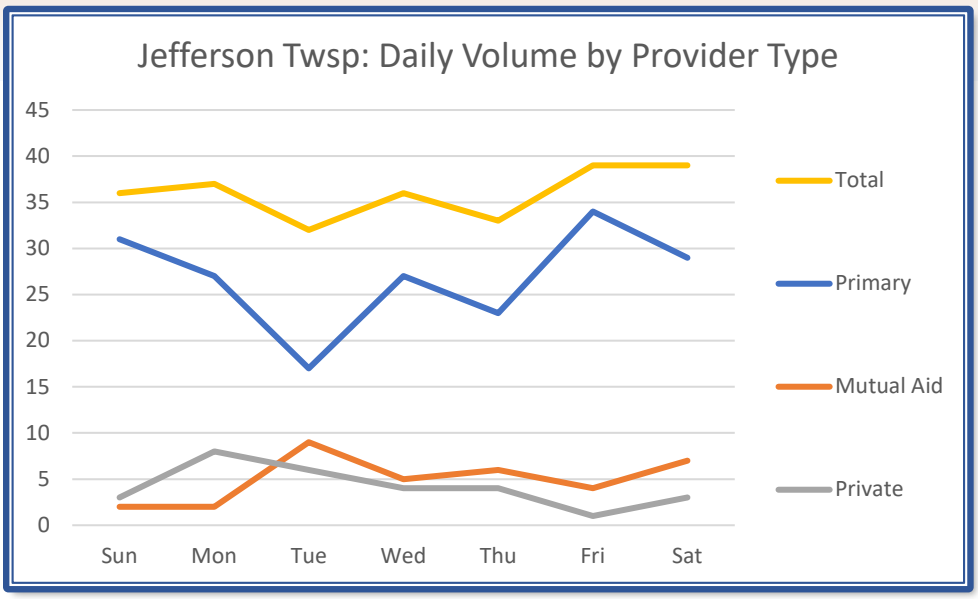
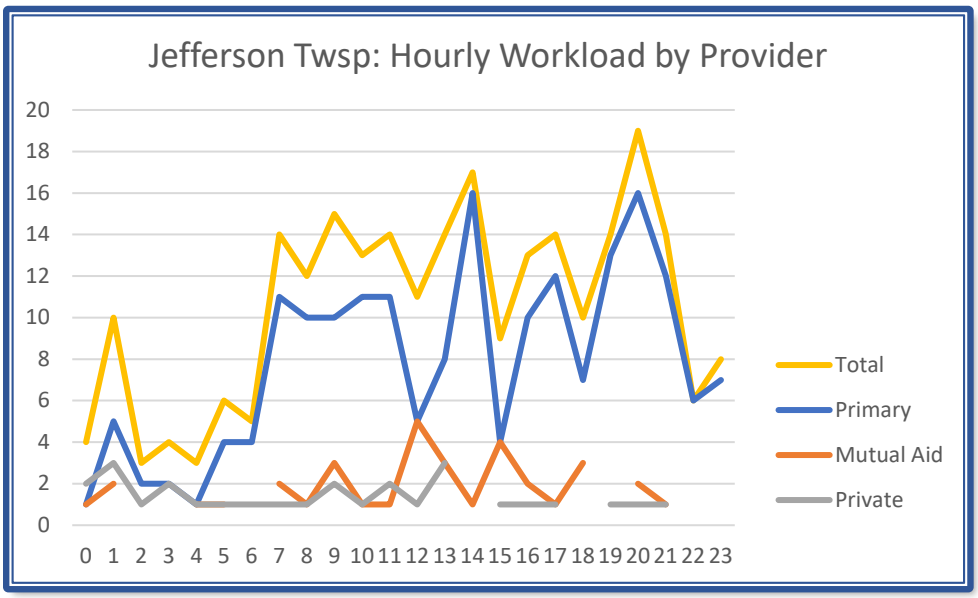


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 6AM and increases until the early afternoon, with a notable spike in higher volume in the early evening.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

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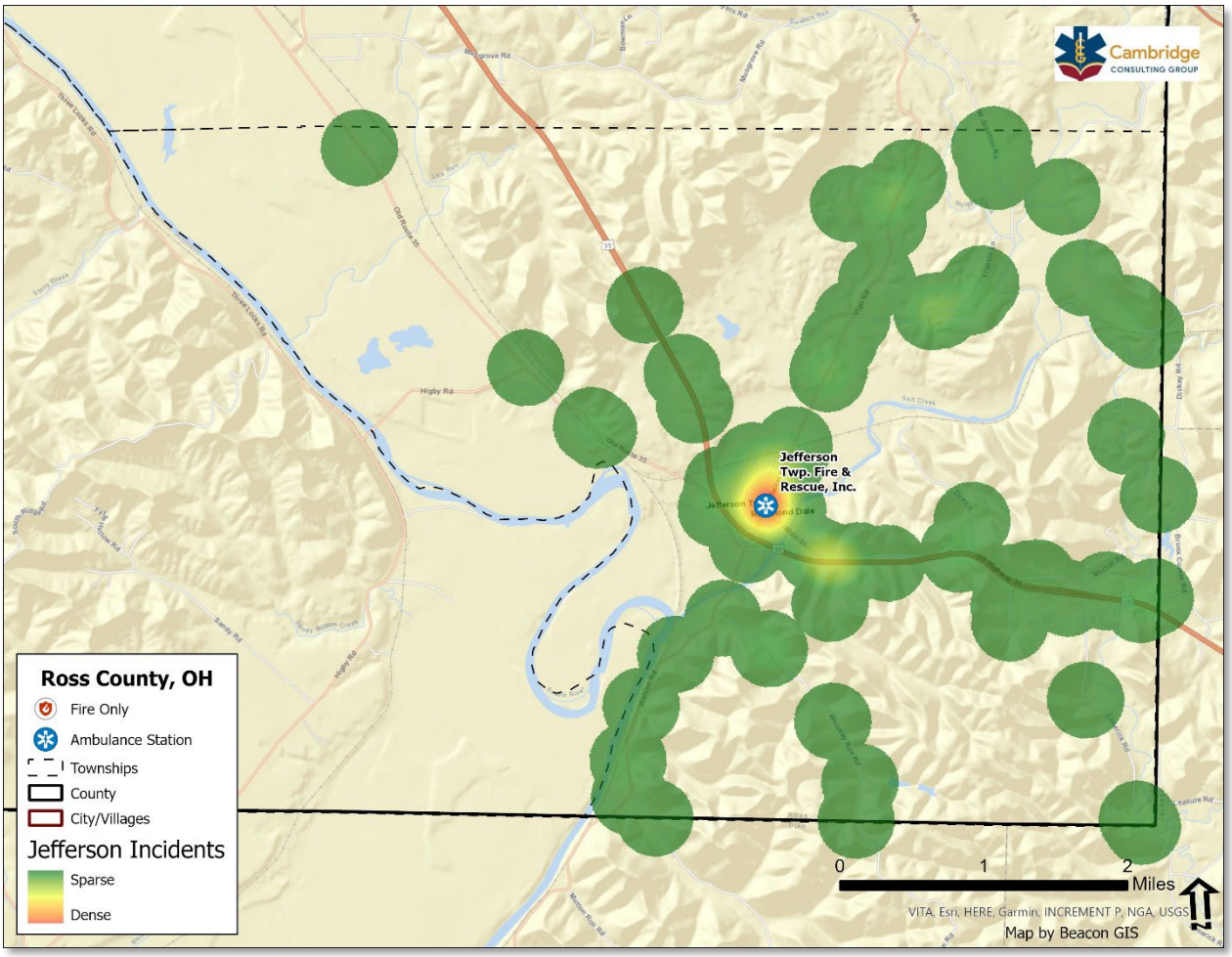
Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:16:58	0:27:38	No Data
80th Percentile	0:20:43	0:38:31	No Data

The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are within the Village of Richmond Dale near the fire station.

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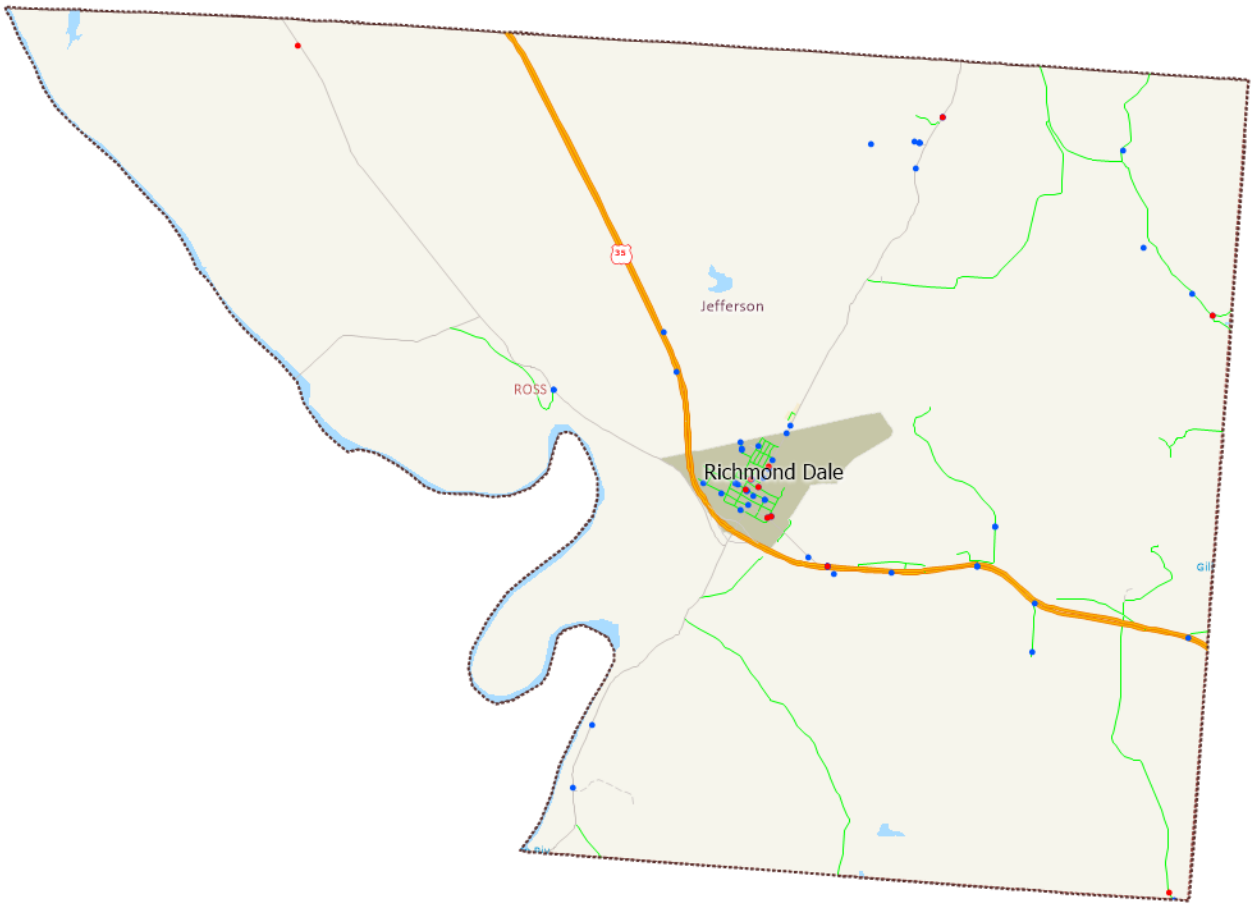
Agency: Primary (Blue) Mutual Aid (Red)



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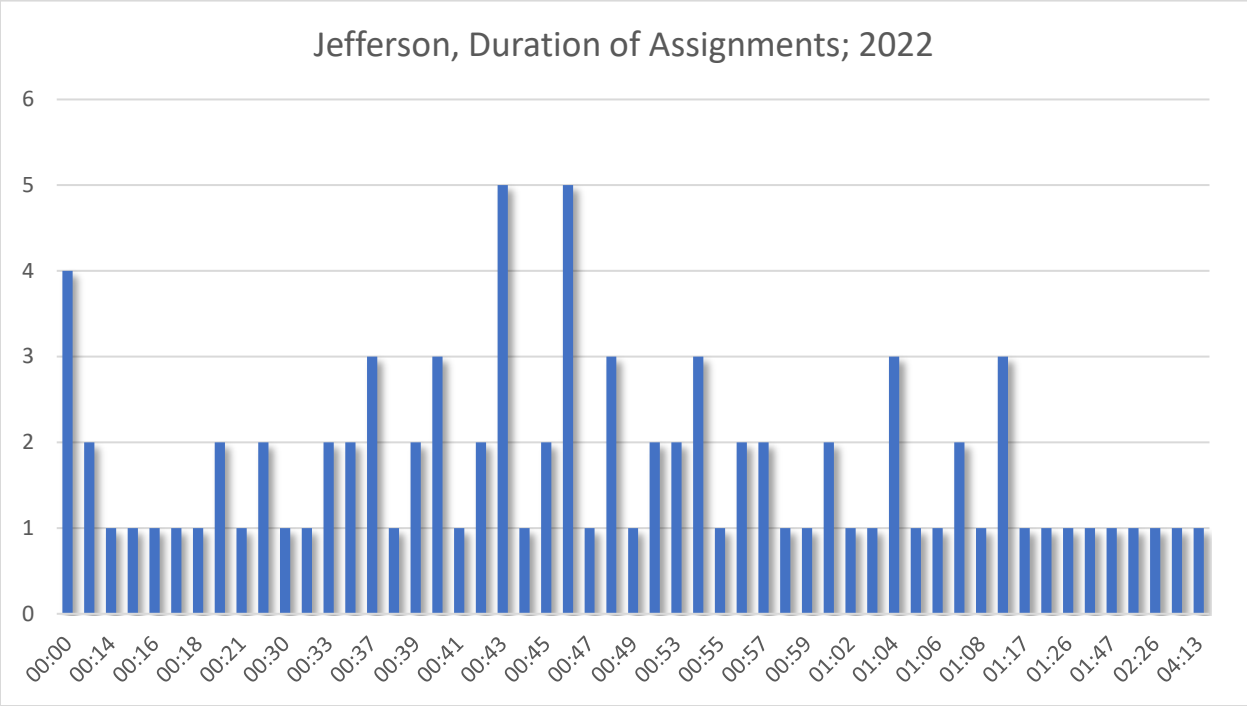
Jefferson Township saw one time when they experienced a concurrent assignment, during 2022.

No pattern can be determined from the duration of calls assessed from Jefferson. This is due to the low volume of cases.



With a low call volume, Jefferson had no EMS activity for 82% of the year.

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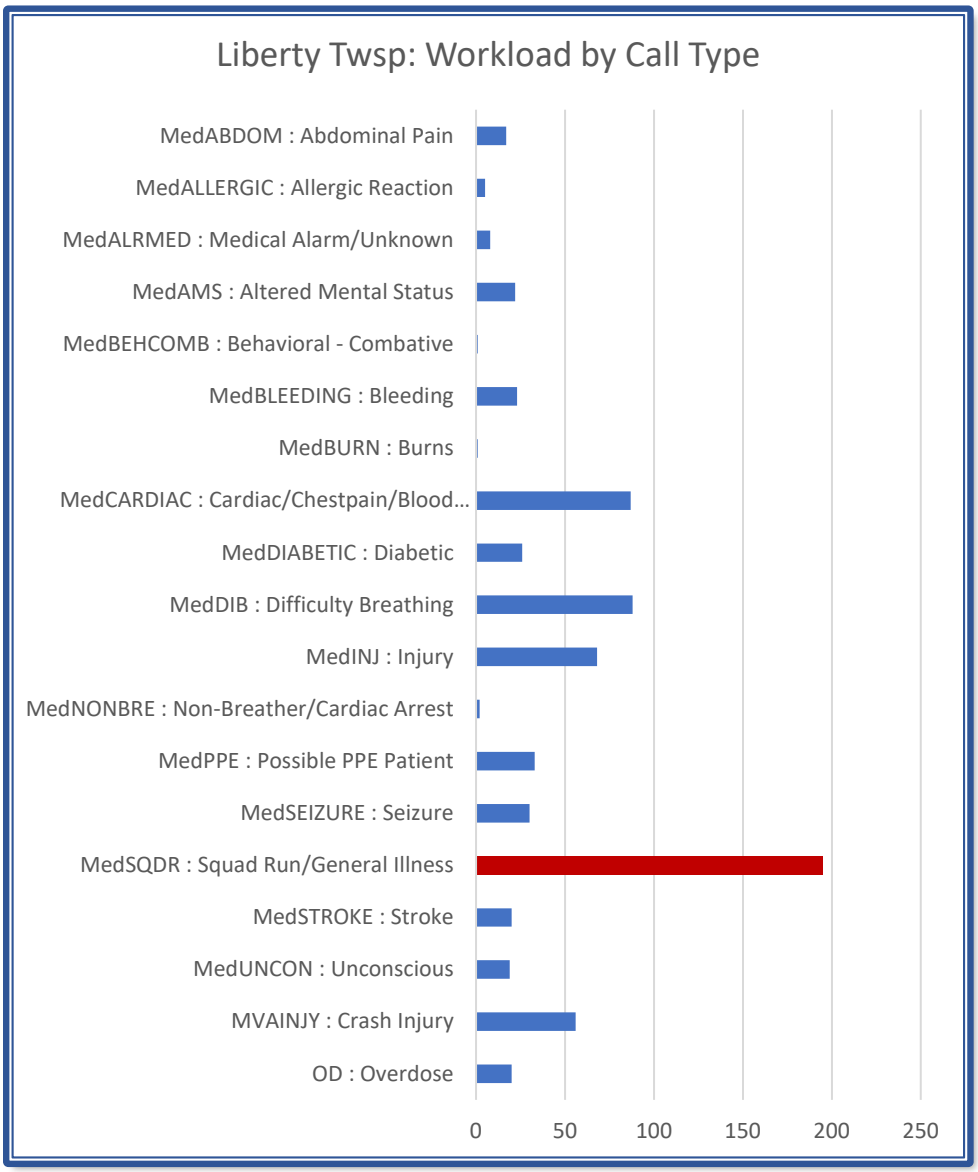
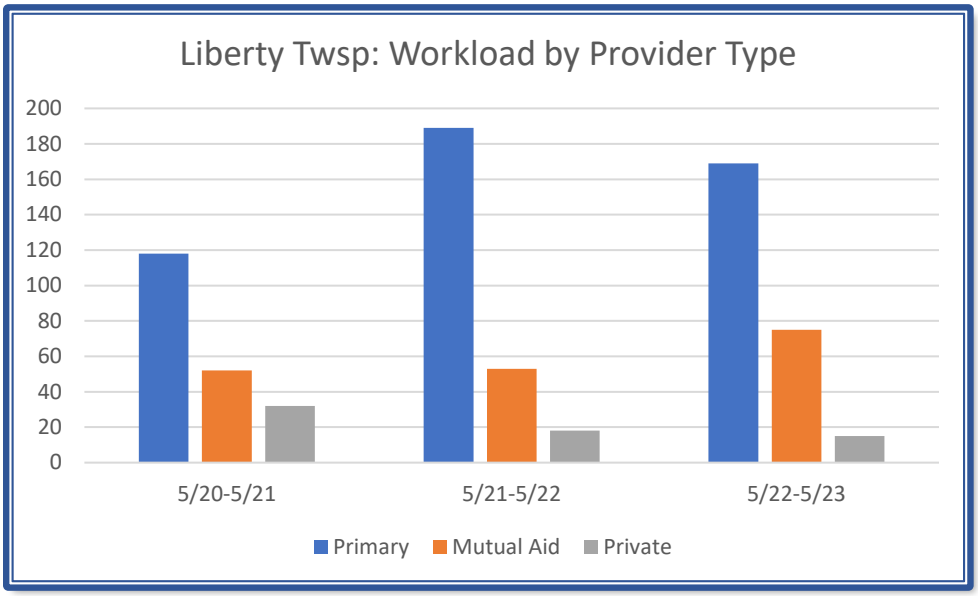
LIBERTY

The Liberty Fire Department has one fire station that is the primary response to emergency medical incidents in the Township. The workload in the township over the three years of data includes 476 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 27% of the volume.

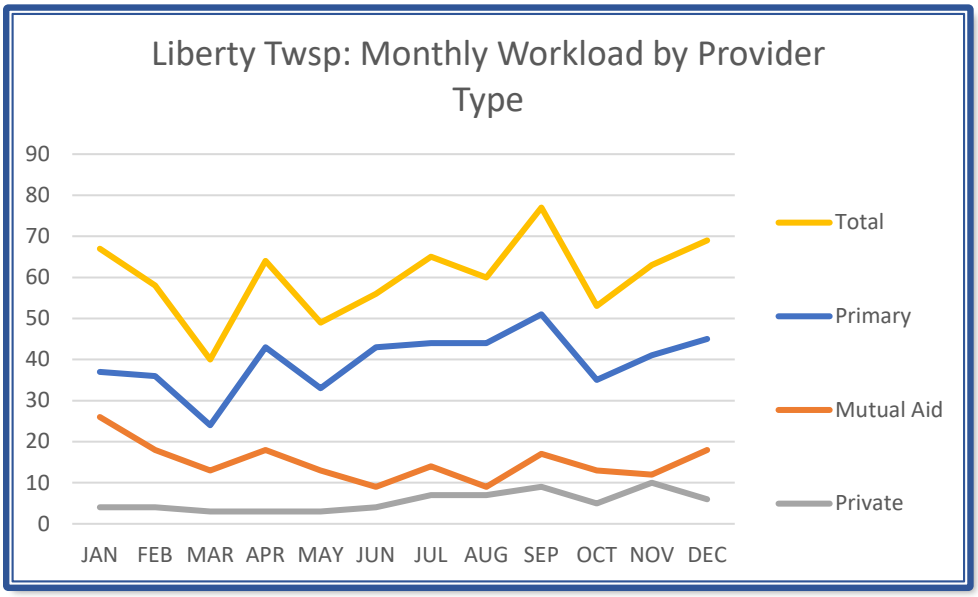


For the three-year data period, 66% of the incidents were handled by Liberty Twp. Fire Department. Harrison, Scioto, and Jefferson were the most responding mutual aid departments. The following chart shows the workload level by full year and by provider in relation to the total.

Note that the total volume has been stable, averaging 240 calls per year. It appears that mutual aid increased lately have increased while private response has decreased over the data period.



When the data is examined on a monthly basis, the volumes busiest in September and December with a varied volume level throughout the year.



On a daily trend basis, Thursdays are the busiest days. Mutual Aid and private provider back-up are busier during the week.

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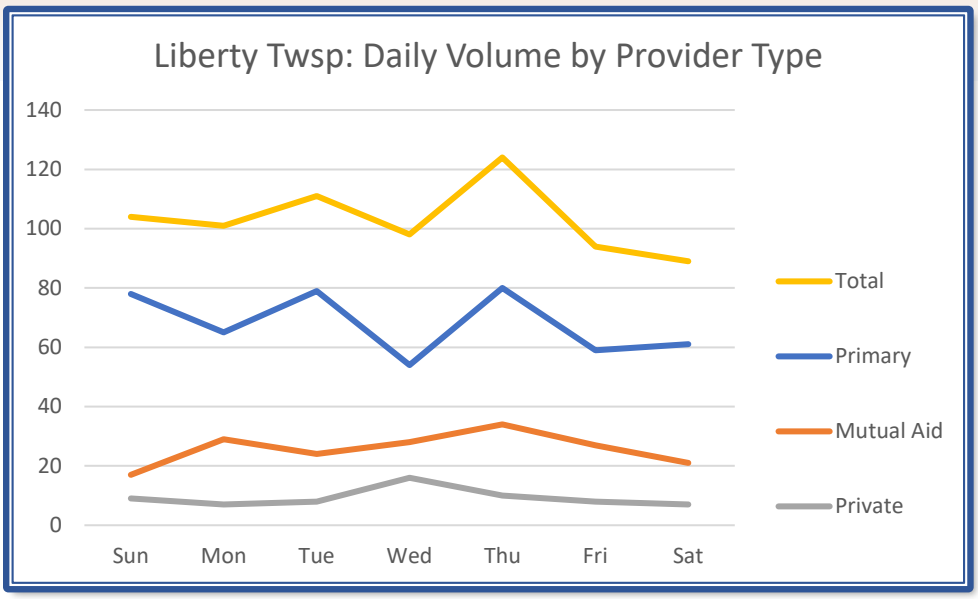
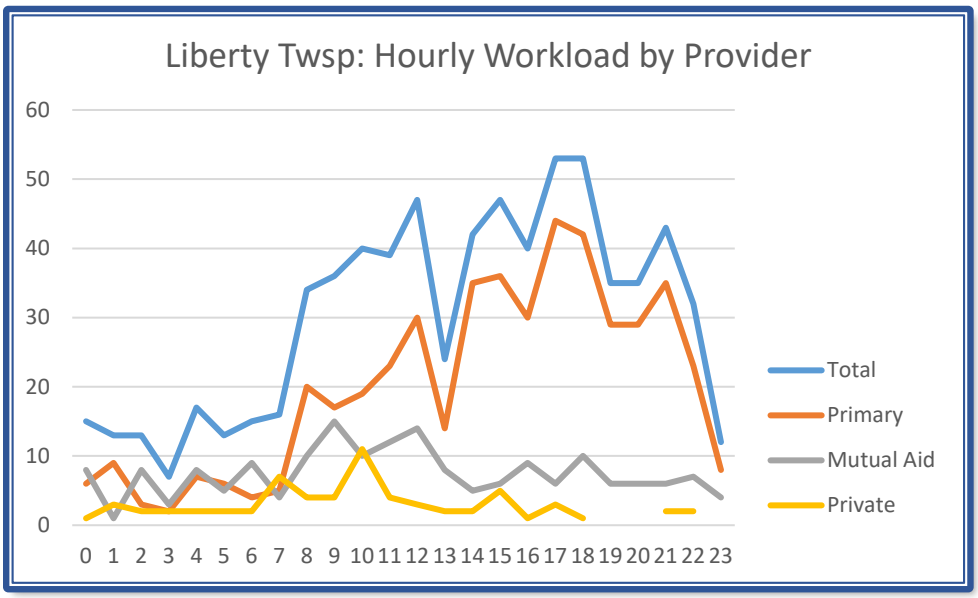


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 7AM and increases until the late afternoon, then reduces through the evening generally except a sike in higher volume at 9 PM.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

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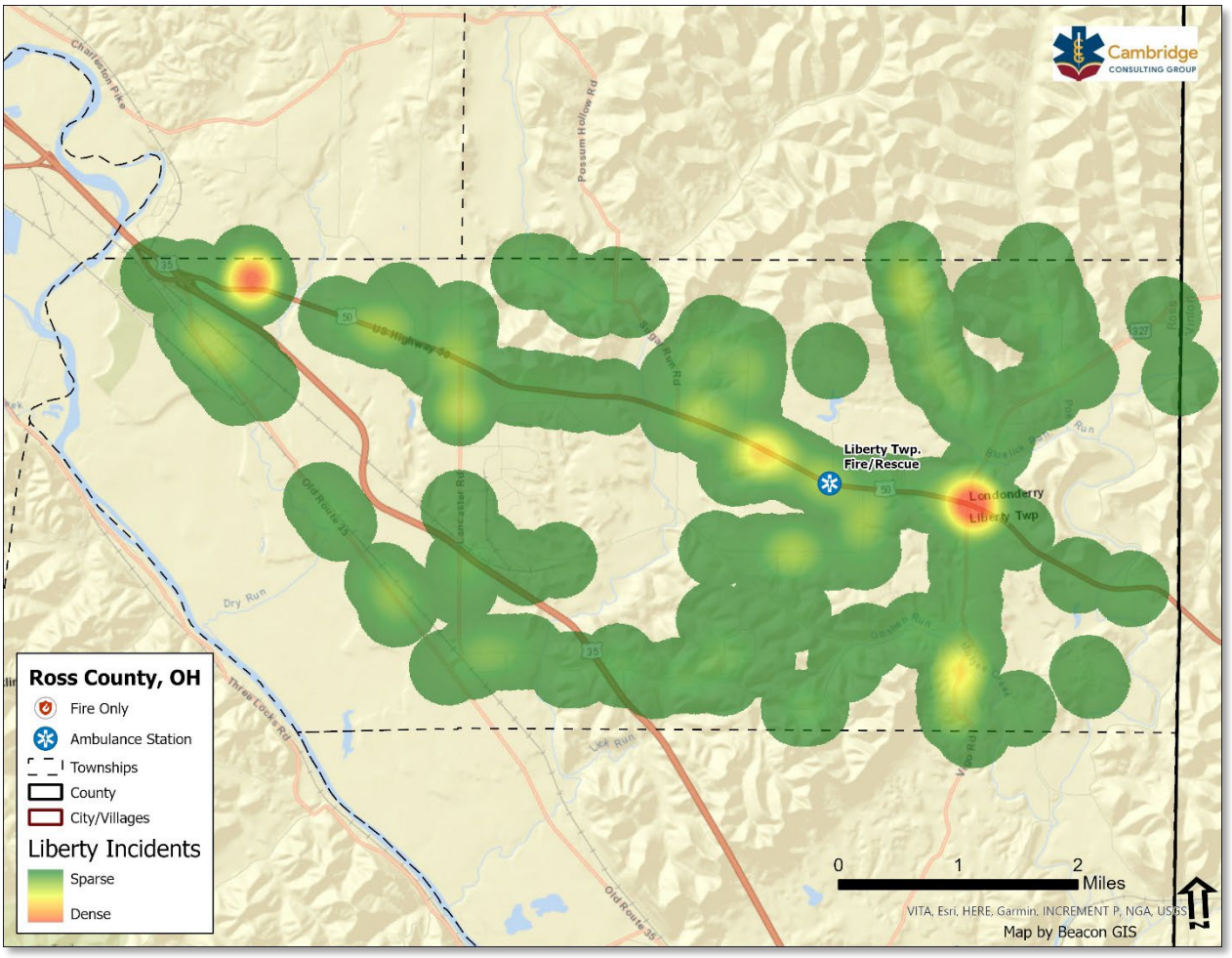
Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:16:55	0:25:58	No Data
80th Percentile	0:23:26	0:34:28	No Data

The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are within the Village of Richmond Dale near the fire station.

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Agency: Primary (Blue) Mutual Aid (Red)

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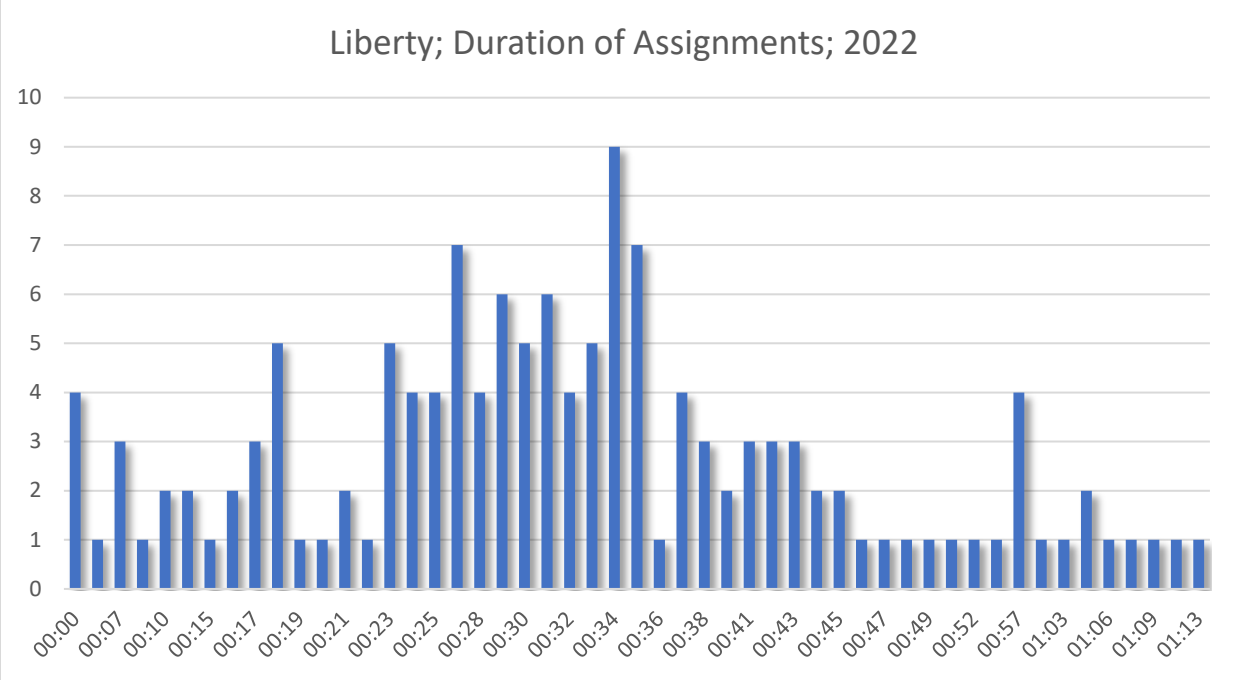
Liberty saw two times when they experienced concurrent calls, in 2022.

Despite a low call volume, Liberty data did reveal a typical call duration pattern. Their non-cancelled assignments ranged from 15 to 45 minutes.



Liberty saw no EMS activity for 291 days (80%) of the year, 2022.

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PAINT

No EMS activity information was provided for Paint Township.

Paint Township is served by the Paint Creek Joint EMS/Fire District.

The Paint Creek Joint EMS/Fire District is a large public safety district in the State of Ohio, which provides fire suppression and/or EMS services to several jurisdictions in three counties; Highland, Ross, and Fayette. It covers approximately 360 square miles and includes 10 townships, the Village of Greenfield, the City of Hillsboro, and several other smaller municipalities.

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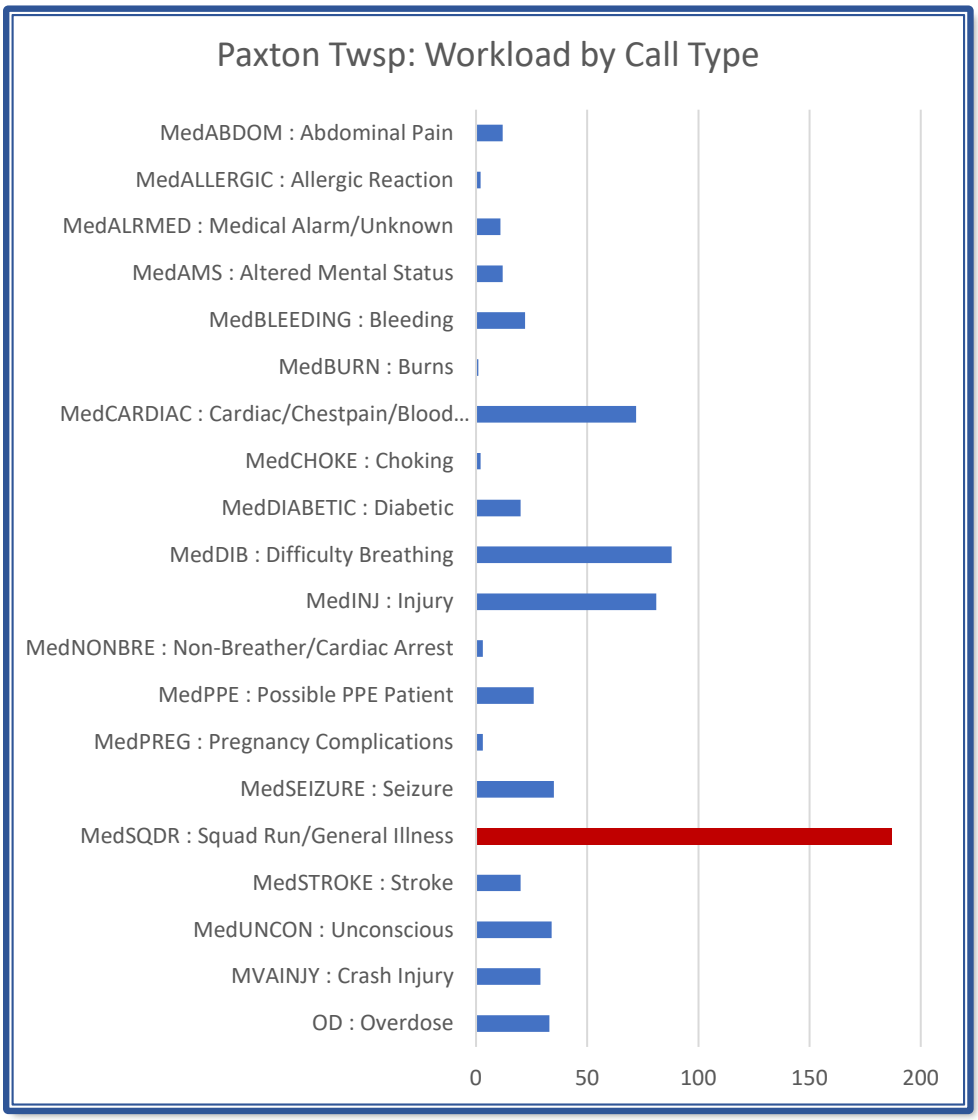
PAXTON

The Paxton Life Squad has one station that is the primary response to emergency medical incidents in the Township. The workload in the township over the three years of data includes 693 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 27% of the volume.



For the three-year data period, 87% of the incidents were handled by the Paxton Life Squad. Paint Creek is the most responding mutual aid department. The following chart shows the workload level by full year and by provider in relation to the total. Note that the total volume has been stable, averaging 200 calls per year. It appears that mutual aid increased lately have increased while private response has been nearly none the data period.

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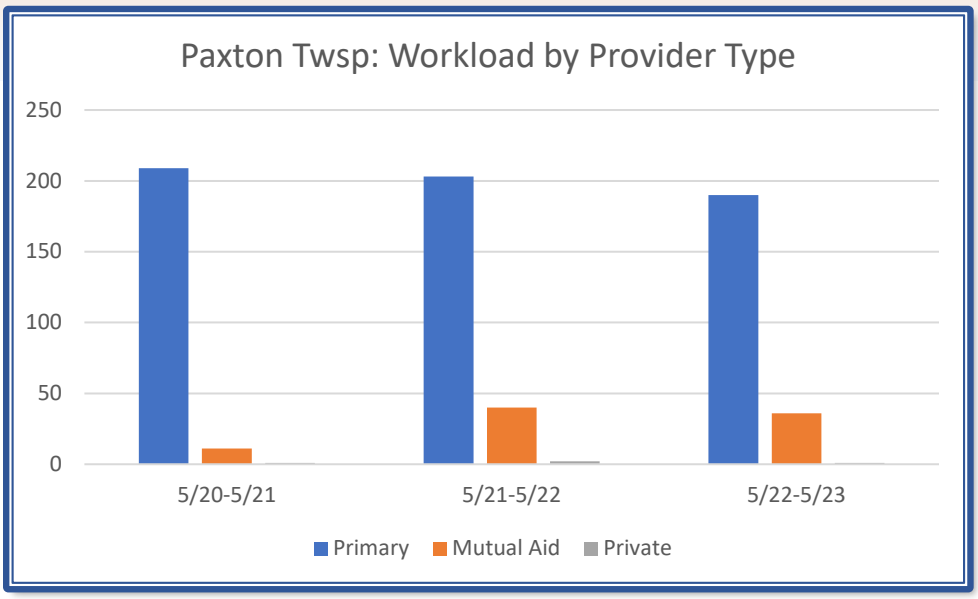
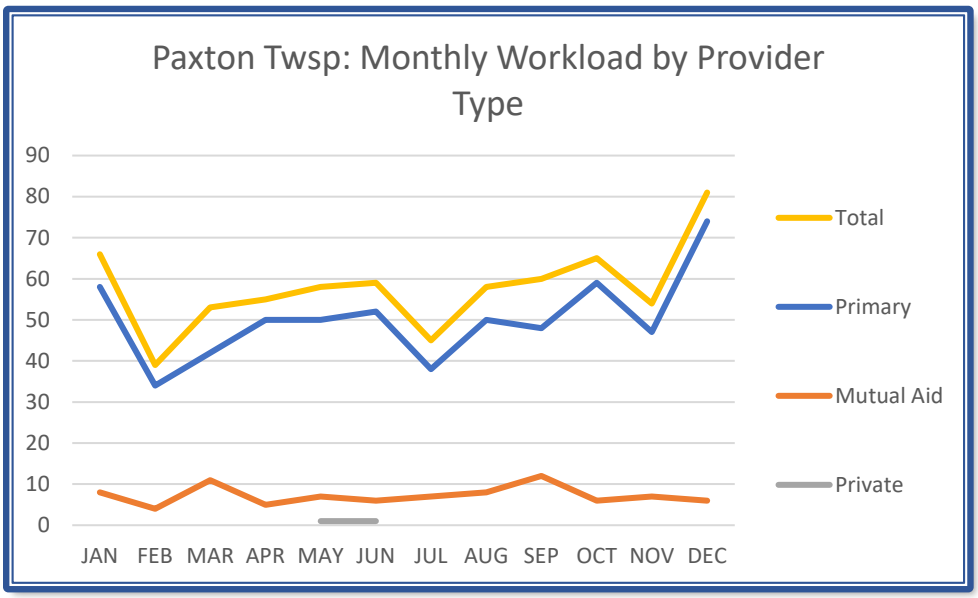


When the data is examined on a monthly basis, the volumes busiest in January and December with lower volumes in February and July. Mutual aid assistance and private service use is lower and speaks to the higher reliability of the primary provider's ability to respond.



On a daily trend basis, Mondays are the busiest days the rest of the week declines in volume until Sunday. Mutual Aid provider back-up is busier during the week.

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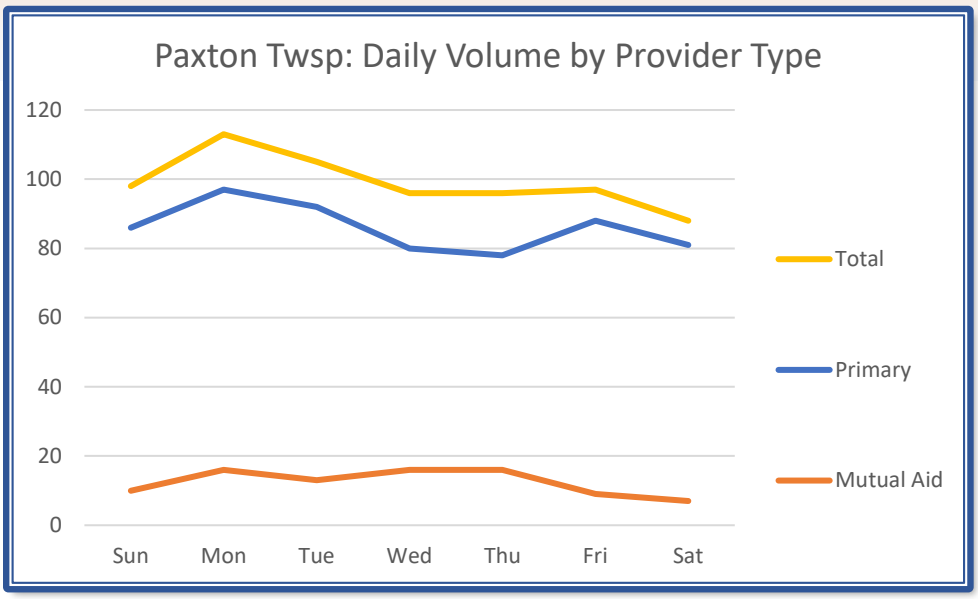
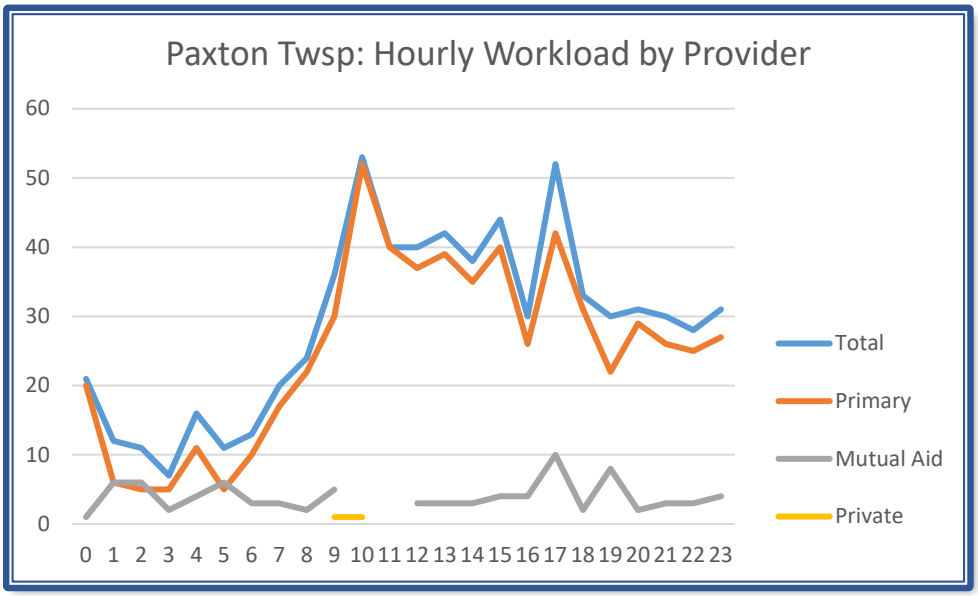


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 5AM and increases in the morning. A slight decrease is noted until a spike in higher volume at 5 PM. Mutual aid assistance is higher in the earliest morning hours and during the early evening peaks in volume.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

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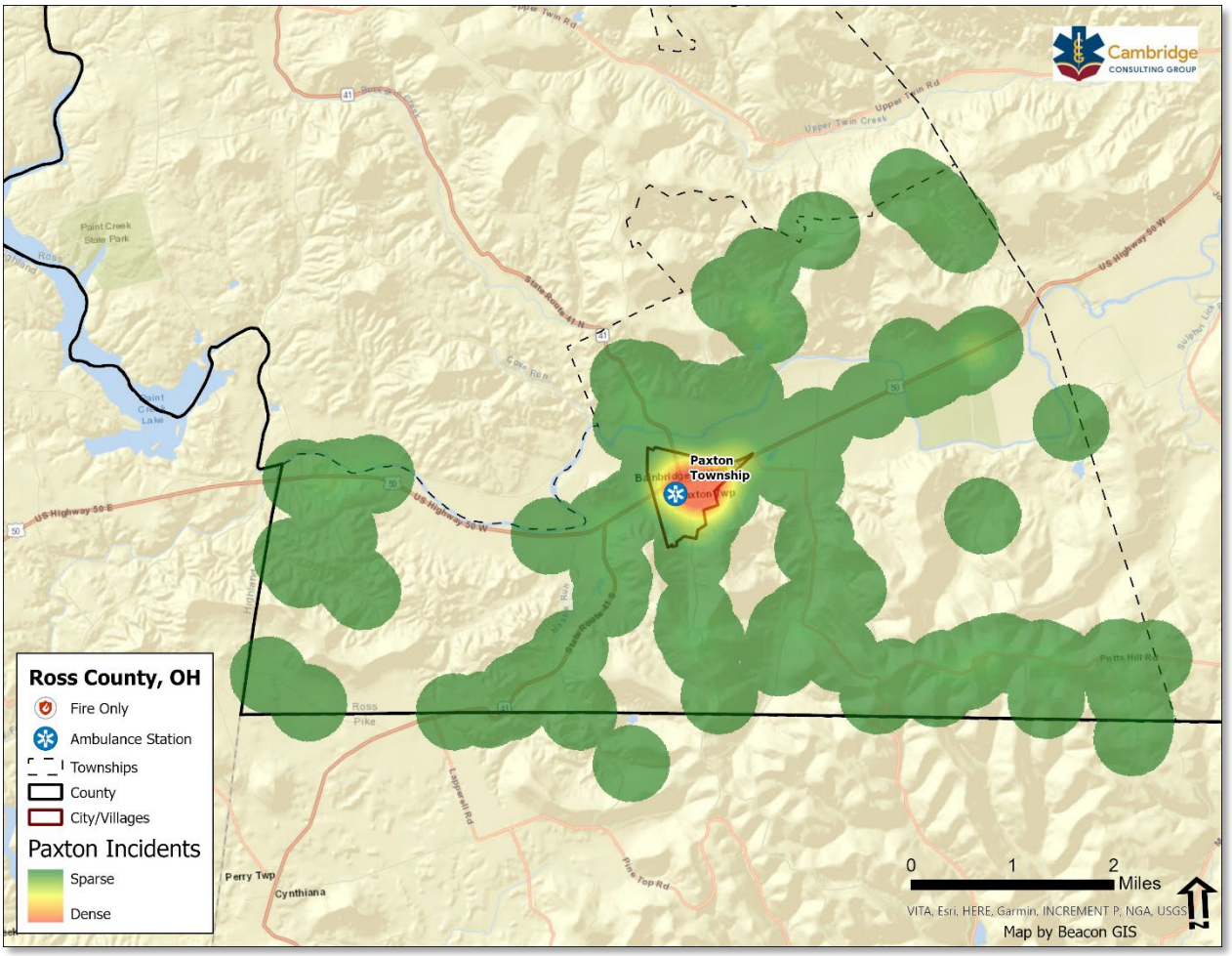
Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:12:24	0:18:25	No Data
80th Percentile	0:17:05	0:27:38	No Data

The following map shows where within the Township the incidents are most concentrated.



The highest concentration of incidents is within the Village of Bainbridge.

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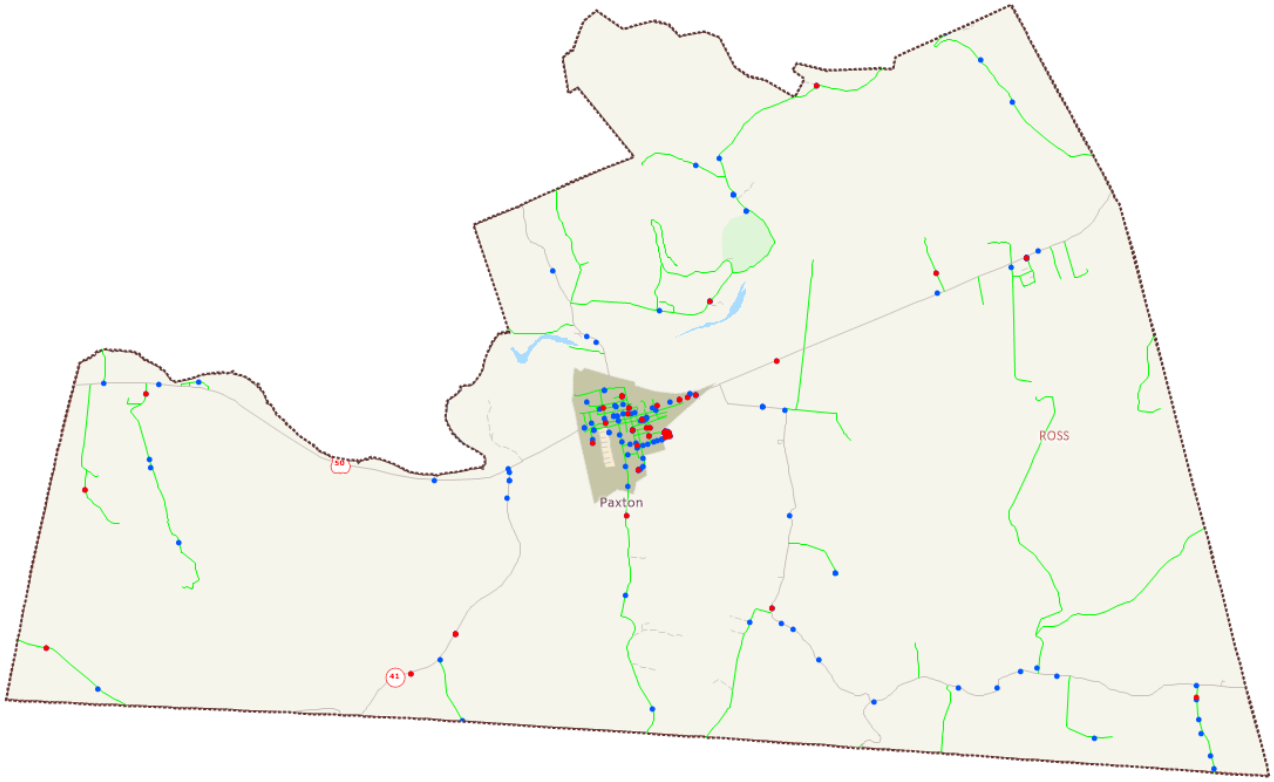
Agency: Primary (Blue) Mutual Aid (Red)



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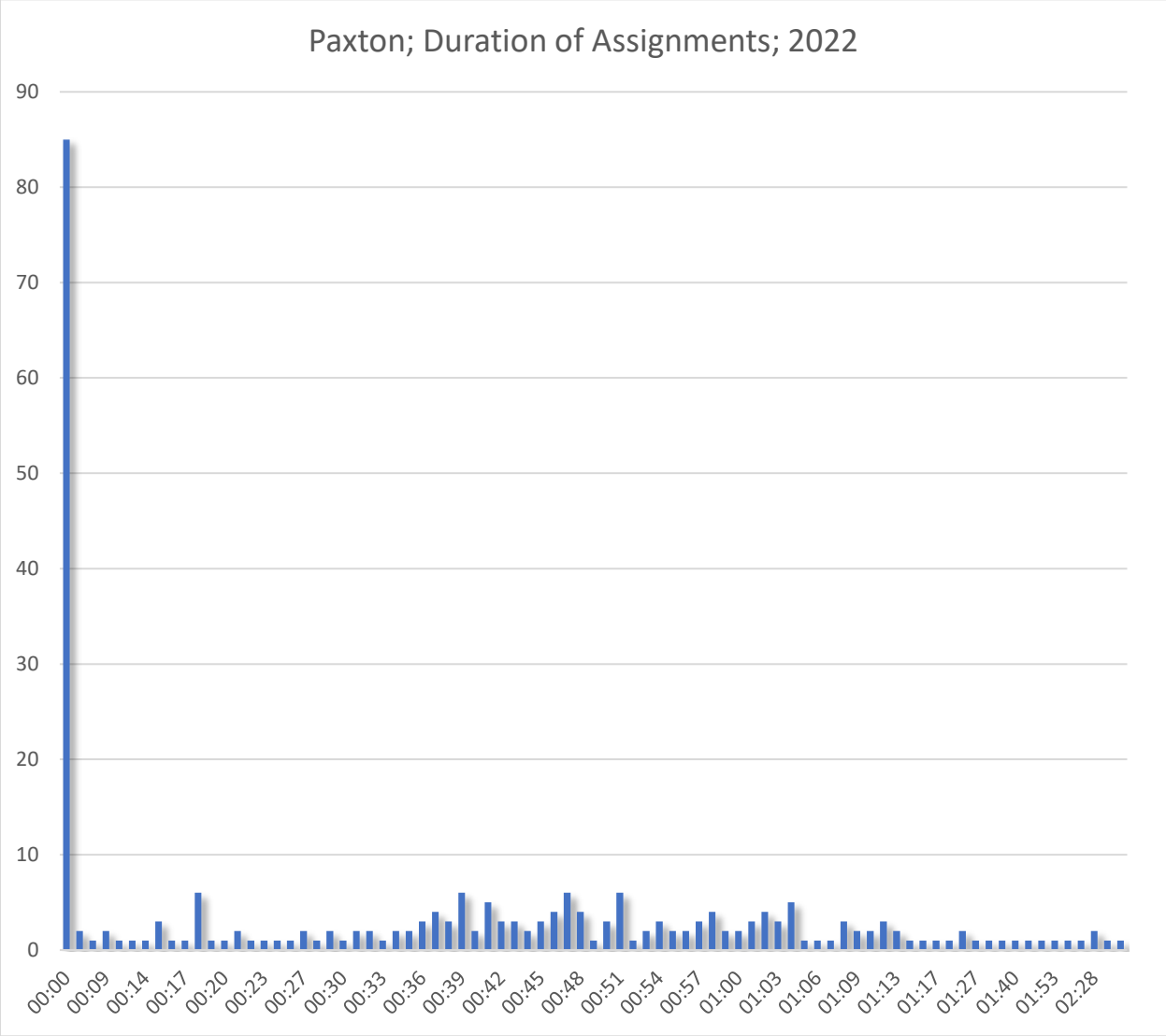
Paxton data showed no concurrent assignments during 2022.

The data from Paxton concern duration of calls was not reflective of an EMS agency completing assignments. Instead, it shows calls that are initially dispatched to, or categorized for, Paxton and then transferred to another agency to answer. Therefore, no usable information can be gleaned regarding the length of time Paxton units spend with patients on assignments they complete.



Paxton had no EMS activity for 203 days (56%) of the year, 2022.

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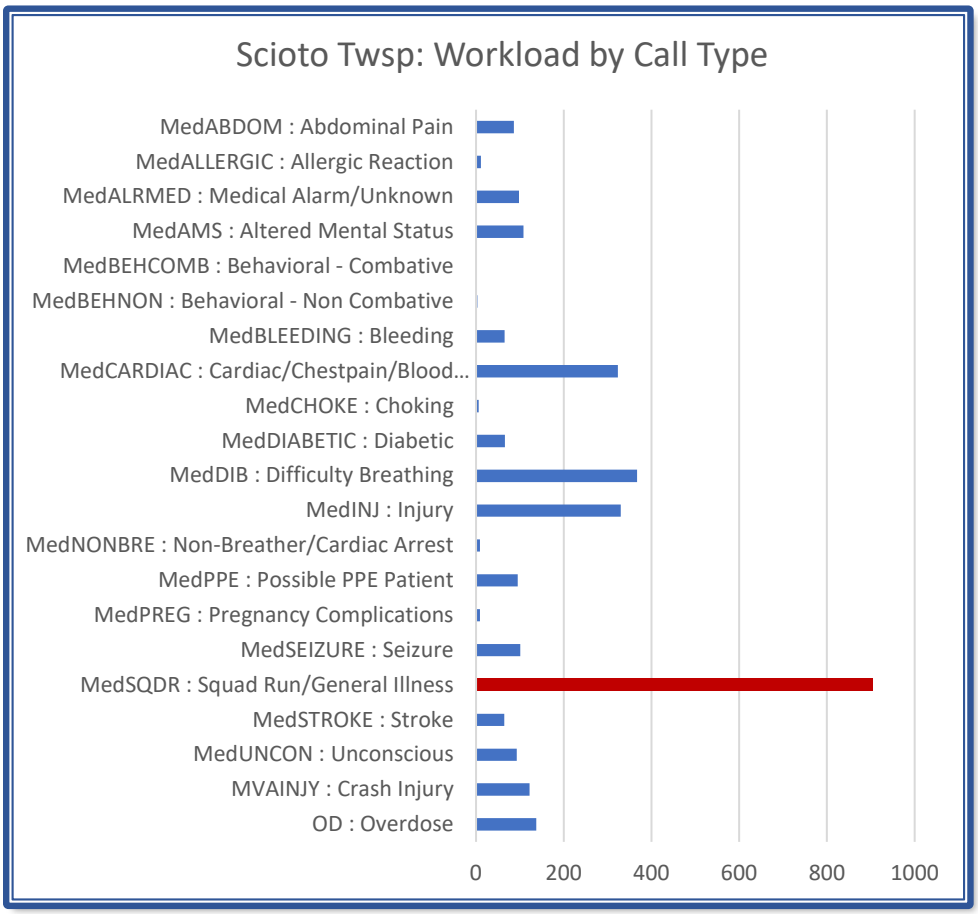
SCIOTO

The Scioto Fire Department has two fire stations and provides the primary response of emergency medical incidents from one of them. The workload in the township over the three years of data includes almost 3,000 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 30.2% of the volume.



For the three-year data period, 81% of the incidents were handled by the Scioto Fire Department. The following chart shows the workload level by full year and by provider in relation to the total. Note that the total volume has been relatively stable, averaging 515 calls per year. It appears that primary provider response has increased while mutual aid response has varied over the data period.

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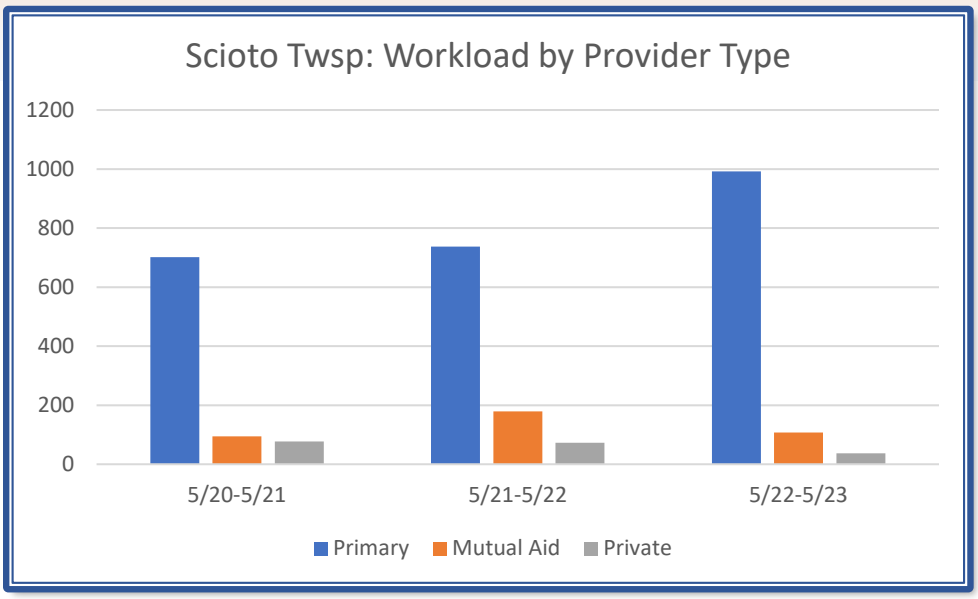
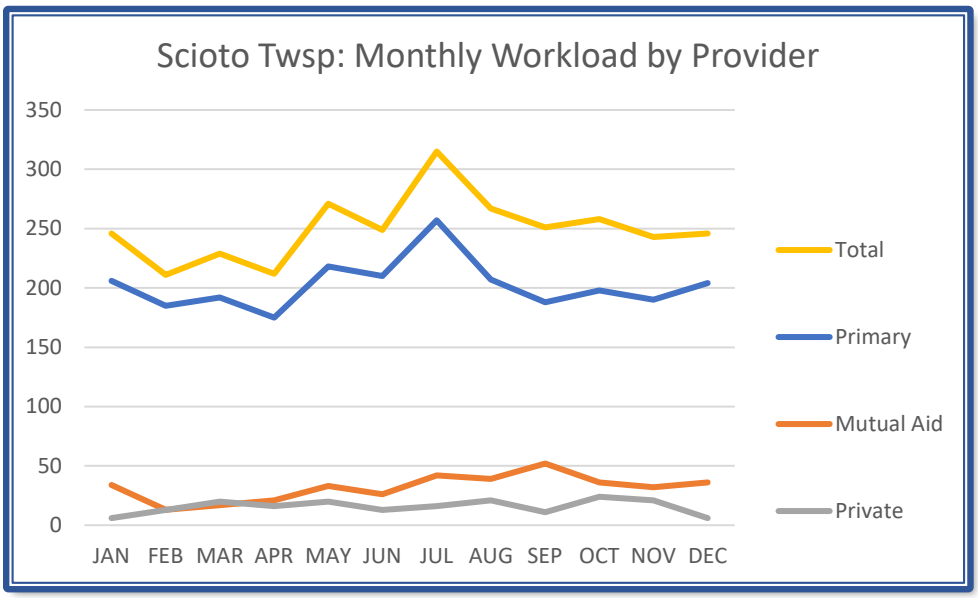


When the data is examined on a monthly basis, The volumes are varied over the year with higher volumes noted in summer and fall months. Mutual aid assistance and private service use is low but increases in later months.



On a daily trend basis, Mondays are the busiest than the rest of the week. Note mutual aid is higher on the weekends and the primary responses are lower.

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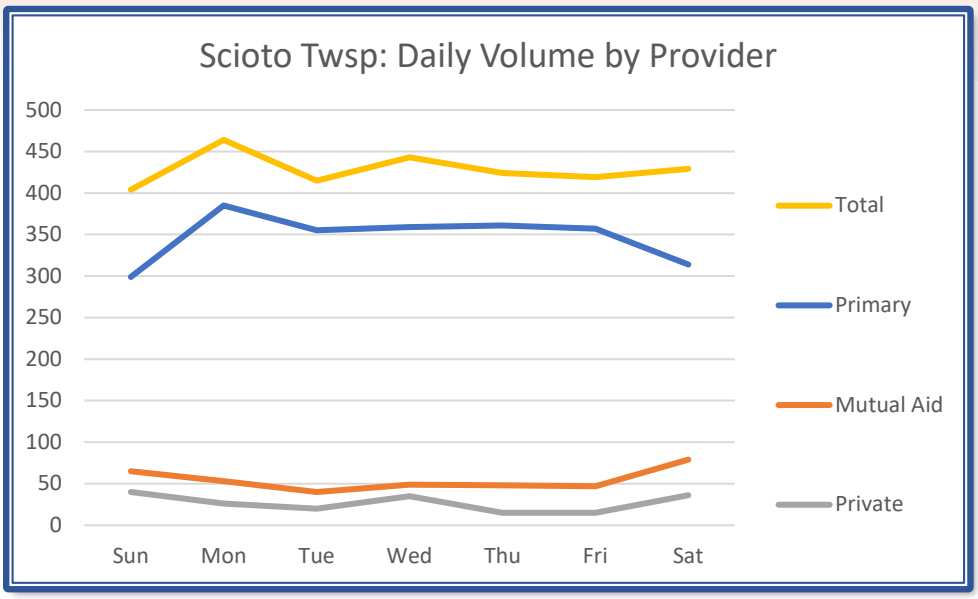
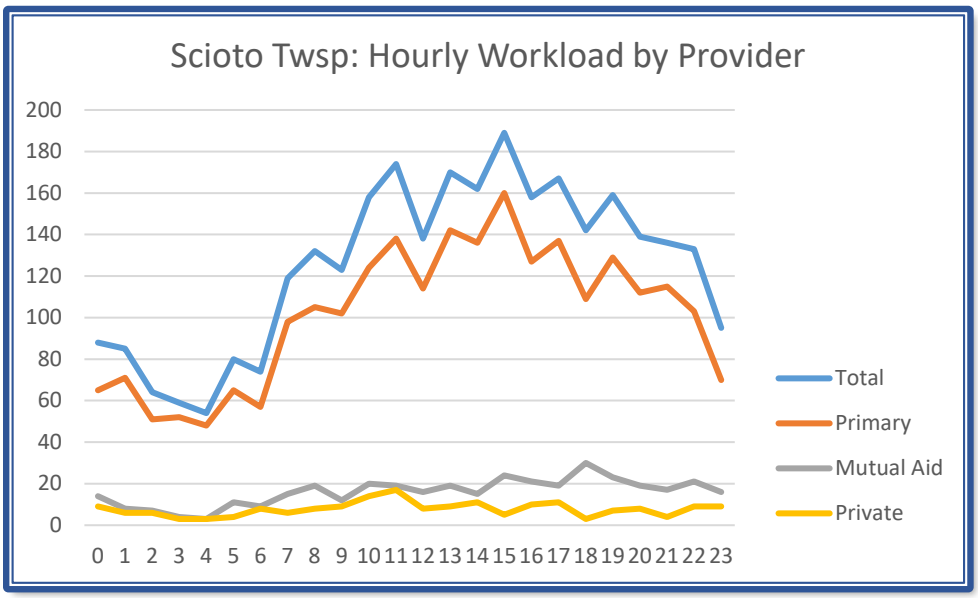


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 5AM and increases until the late afternoon, tapering off afterwards. Mutual aid response increase in the late afternoon and early evening.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

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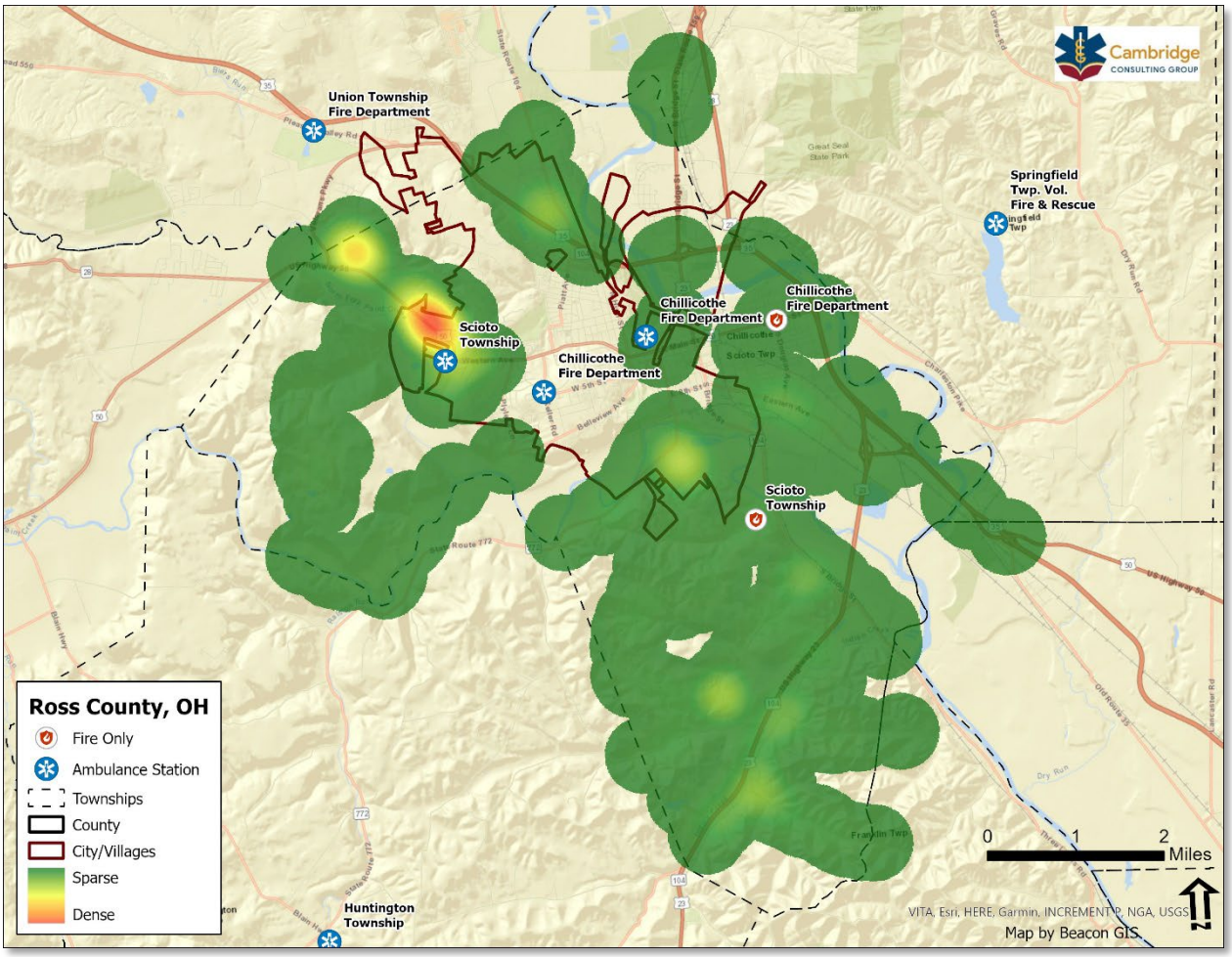
Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:11:19	0:15:28	No Data
80th Percentile	0:15:15	0:20:47	No Data

The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are scattered throughout the township. The highest concentration is near the station with the ambulance.

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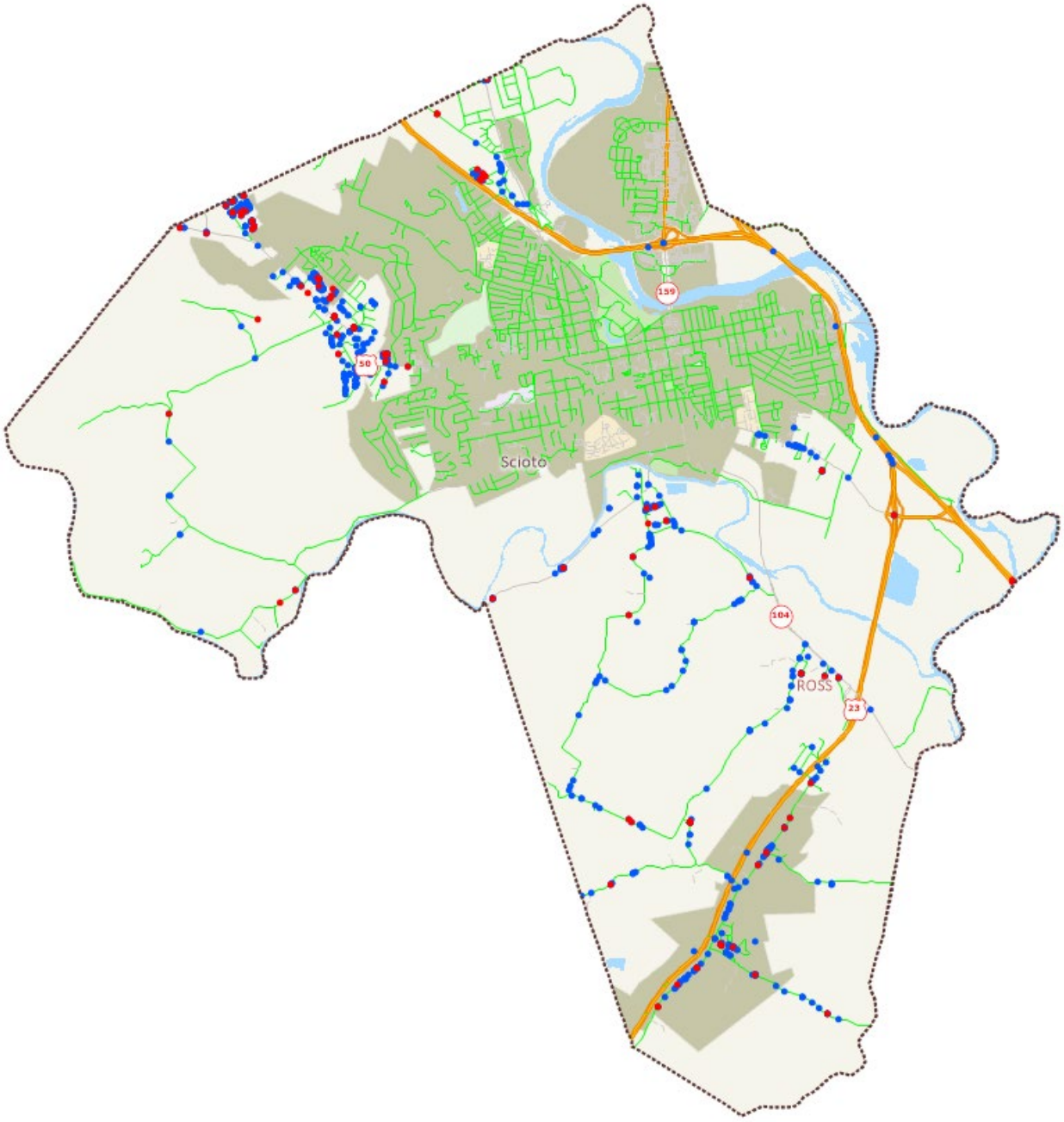
Agency: Primary (Blue) Mutual Aid (Red)



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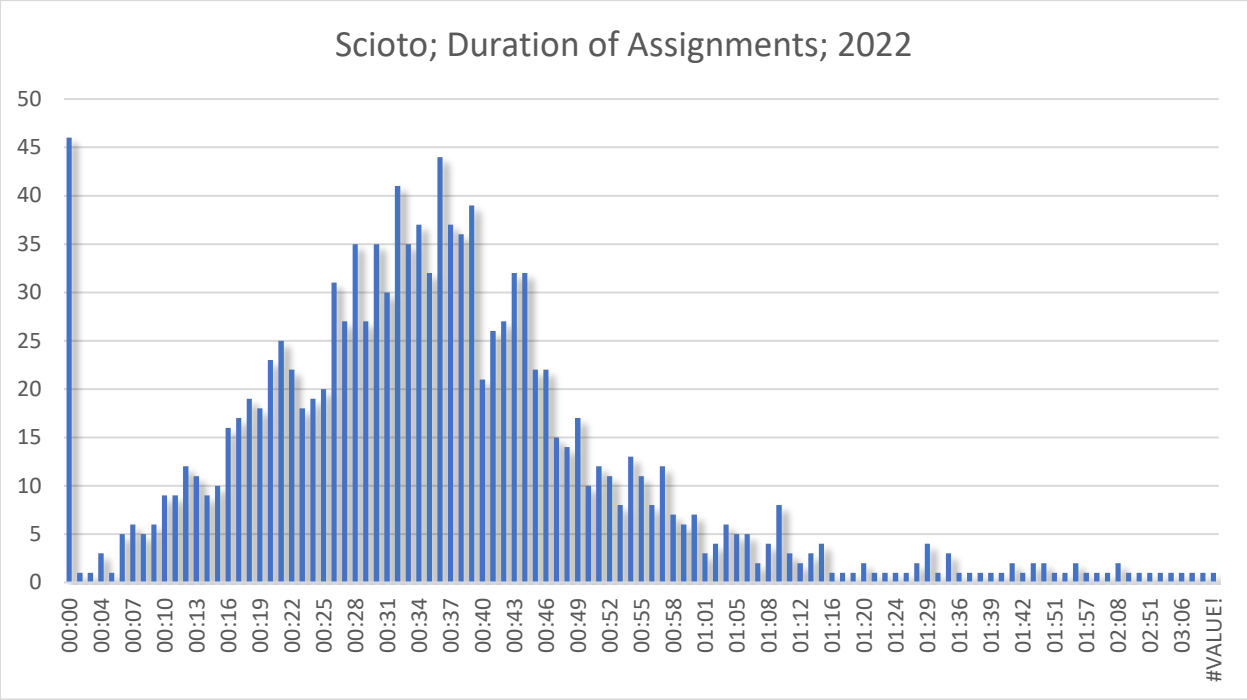
The data revealed only two instances when Scioto experienced concurrent assignments in 2022. This seems unusual considering the Townships EMS volume for the year. On several occasions (ten times) in the year, Scioto saw in excess of four dispatches within an hour.

Scioto showed a very typical pattern of call duration. Aside from cancelled cases, their routine calls lasted 15 minutes and a little over an hour.



Scioto saw only 15 days (4%) during 2022 when they experienced no EMS activity.

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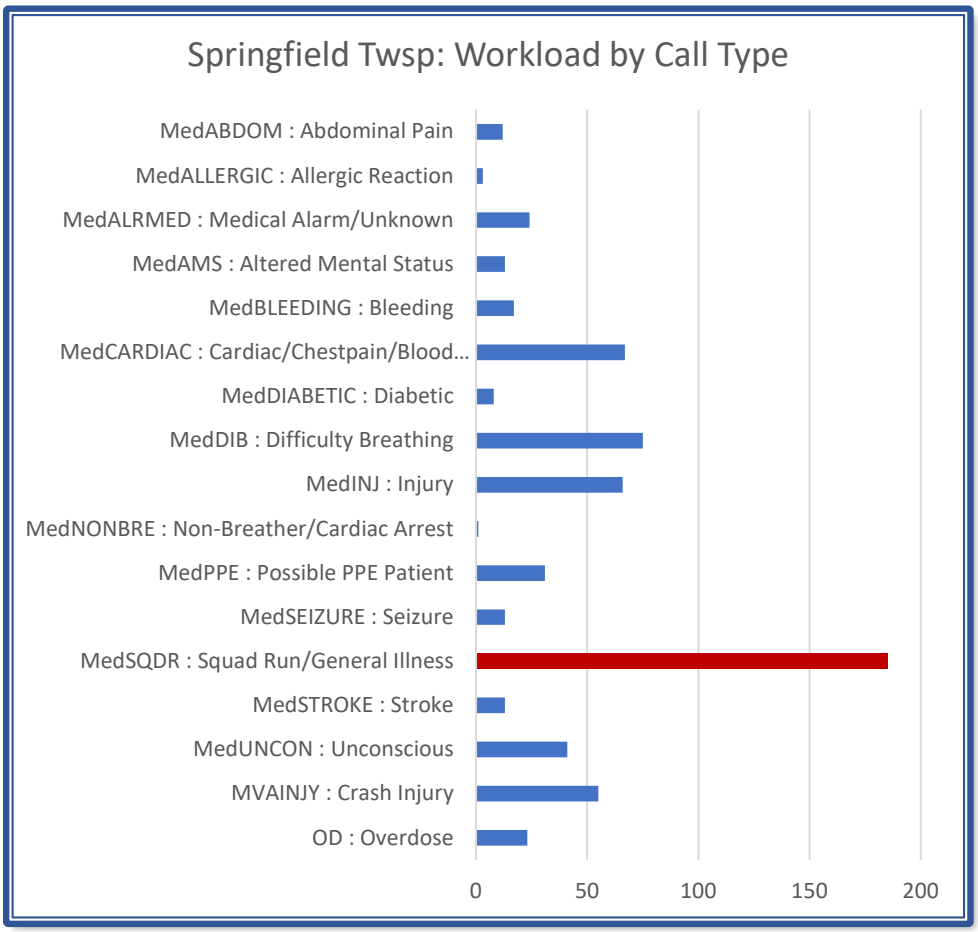
SPRINGFIELD

The Springfield Fire Department has one fire station and provides the primary response of emergency medical incidents to the township. The workload in the township over the three years of data includes 647 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 28.5% of the volume.



For the three-year data period, 28% of the incidents were handled by the Springfield Fire Department. The following chart shows the workload level by full year and by provider in relation to the total. Note that the total volume has been relatively stable, averaging 216 calls per year. It appears that primary provider and private provider response has decreased while mutual aid response has increased over the data period.

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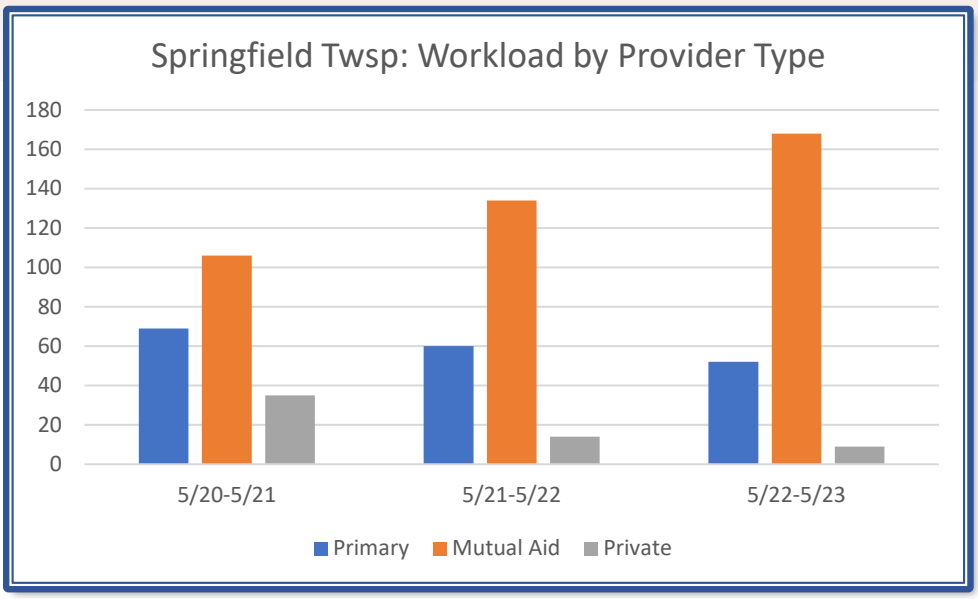
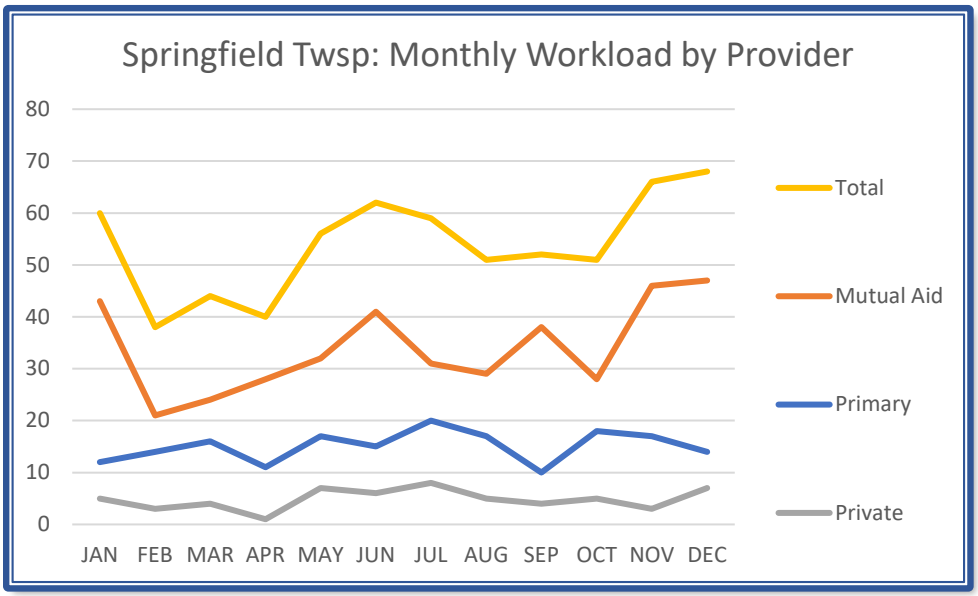


When the data is examined on a monthly basis, The volumes are varied over the year with higher volumes noted in summer and late fall months.



On a daily trend basis, Sundays are the busiest than the rest of the week.

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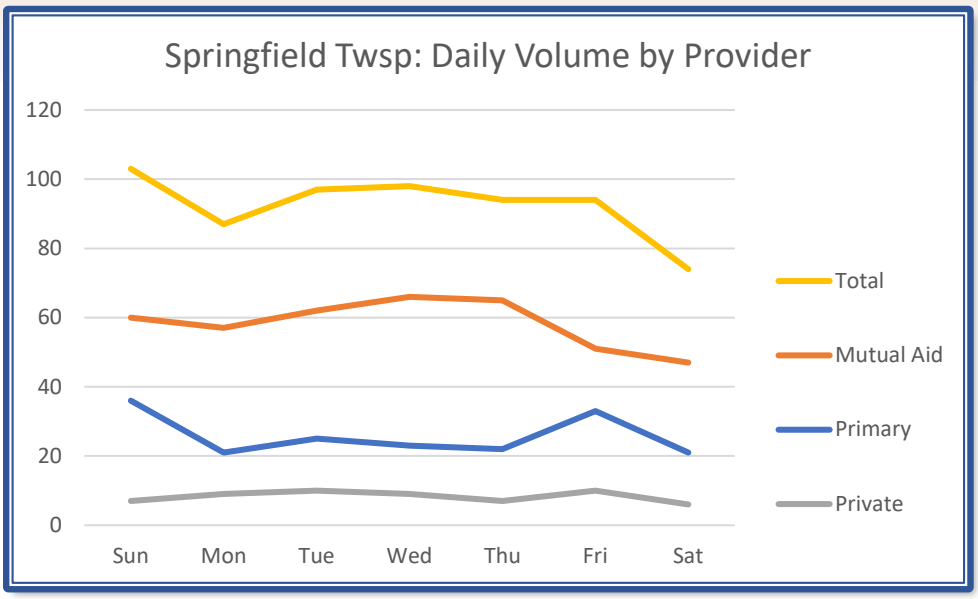
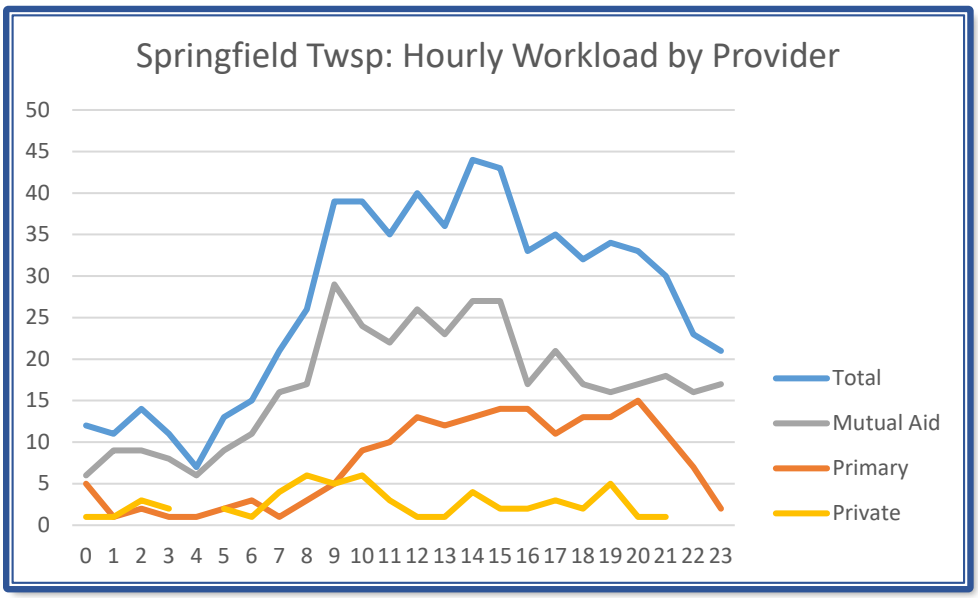


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 4AM and increases until the late afternoon, tapering off afterwards. Primary provider response increases during the daytime hours.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

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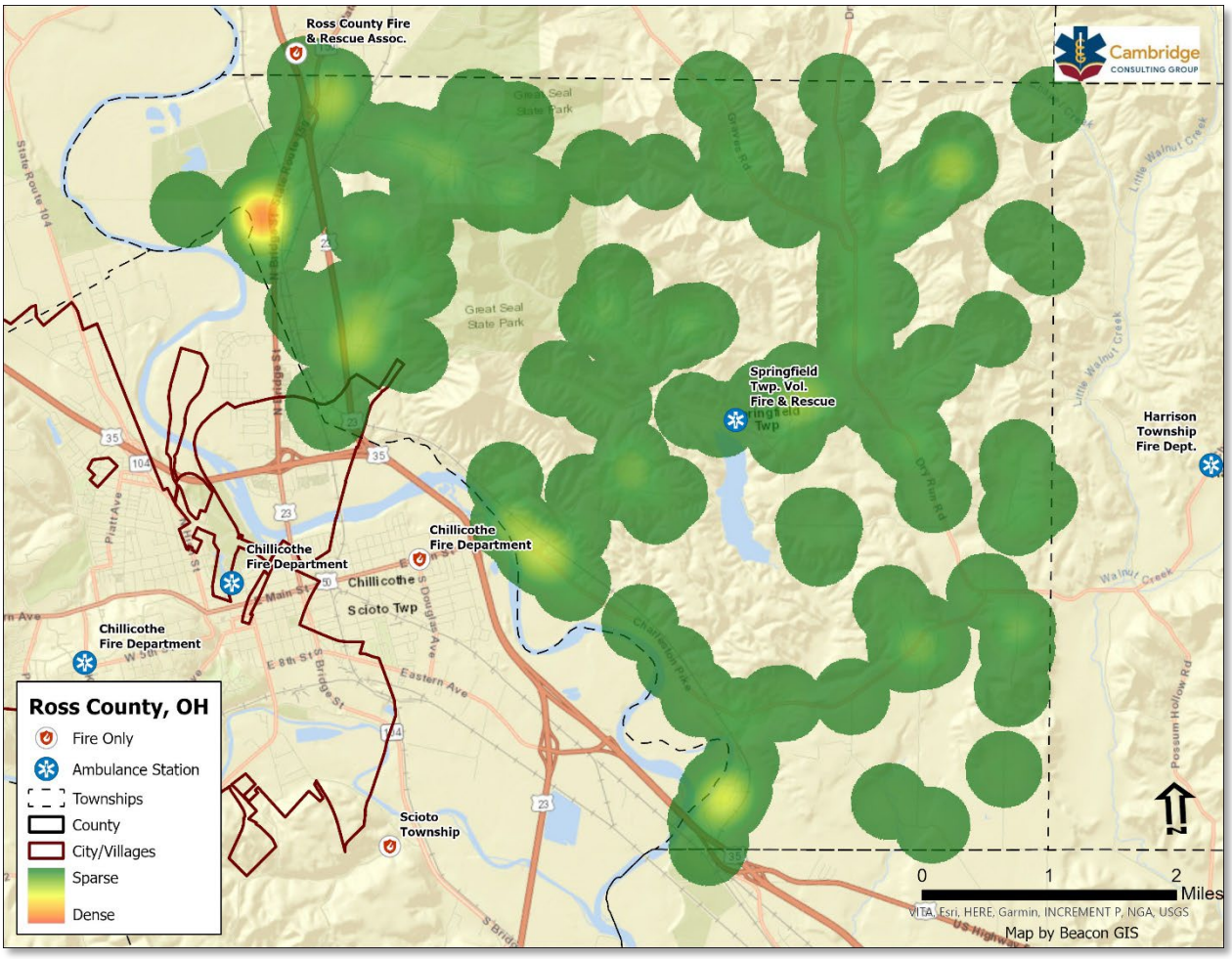
Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:17:41	0:18:06	No Data
80th Percentile	0:23:39	0:24:45	No Data

The following map shows where within the Township the incidents are most concentrated.



The concentrated areas of demand are on the west side of the township.

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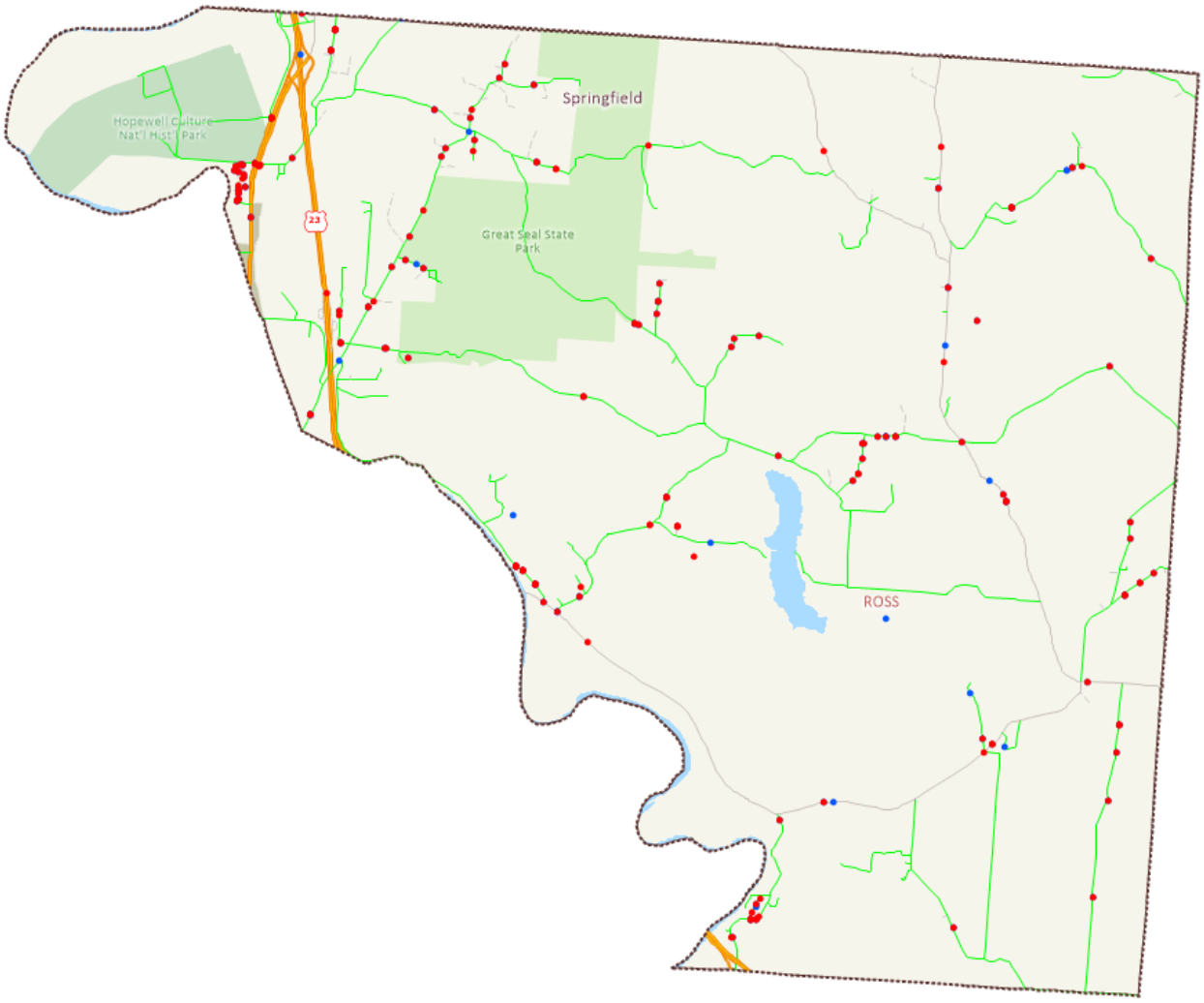
Agency: Primary (Blue) Mutual Aid (Red)



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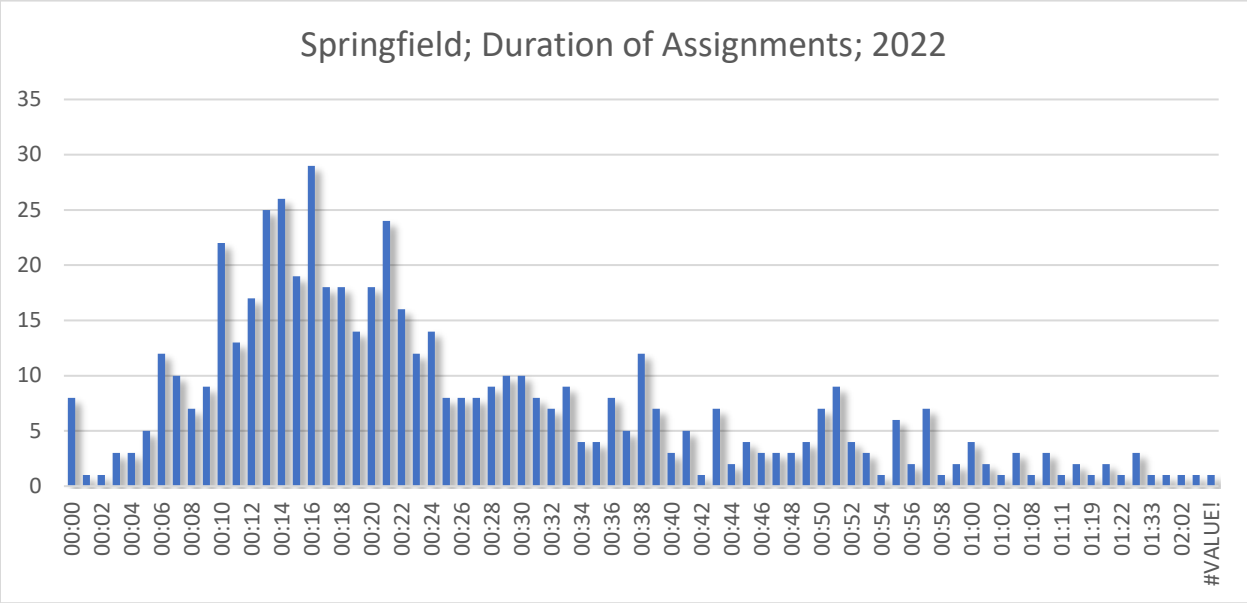
Springfield saw no concurrent assignments in 2022.

Springfield demonstrated a typical call duration pattern, with the majority of non-cancelled calls lasting between 10 and 40 minutes.



Springfield Township experienced no EMS activity for 191 days (52%) of 2022.

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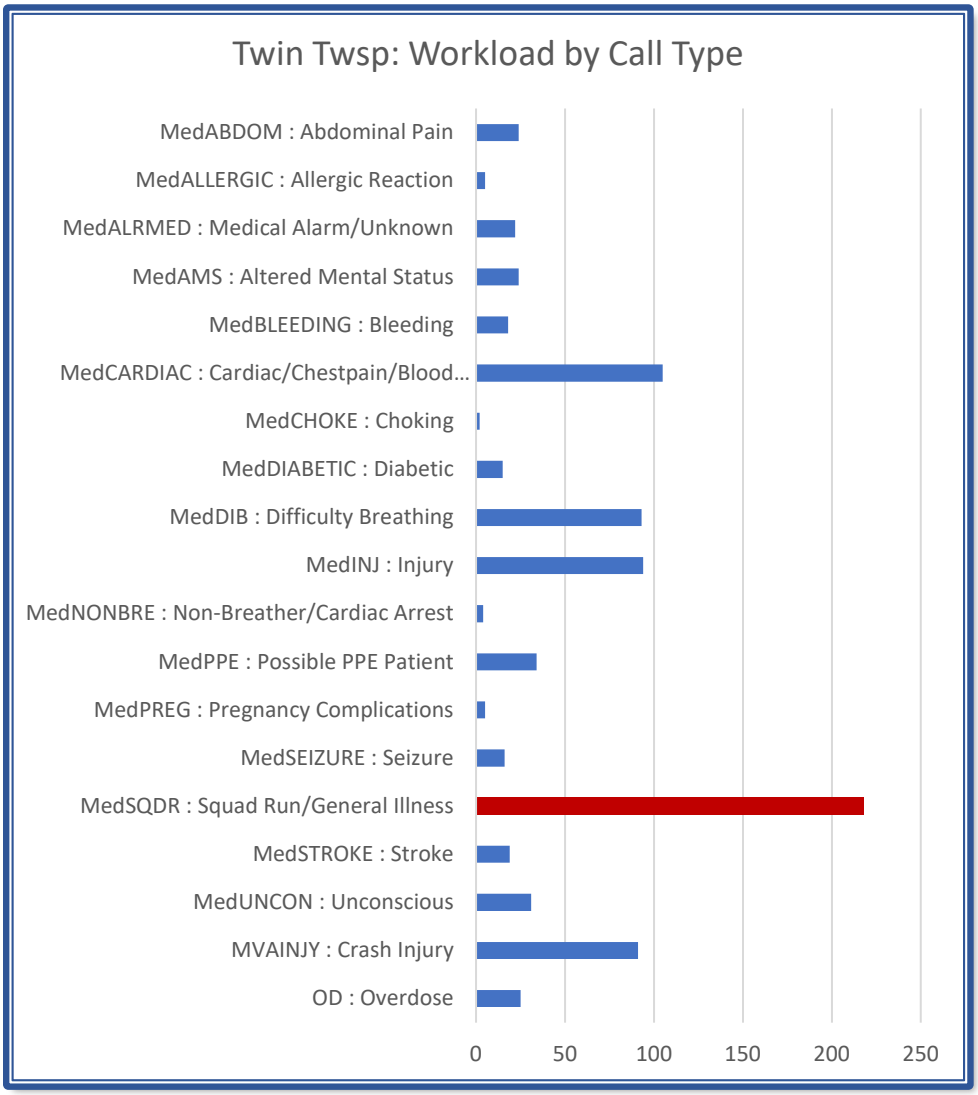
TWIN

The Twin Township Fire Department has one station and was the primary response to emergency medical incidents in the Township until January 2023 when it relinquished responsibility to three area providers: Scioto, Huntington, and Paxton. The workload in the township over the three years of data includes 845 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 26% of the volume.



For the three-year data period, 74% of the incidents were handled by mutual aid agencies. The following chart shows the workload level by full year and by provider type in relation to the total. Note that the total volume has been stable, averaging 281 calls per year.

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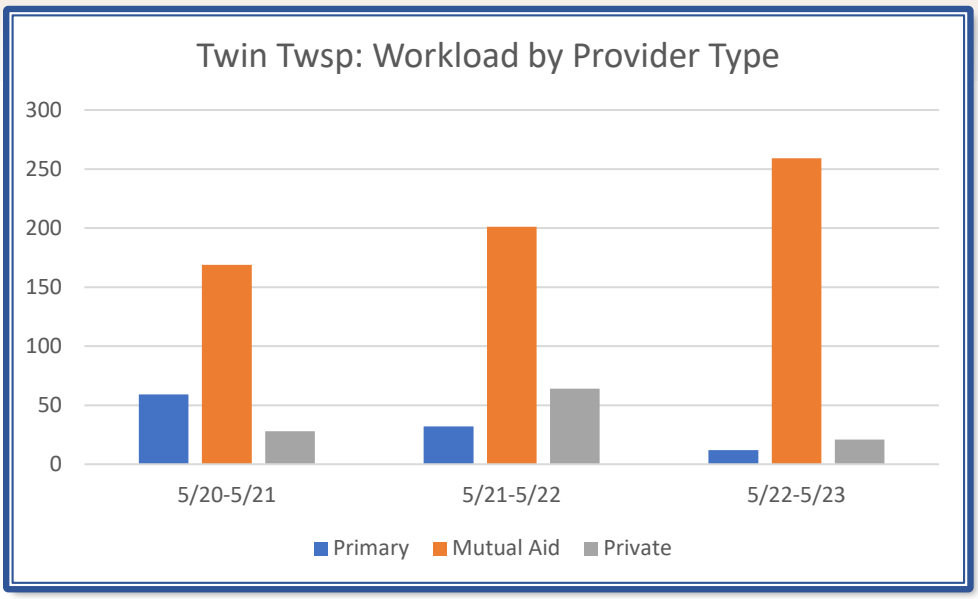
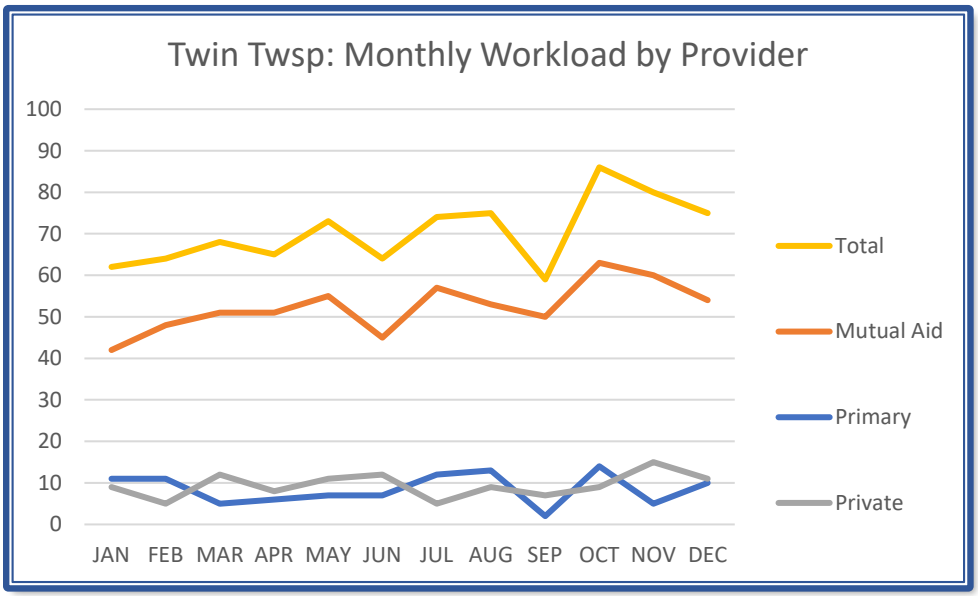


When the data is examined on a monthly basis, the volumes generally increase through the year with a brief dip in volume in September.



On a daily trend basis, Tuesdays are the busiest days the rest of the week is stable.

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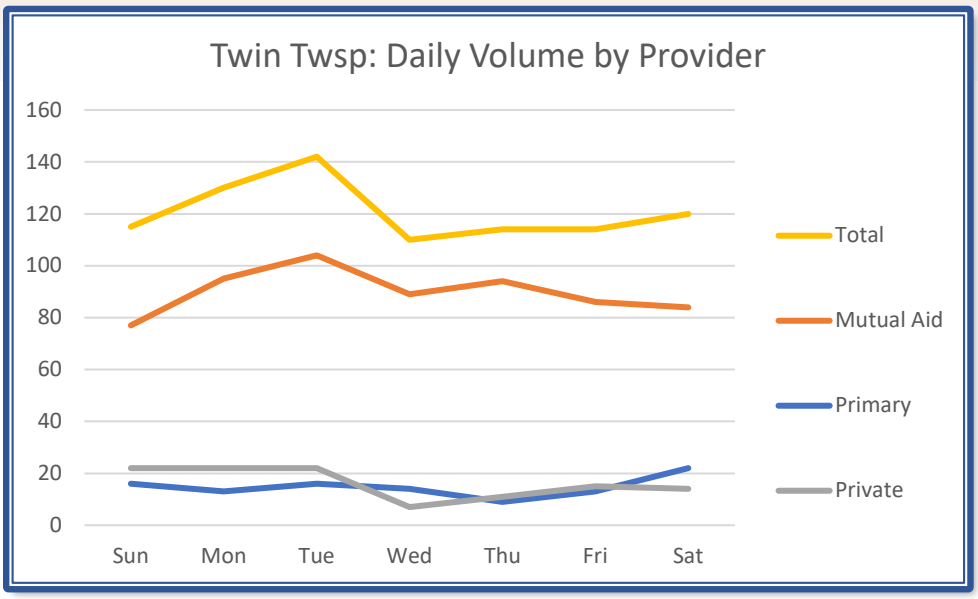
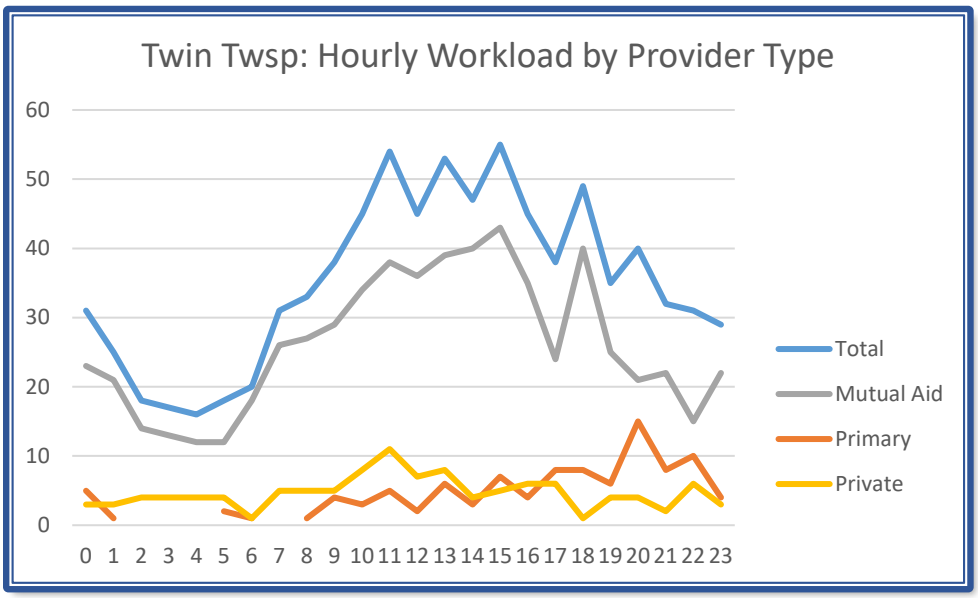


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 5AM and increases into the afternoon gradually decreasing in volume through the evening.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

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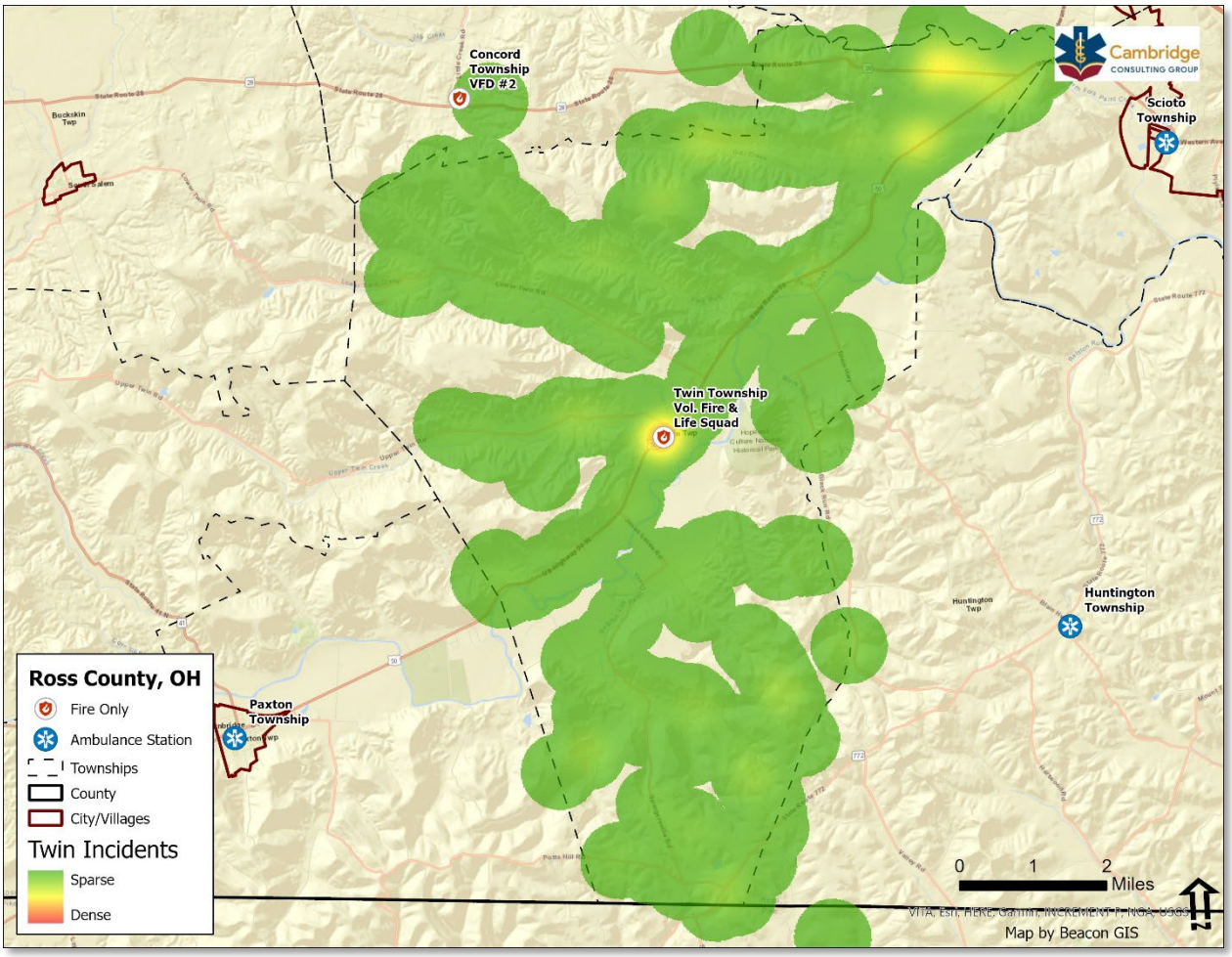
Assigned to Onscene	Primary	Mutual Aid	Private
Average	0:18:04	0:20:55	No Data
80th Percentile	0:23:12	0:27:48	No Data

The following map shows where within the Township the incidents are most concentrated.



The highest concentration of incidents is near the fire station and in the northeast part of the Township.

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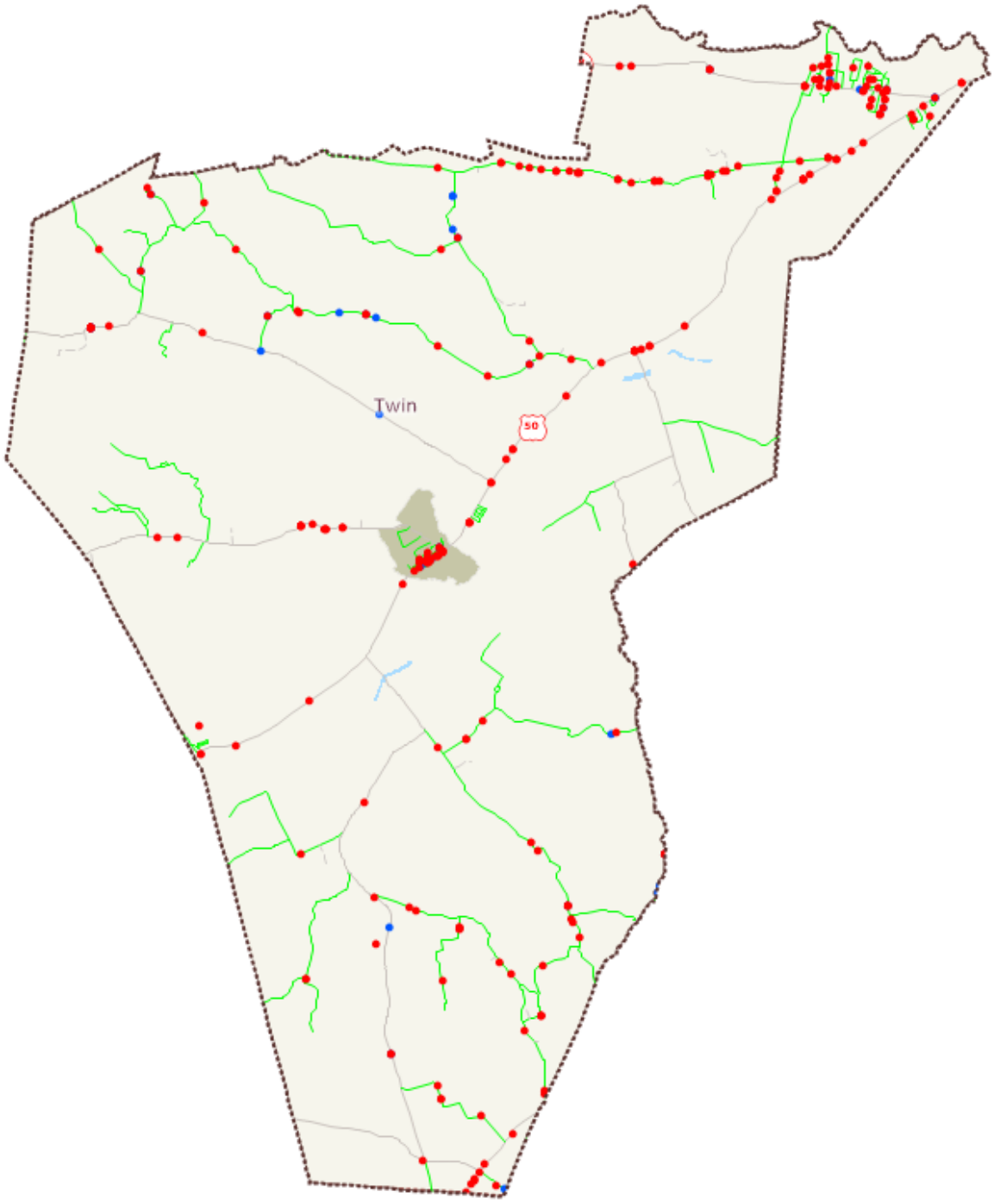
Agency: Primary (Blue) Mutual Aid (Red)



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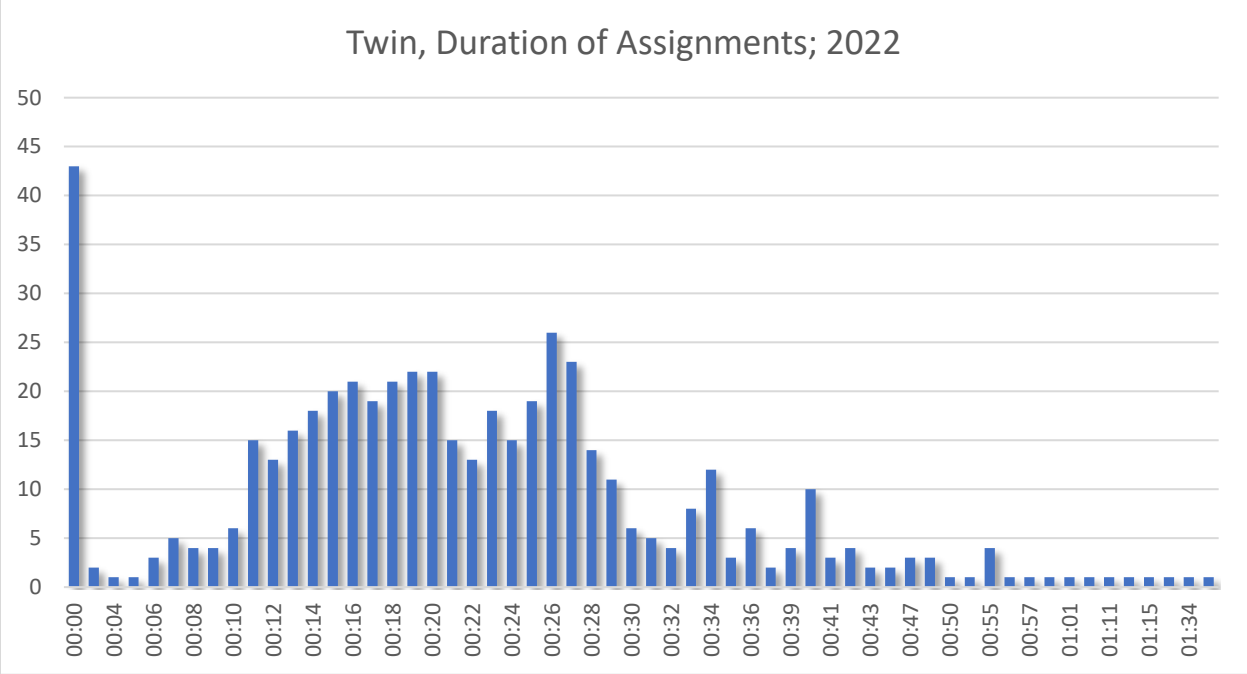
Twin Township saw two times when they had concurrent dispatches in 2022.

Twin Township experienced a classic pattern of EMS call duration, with non-cancelled assignments lastly mostly between 10 minutes and 30 minutes.



Twin saw no EMS activity for 170 days (47%) of 2022.

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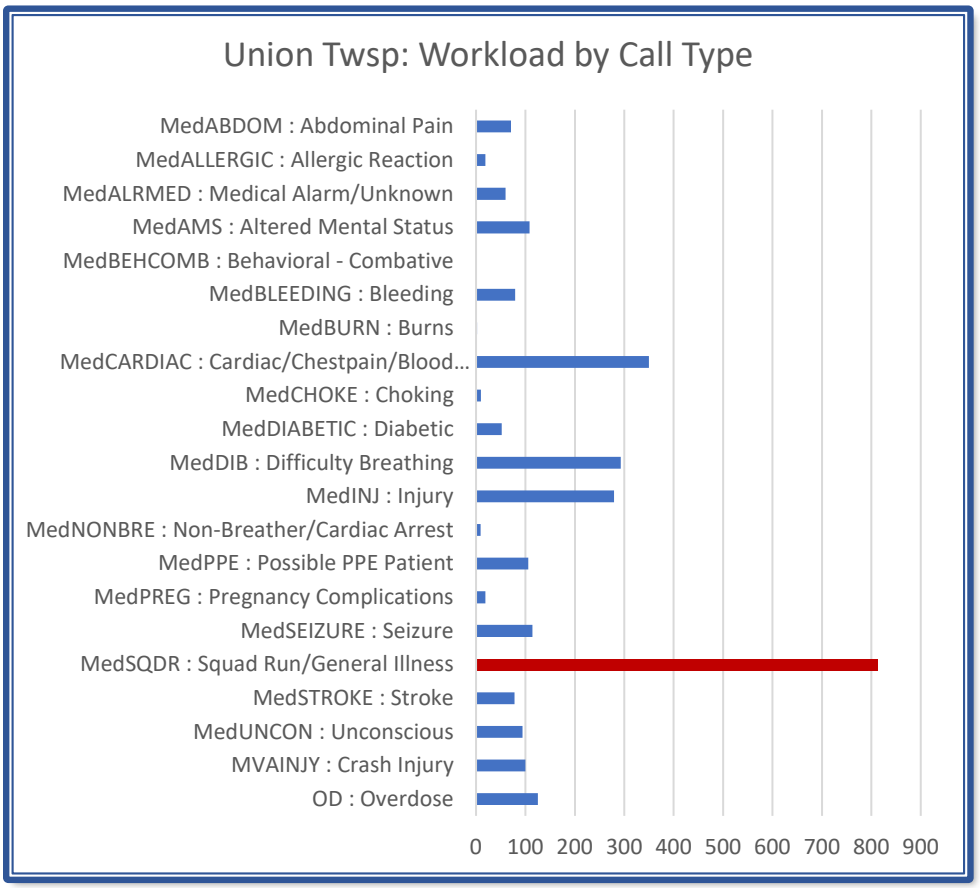
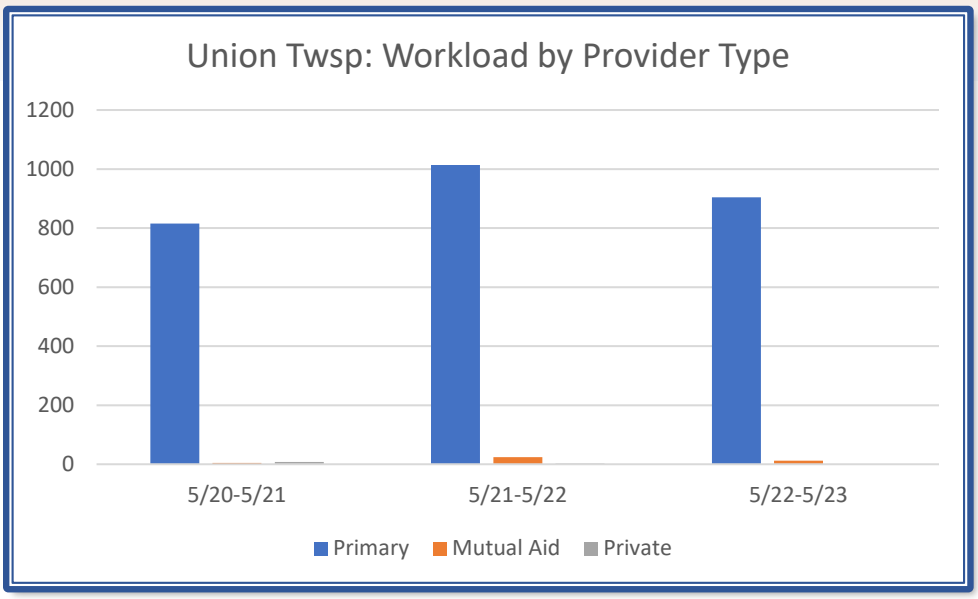
UNION

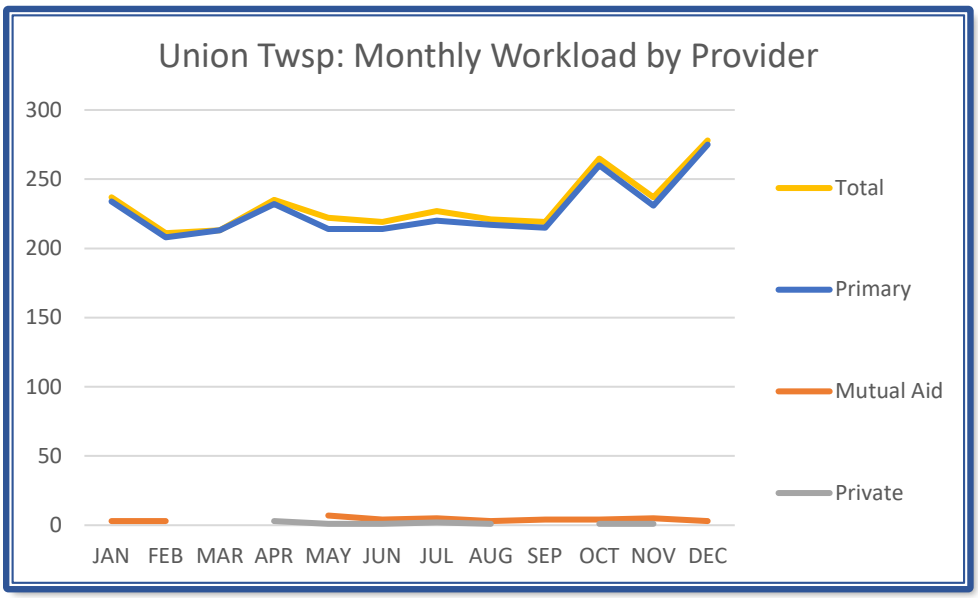
The Union Fire Department has three fire stations and provides primary response of emergency medical incidents from two of them. The workload in the township over the three years of data includes over 2,700 incidents. The most frequently dispatched incident type is the unspecific "Squad Run/General Illness" accounting for 29.2% of the volume.



For the three-year data period, 98% of the incidents were handled by the Union Township Fire Department. The following chart shows the workload level by full year and by provider in relation to the total. Note that the total volume has been relatively stable, averaging 928 calls per year.



When the data is examined on a monthly basis, The volumes are stable over the year except higher volumes at year's end. Mutual aid assistance and private service use is low and speaks to the reliability of the primary provider's ability to respond.



On a daily trend basis, Tuesdays are the busiest than the rest of the week, but it is overall stable.

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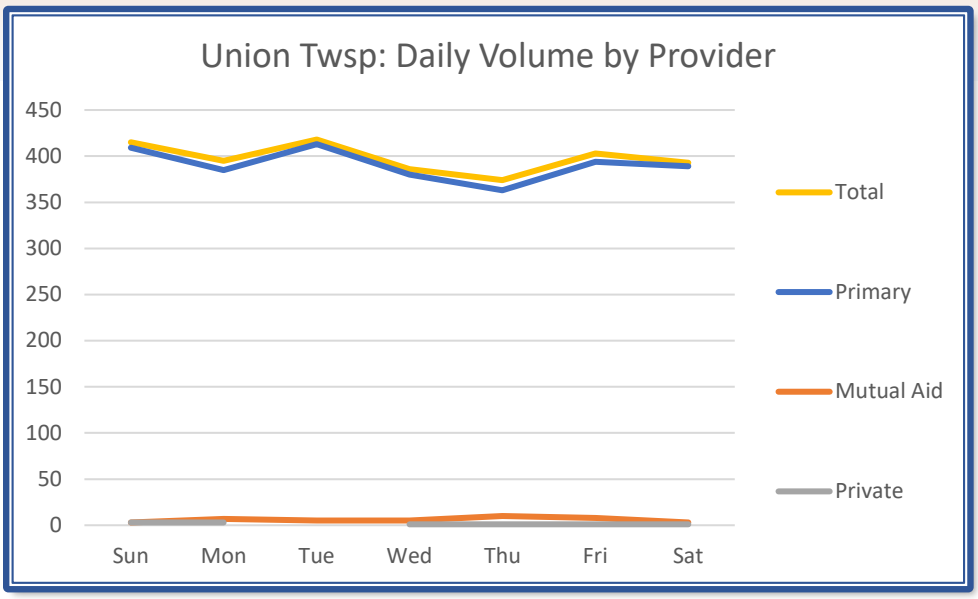
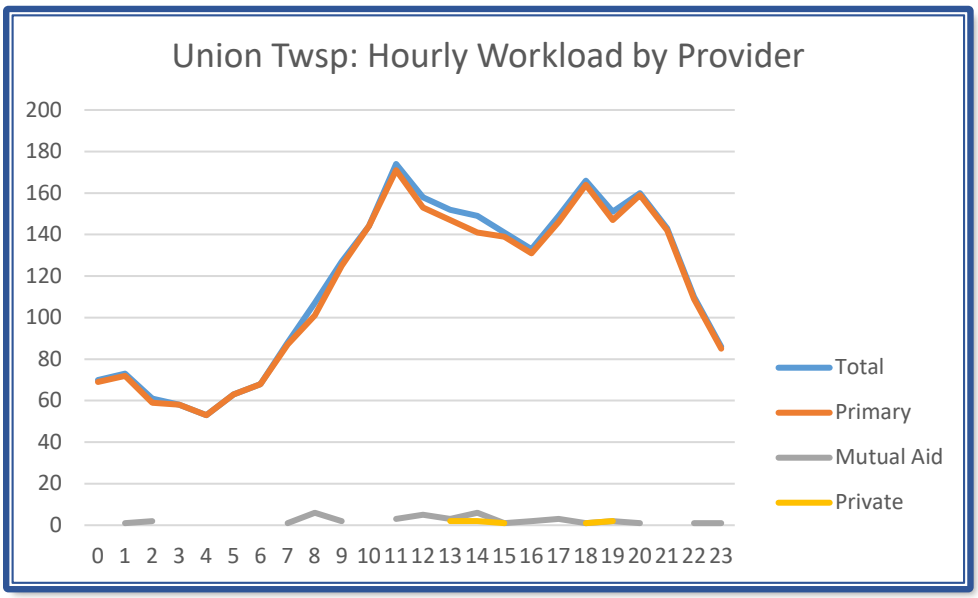


A typical pattern seen in emergency services of higher daytime volume of incidents is noted as the volume begins at 6AM until 10Am then a lull in volume amount until a peak in the early evening hours tapering off afterwards.



Response time performance by provider type to all call types is noted in the following table. Again, criticality of the call was not provided in the data.

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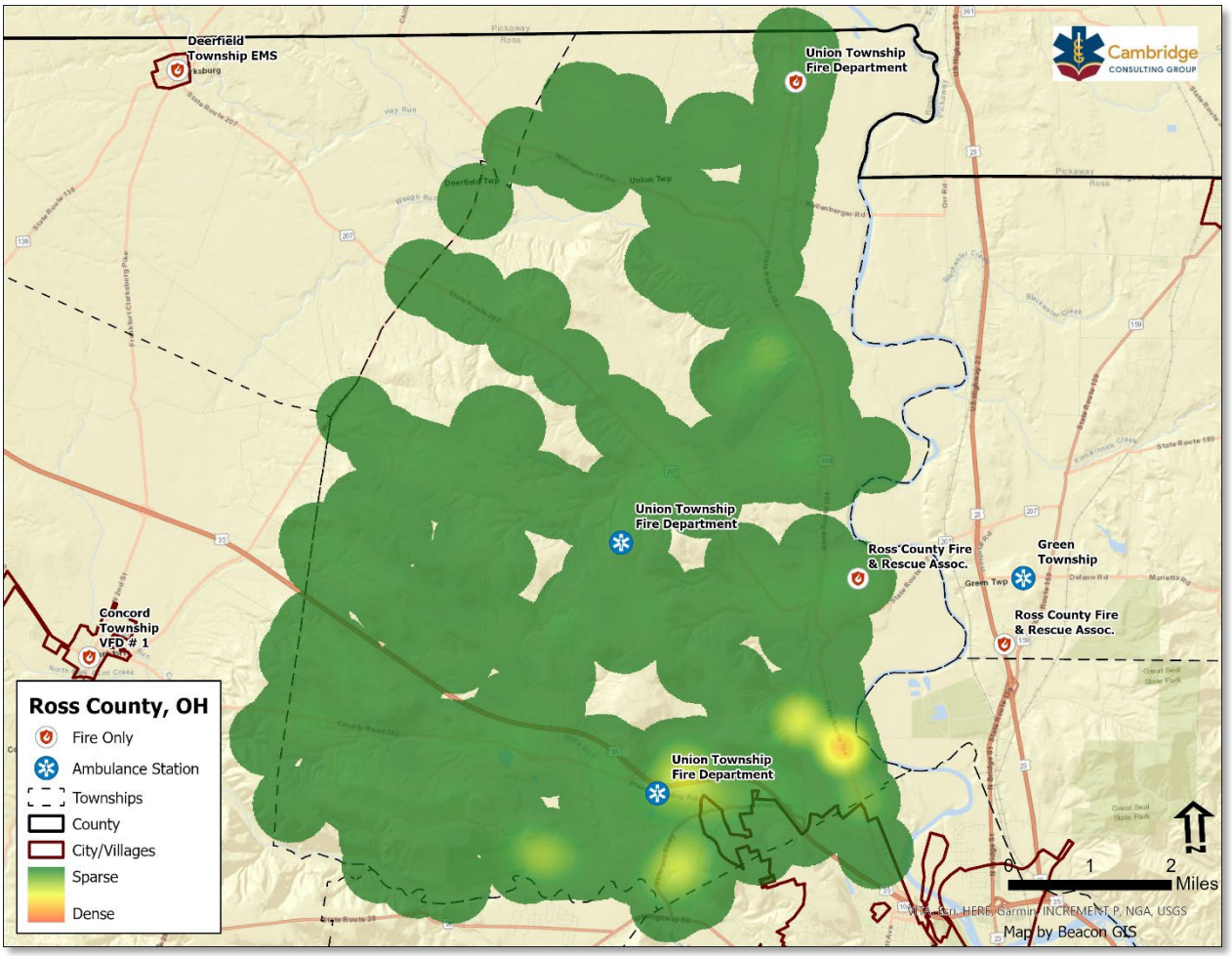
Assigned to Onscene	Primary	Mutual Aid
Average	0:11:51	0:12:19
80th Percentile	0:17:14	0:21:26

The following map shows where within the Township the incidents are most concentrated.



The areas of demand are scattered throughout the township. Higher concentrations are noted in the southeast part of the township closer to the City of Chillicothe.

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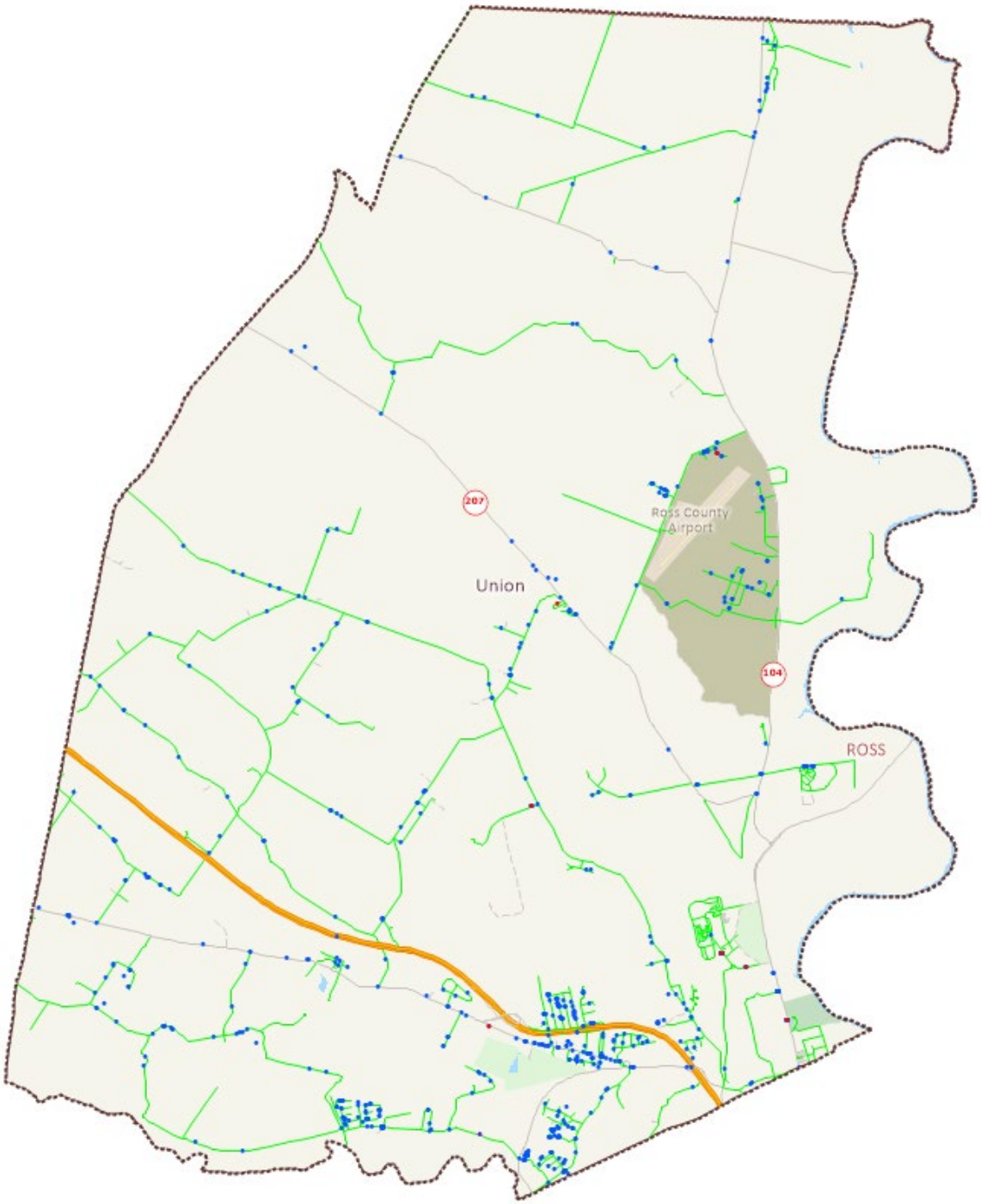
Agency: Primary (Blue) Mutual Aid (Red)



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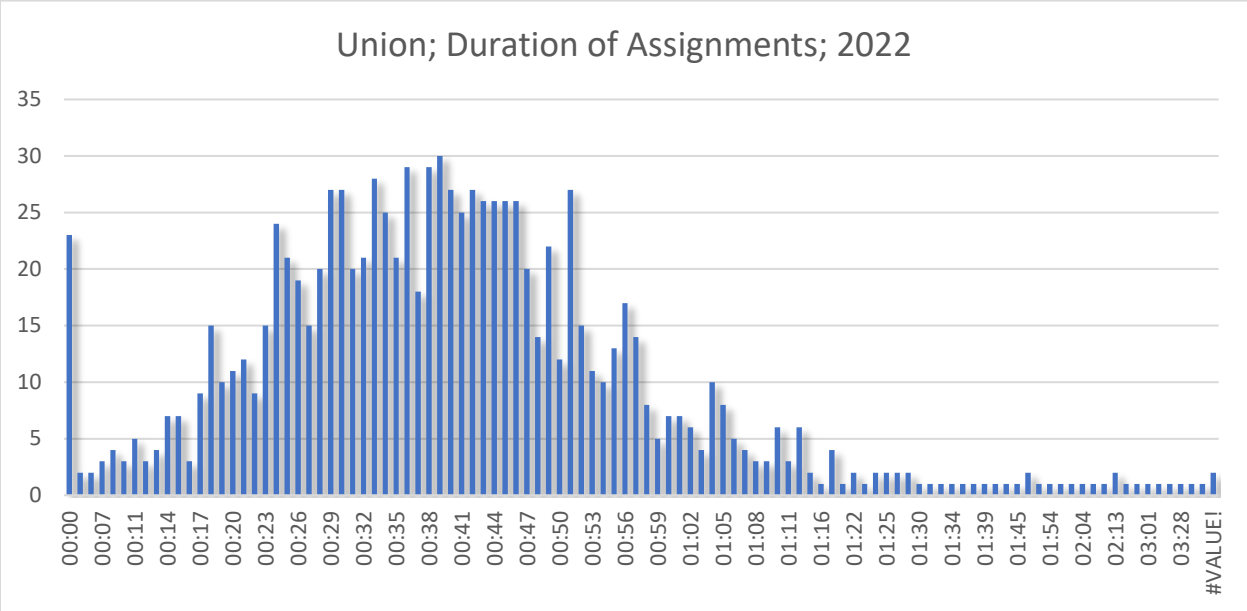
Union experienced one instance in 2022 when they had a concurrent assignment.

Union's assignment duration pattern was typical, with active cases lasting between 15 minutes and just over an hour.



And, there were 23 days during the year 2022 when Union experienced no EMS activity.

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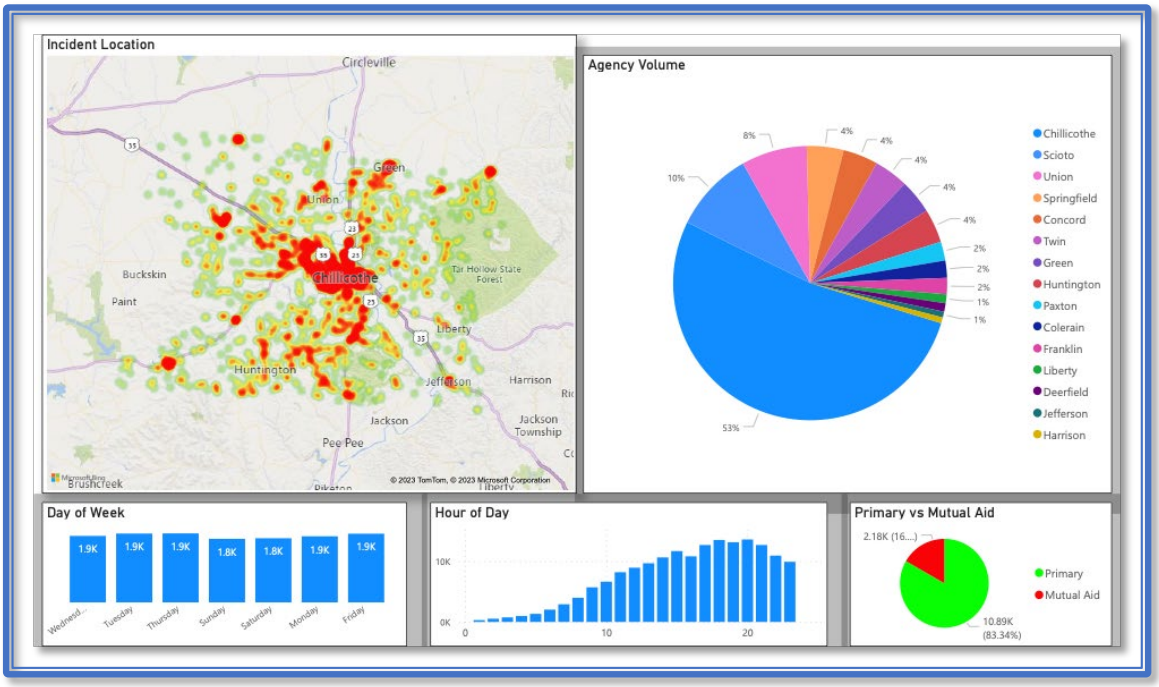
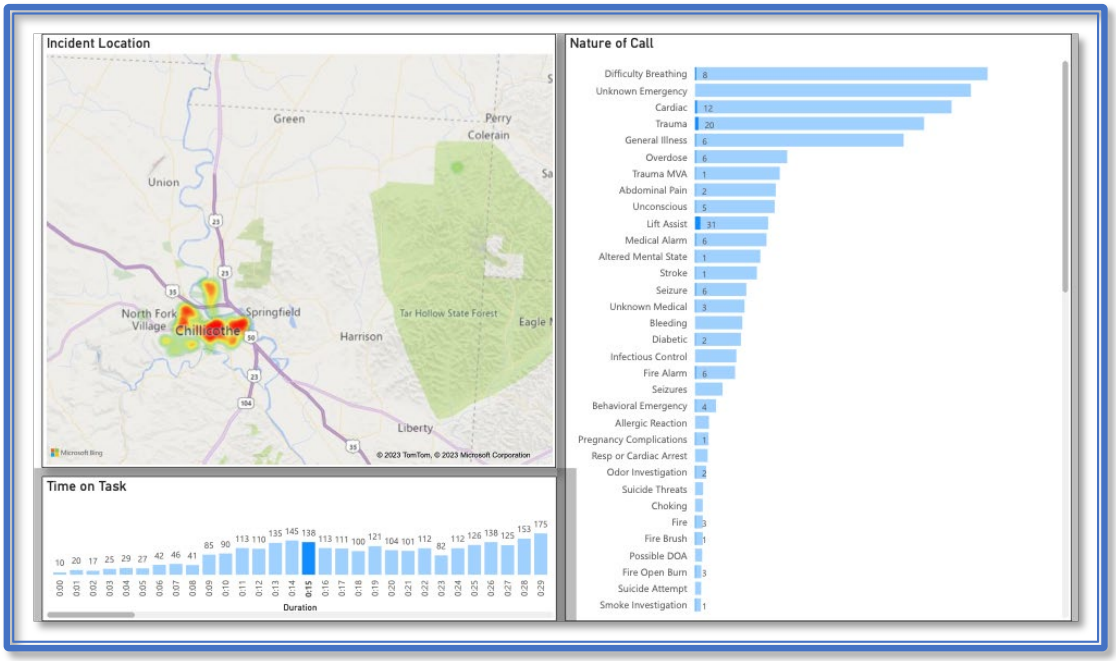
REPORTS

Cambridge Consulting Group has created interactive, dynamic reports using the Microsoft Power Business Intelligence® (PBI) platform with Ross County EMS data. These reports are available to authorized representatives of Ross County.





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FUNDING AND TAX LEVY'S

Currently, several townships have tax levies in place that are used, or partially used, to financially support EMS services. It is difficult to decern from the documents provided to Cambridge Consulting Group exactly for what the levy funds are being used. In some cases, it appears to be for capital equipment acquisition. Mostly, however, the purpose of the funds is not detailed.

Scioto, Jefferson, and Frankford Townships each reported current tax levies were in place at least partially to fund EMS operations or capital expenditures. Those levies ranged from $49,000 to $174,000. Seven jurisdictions reported that they billed for EMS services, with three of them indicating those funds were the only source of financing EMS services[34]. If this is the case, there would be a significant funding opportunity through billing, that remains untapped.

Approving a tax levy for EMS services in Ohio involves a comprehensive process that requires thorough planning, community engagement, and strategic campaigning. Understanding this process is crucial for EMS providers, as it enables them to navigate through potential challenges and secure the necessary support for their initiatives.

STEPS TO INITIATE A TAX LEVY FOR EMS SERVICES

Conduct a needs assessment: Before initiating a tax levy proposal, it is essential to conduct a needs assessment to determine the specific requirements of the EMS service in question. This assessment should include an evaluation of current resources, projected demand, and any gaps in service delivery.

Develop a comprehensive proposal: Once the needs assessment is complete, a comprehensive proposal outlining the specifics of the tax levy initiative should be developed. This proposal should include details such as the purpose of the levy, the anticipated impact on the community, and the proposed tax rate.

Engage key stakeholders: Building support for the tax levy requires active engagement with key stakeholders, including community leaders, elected officials, and local organizations. It is crucial to present the proposal to these stakeholders, addressing any concerns or questions they may have and highlighting the benefits of the tax levy for the community.

Community education plays a vital role in gaining support for the tax levy proposal. It is important to inform residents about the necessity of the tax levy and how it will directly impact their access to quality EMS services. Here are a few strategies for educating the community:

[34] This is doubtful, since the amount of revenue that was reported associated with their billing appeared to be insufficient to fully fund their EMS operations.

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Public meetings and forums: Organize public meetings and forums where residents can learn about the tax levy proposal and ask questions. These meetings provide an opportunity to address any concerns and provide detailed information about the benefits of the tax levy.

Media outreach: Utilize local media outlets to spread the word about the tax levy proposal. Press releases, interviews, and op-eds can help generate awareness and educate the community about the importance of the tax levy for EMS services.
Collaborate with community organizations: Partner with local organizations, such as community centers, schools, and civic groups, to host educational events. These events can include presentations, demonstrations, and interactive activities to engage the community and provide a deeper understanding of the tax levy proposal.

Gaining community support is critical for the success of a tax levy campaign. Here are some effective strategies to build support:

Create a coalition: Form a coalition of individuals, organizations, and businesses that are invested in the success of EMS services. This coalition can work together to raise awareness, advocate for the tax levy, and mobilize community support.
Utilize social media: Social media platforms provide a powerful tool for reaching a wide audience and generating support. Create engaging content, share success stories, and encourage community.

Door-to-door campaigns: Organize door-to-door campaigns to personally engage with residents and provide them with information about the tax levy proposal. This direct interaction allows for a more personal connection and an opportunity to address any concerns or misconceptions.

The approval process for tax levies can be complex and challenging. Here are some common challenges and strategies for overcoming them:

Addressing opposition: It is not uncommon to face opposition from individuals or groups who are skeptical about tax levies. To overcome this challenge, focus on providing accurate information, addressing concerns, and emphasizing the positive impact the tax levy will have on EMS services and the community.
Financial considerations: Some residents may be concerned about the financial burden of a tax levy. It is important to clearly communicate the anticipated costs and explain how the tax levy will be.

Building trust: Building trust is crucial in gaining support for the tax levy. Transparency, open communication, and accountability are key factors in establishing trust with the community. Provide regular updates on the progress of the tax levy campaign and be responsive to any questions or concerns raised by community members.

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Ohio State Levy Limits

A current Ten-Mill limitation on tax levies is detailed under Section 5705.02 and of the Ohio Revised Code, Title 57 “Taxation”, Chapter 5705 “Tax Levy Law”.

“The aggregate amount of taxes that may be levied on any taxable property in any subdivision or other taxing unit shall not in any one year exceed ten mills on each dollar of tax valuation of such subdivision or other taxing unit, except for taxes specifically authorized to be levied in excess thereof. The limitation provided by this section shall be known as the "ten-mill limitation," and wherever said term is used in the Revised Code, it refers to and includes both the limitation imposed by this section and the limitation imposed by Section 2 of Article XII, Ohio Constitution.”

The County will need to take into account any limitation on tax levies if it pursues a solution that requires funding at the County level.

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EMS SYSTEM DESIGN

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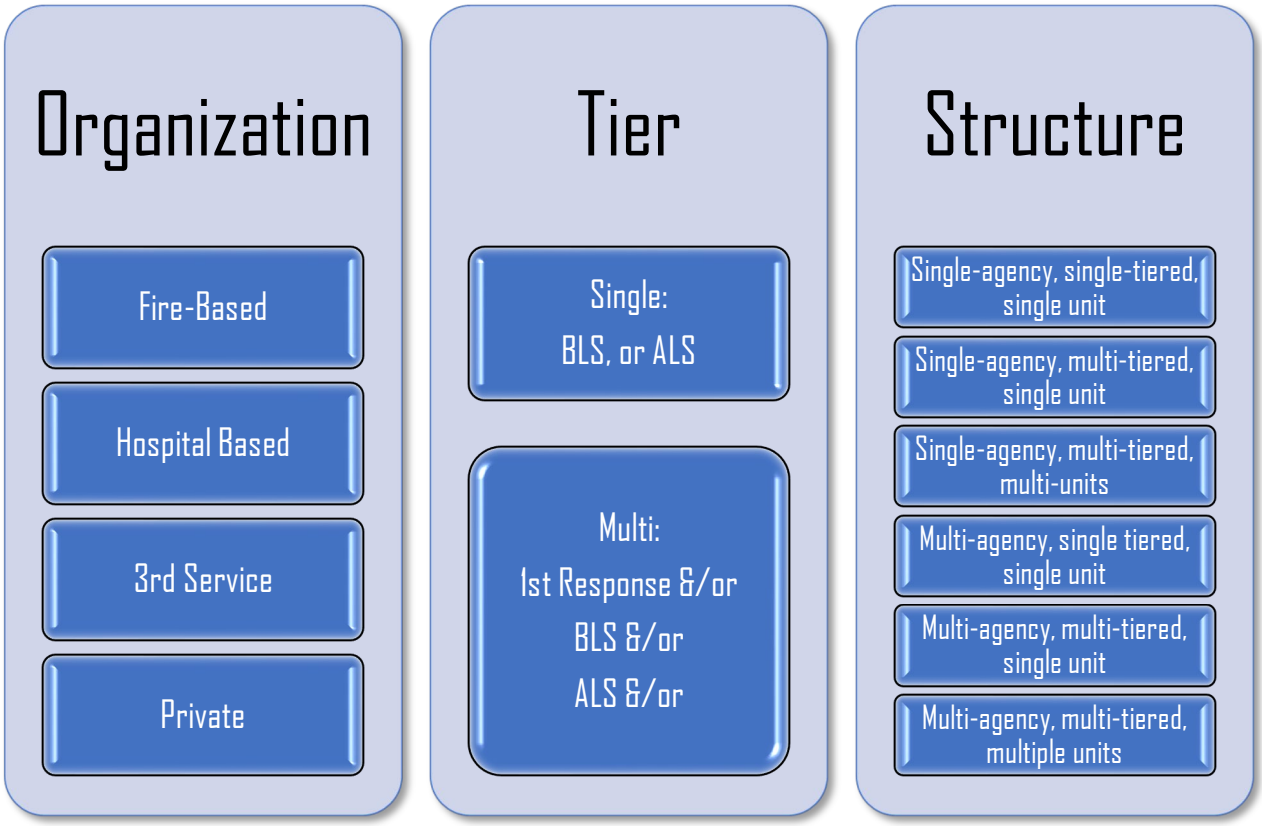
Models of EMS Service Delivery

In 1971, the American Academy of Orthopedic Surgeons (AAOS) published the first edition of a book which laid the foundation of EMS training. This physician group with a hospital focus proclaimed Care and Transportation of the Sick and Injured as the fundamental objective of any EMS system. In 1973 the EMS Systems Act, further defined the elements of a modern system. This landmark legislation delineated the structure, education, oversight, and funding of EMS. Thereby fortifying the role hospitals play in developing and delivering EMS.

Emergency Medical Services (EMS) in the United States are provided by entities segregated into a few, different and distinct organizational structures (Kirkwood, et al., 2015). Approximately 40% of EMS provided in the country is through fire-based agencies, with another 20% through non-fire-based governmental organizations. Hospital-based services account for about 6% of all EMS provision, while private, non-hospital-based services deliver 25% of America's EMS (Federal Interagency Committee on Emergency Medical Services, 2011).

EMS is provided using a combination of characteristics from three delivery model elements. These are: Structural, Tiers and Organizational.



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EMS Structural Models

EMS in a given community is delivered through one of several structural models, some of which are regulated by states, counties, or regional authority councils, others controlled by public utility model authorities (PUM) or local political determinations. These structural models include (Zavadsky, 2015) (Walz, 2002);

- Single-agency, single-tiered, single unit:

  One organization provides all EMS at one level (tier) of care. That level of care could be the Basic, Intermediate, or Advanced Life Support.

- Single-agency, multi-tiered, single unit:

  One organization provides all EMS but responds units of different tiers to emergencies based on the severity of the patient.

- Single-agency, multi-tiered, multi-units:

  One organization provides all EMS but responds more than one unit to emergencies based on the severity of the patient. Typically, the closest and first arriving units are of lower tiered capability, while Advanced Life Support units are stationed regionally and service several, more locally based Basic Life Support and Non-transport first-response units.

- Multi-agency, single tiered, single unit:

  Several organizations provide EMS to a particular jurisdiction, all at the same tier and with one unit. They are sent to the emergency based on its location, through previously delineated geographic boarders.

- Multi-agency, multi-tiered, single unit:

  Several organizations (usually only two) deliver the EMS, one which provides Basic Life Support and the other Advanced Life Support. Either one or the other of the organizations is sent to the emergency based on the severity of the patient.

- Multi-agency, multi-tiered, multiple units:

  Several organizations provide the EMS and together respond more than one unit to emergencies based on the severity of the patient. The closest and first arriving units could be lower tiered and usually not transport capable, while Basic Life Support ambulances are more regionally located. Both respond to all emergencies. Advanced Life Support units are stationed to support several Basic Life Support and are held in reserve for only severely ill or injured patients.

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EMS Tier Models

Emergency medical services is sometimes provided by way of a single tier of delivery, as referenced above. However, in many jurisdictions throughout the United States, EMS programs employ multi-tiered response systems. While there are many permutations of how these systems are designed and the number of levels they actually use, they can be refined for the purposes of simplicity into three. Hence, multi-tiered EMS systems basically divide their organization of response into First Responder, BLS and ALS levels[i,ii].

This section highlights a classic three-tiered EMS system for special consideration.

In a three-tiered EMS system, often, the First Responder component is a single person who has a limited amount of EMS training, although they may be trained to the EMT[35] (Emergency Medical Technician) level, and minimal equipment. In some cases, First Response units may be staffed with paramedics. This tier is often provided by the local police, fire, or EMS department. Sometimes, however, usually when provided by fire departments, the First Responder unit may have several crew members, such as an engine company, where one or more are trained in basic EMS skills, again, possibly to the advanced paramedic level. First Responder units today commonly carry AEDs (Automated External Defibrillators) along with rudimentary medical supplies and equipment but are not usually transport capable.

The second level, BLS (Basic Life Support), almost always uses a fully equipped ambulance staffed by at least one EMT, but frequently two. This unit is inventoried with the minimum type and number of medical supplies and equipment needed for providing the state's standard for basic life support care and transport to a hospital.

Lastly, the ALS[36] (Advanced Life Support) level, is a unit which carries much higher capability medical equipment, as well as an array of medications, and is crewed by at least one paramedic, sometimes two. Each state has established different scope of practice standards for advanced life support services, but in all cases, they provide a level of medical intervention more complex and significantly beyond that of the EMT in a BLS ambulance.
This last level of EMS response is often referred to as "paramedic intercept" in a multi-tiered system. However, caution is necessary when utilizing this term, because it is also a very specific designation for a rare class of reimbursement eligibility under Medicare[37] billing rules that is narrower than when used in the context of discussing an EMS system response model.

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[35] For the purposes of this chapter, EMT refers to the BLS level EMT, often called the EMT-B (Emergency Medical Technician-Basic) or EMT-D (Emergency Medical Technician-Defibrillator). Another designation, the EMT-A, is no longer used and was often confusing, since the listener/reader did not always know whether it referenced an Emergency Medical Technician-Advanced or an Emergency Medical Technician-Ambulance, with the former being a much higher trained practitioner than the latter. To avoid misunderstanding the EMT-P, which is now used to mean an Emergency Medical Technician-Paramedic, will be referred to as simply a Paramedic.

[36] ALS is often referred to as MICU (Mobile Intensive Care Unit) in many parts of the country. The terms are usually interchangeable.

[37] Medicare is also interchangeably referred to as CMS (the Centers for Medicare and Medicaid).

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In multi-tiered systems, responses to EMS requests are usually graduated based on the initial call-in information and interrogation of the caller by trained dispatchers. This means, if the type of medical emergency discerned from the original request warrants only a BLS ambulance, then a paramedic unit is not initially dispatched. If, however, the caller indicates a serious or life-threatening crisis, local dispatch protocol will usually require either both the BLS and ALS units, or just the ALS unit, be sent. In almost all cases the First Responder unit is activated since it is often closer. Also, the higher the level in the tier, the fewer the units, in the system, the larger the area each serves and the more regionally they are based. Thus, the response times for various EMS units in the tiered model are usually quicker for the lower levels and longer for the more advanced.

EMS Tiers	Examples of Response Time Averages
First Responder	5 minutes
BLS Ambulance	9 minutes
ALS (Paramedic) Intercept	11 minutes

As an example, there may be nine First Responder units, three BLS ambulances and one ALS unit that cover a particular geographic area. And the First Responder apparatus is almost never transport capable while the ALS unit is often not an ambulance either. In these cases, the ALS unit is frequently referred to as a Paramedic Chase vehicle and uses a car or SUV[38].

Multi-Tiered Response Delivery Model

The generally accepted definition of a multi-tiered[39] EMS delivery system is one in which emergency medical services are provided by both basic life support and advanced life support units, operating in the same coverage region, and dispatched in a selective, triaged manner. In such operations, there are significantly more BLS ambulances than ALS units and the former are dispersed in a localized manner to each municipality or unincorporated community. The ALS units are stationed to cover multiple towns and support several BLS ambulances.

In addition, since the ALS units are fewer in number and reserved in a two-tiered system for the more serious EMS cases, they are typically located to optimize their response times.
This requires sophisticated data assessment and usually requires these units to change their ready location during a shift more often than BLS ambulances.

Therefore, two-tiered systems are comprised of a local Basic Life Support "first level"[iii] and a regional Advanced Life Support (also referred to as the mobile intensive care or paramedic unit) "higher" level[iv]. The BLS ambulances respond to all 911 calls and transport virtually all the patients. The ALS tier responds to only about a third of these calls, which are life threatening.

[38] Some systems refer to the ALS separate response vehicle as a "chase car".
[39] These types of systems are often described as "two" or "three"-tiered models.

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The decision on which units to send to each request is made by the dispatch communications center utilizing a medical priority dispatch system (MPDS).

In some two-tiered systems, the paramedic units do not typically transport the patients, relying on the BLS ambulance for that service. One of the paramedics from the ALS unit accompanies the patient and continues their advanced care treatment in the BLS ambulance. The other ALS crew member[40] will drive the paramedic unit, following the BLS ambulance to the hospital. However, the ALS unit can also be capable of transporting patients and may be used for that purpose routinely in some systems. In these operations, the BLS ambulance that responded with the ALS units initially, will assist the paramedics at the scene but return to available status when the ALS unit transports the patient. In this type of operation, the ALS unit is staffed by two practitioners.

Variations of this model are common throughout the United States, but the fundamental structure remains consistent. Specifically, the two-tiered delivery model operates with separate vehicle fleets of BLS and ALS units, staffing only the ALS unit with advanced partitioners; EMS calls are assigned through medical triaging to the appropriate units based on the severity of the patient's condition, resulting in more BLS responses than ALS dispatches and there are more basic life support ambulances than advanced life support units.

It is important to note that different organizations may provide each tier. In some systems, the BLS level may be provided by local governments, profit or non-profit companies, or volunteer agencies. Likewise, the advanced level may be provided by a hospital (or hospital system), local government, such as a fire department, or an independent corporation. However, it is also possible for one entity to provide both levels of the two-tiered system.

Regardless of who operates which components, a two-tiered system may also function as a public-private partnership, if at least one element of the operation is provided by a non-governmental entity. It is also possible for the public-private partnership to exist if the two-tiered system is organized as a public utility model or semi-autonomous government entity. In both cases, the common structure uses a franchise mechanism to contract the provision of either one or both tiers to a private sector company.

In the two-tiered model, paramedics experience a higher contact volume with severely ill or injured patients than other models as a function of the selective dispatching process. BLS partitioners on the other hand continue to care for a relatively large volume of patients. As a result, the probability exists that all clinicians in the two-tiered system will demonstrate higher proficiency and less skill degradation than with other models.

[40] The ALS unit may be staffed by one paramedic, or one paramedic and an EMT assistant, or, in some systems, by two paramedics.

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For Ross County, such a model would mean multiple BLS ambulances would be located throughout the County and be responsible for responding to all EMS calls. In approximately 67% of these cases, the BLS ambulance would care for the patient without ALS intervention and take care of the patient's disposition, whether transporting them to the hospital or releasing them after treatment.

ALS units, on the other hand, would be stationed strategically in the County to support several BLS ambulances and would be dispatched to only those EMS calls that are triaged as serious or life threatening[41]. This would account for about 33% of all the cases during a given time period. The ALS unit would arrive, in most cases, after the BLS ambulance was on-scene[42]. The BLS crew would already have begun basic level treatment of the patient and the later arriving paramedics would adjunct that care to an advanced level. Once on-scene care was completed, either the BLS ambulance would transport the patient with the paramedic in attendance and continuing care, or, if the system is designed to utilize ALS ambulances for the second tier, the patient would be transported in the paramedic unit while the BLS ambulance would be placed back in service, available for the next assignment.

The direct operational effect on the entities that currently deliver ALS ambulance transport would include modifying staff and crew configuration, as well as acquiring additional vehicles, whether they be ALS ambulances or ALS intercept units. The First Response unit crew configuration would also need to be considered. It could remain ALS in nature or change to the Basic level by replacing paramedics with EMTs. The main issue to be considered is what benefit does an ALS First Response unit offer for the patient in a two-tiered system, when the ALS unit will usually arrive within 10 minutes of the first unit's arrival.

The most critical cases, where time is of paramount importance, consist of those that require a rapid BLS response as well as ALS intervention. BLS staffed First Response units can provide lifesaving care, such as defibrillation, CPR, hemorrhage control, oxygen therapy, fracture stabilization, rescue, and extrication, as well as Aspirin and EpiPens, all before the ALS unit arrives. These are treatment modalities that would need to take place regardless of the presence of ALS at the scene.

If First Response capability was ALS, consideration should be given to changing crew configuration to one paramedic and an EMT. Since additional ALS personnel would arrive within 10 minutes of the First Response unit, a paramedic/EMT would likely be just as capable as a two-paramedic crew (Merlin, Robbins, & Shotwell, 2018). In addition, a paramedic/EMT team provides the opportunity for the ALS practitioner to maintain a higher proficiency of skills due to an increased patient contact volume.

[41] Call triaging would be accomplished by the communications center using an MPDS protocol process.
[42] This is due to the regionally located ALS units as compared to the more locally located BLS ambulances.

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The financial impact of such a change in delivery model would be minimal. In fact, an annual operating cost reduction should be realized throughout the system and especially by the main EMS ambulance provider. Since BLS units are less expensive to staff and operate, modifying the current all ALS system to a tiered BLS/ALS design would substantially reduce the annual cost for most of the transport units. This is primarily due to the lower wages EMTs are paid versus those for paramedics. In addition, with the reduction in the total number of ALS units in this model, when compared to an all-ALS system, less sophisticated medical equipment is required.

EMS Organizational Models

EMS can be provided through several organizational models, which describe the entity, or entities, responsible for delivering service to the community. These organizational types typically fall into one of several categories: Local EMS-based, Fire-based, Hospital-based, Third Service[43]-based, and Privatized. Three of these models are discussed in significant detail to provide an understanding of the attributes each brings to the table and the considerations that need to be made when designing an EMS system.

County Third Service Delivery Model

A Third-Service delivery model is considered a newly formed County department to take over ambulance transport and eliminate private provider.

One alternative for Ross to evaluate is to eliminate the need for multiple independent EMS agencies by establishing a county department that serves the citizens and visitors of Ross by providing county operated ambulance response and transport. This model involves a stand-alone department within the county, much like the fire and police departments, that is dedicated to emergency ambulance service. The department would be staffed with civilian employees and be completely owned, financed, and operated by the local government structure.

This model may be perceived by EMS professionals in the community as favorable because it is dedicated to emergency ambulance service and appears to provide parity between EMS and other public safety professionals in the community, such as law enforcement and fire departments. All assets would be the property of the county and all revenues collected for these services would supply revenue to support the operation financially.

In Ross, this model would be completely operated by the County, working closely with a centralized communications center to enhance ambulance response using a “dynamic deployment system.” The dynamic deployment system utilizes a system status management model and a maximal coverage location optimization model to deploy ambulances according to ambulance demand and ensure maximum ambulance demand coverage is realized with a minimal number of ambulances.

[43] Third Service refers to a government department for EMS, with Law Enforcement considered the First and Fire Service dubbed the Second.

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This deployment model ensures that emergency ambulance response times meet established benchmarks, with the fewest number of ambulances necessary to conduct the task.

Additionally, the EMS agency could implement a hybrid system to further supplement any staffing needs by staffing ambulances with a crew of two (2) EMT's, with a group of dynamically deployed Paramedic rapid response vehicles (the two-tiered system described earlier). This dynamic deployment system is not overly complex but does require additional training by EMS telecommunicators and EMS professionals. The dynamic deployment system also requires enhanced ArcGIS, AVL-GPS[44] active in all EMS apparatus, and other collaborating software platforms to be managed efficiently. Hardware updates may be a necessity as well for both the emergency communication centers and ambulances.

The county would continue to utilize township-based fire services for Basic and Advanced Life Support first response throughout the county under this model. This model is focused primarily on coordination of 911 emergency calls and emergency interfacility transfers. From a financial perspective, increased paying transport volume further supplements the cost of EMS operations and assists in offsetting expenses.

A newly formed county EMS department operated by Ross would allow direct oversight of the agency. Many times, private operators hold multiple data sets as proprietary information and refuse to share it with the municipality that contracts for ambulance services. The county operated model would allow seamless and unlimited data sets to assess the level of service being provided by staff of the county. The model would allow Ross to be nimble in enhancing their operations based upon data and quality analysis in near real time. Management of the agency could utilize CAD data to implement movement of ambulances to areas of high demand throughout each day, assessing for peak hours, traffic conditions, and other factors.

Unlimited access to ePCR data will allow the county and agency Medical Direction the ability to ensure that medical protocols and delivery are evidence-based, and to implement clinically focused performance metrics and quality assurance measures to demonstrate value and patient safety.

Access to this data allows management and county officials information to review EMS system performance, identification of any duplicative efforts and to propose system enhancements to the county operated EMS system. If operations are not meeting key performance indicators, operations can be modified to ensure rapid, but safe responses to those in most need. Reports detailing the operations of the agency can be provided regularly to county administrators to provide transparency of operations. This transparency allows county officials to have a clear picture of the current status of staffing of the organization, evidence based clinical quality, and the financial health of the department.

[44] AVL-GPS is Automatic Vehicle Location by Geo-Positioning System.

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A positive attribute of this model is all emergency EMS personnel would be employed under the county government. EMS professionals currently working for private ambulance operators or fire departments could gain employment directly through the county government infrastructure along with any other new applicants. One of the positive aspects of EMS personnel working directly for the county is related to enhanced direct accountability.

Currently, when citizens, hospitals, fire, police, or dispatch have a poor experience with EMS and contact the county, the county must communicate with the local jurisdiction or agency providing the service. It is difficult for the county to ensure that an issue has been resolved and remediated. This model would allow for enhanced customer service to citizens and hospitals as any personnel issues could be handled in house, with loop closure for any complaints encountered.

Additionally, this model would place emergency medical services within the county emergency services infrastructure. Emergency medical services would be provided as a third service public safety agency. This service model would encourage EMS, Fire, Law Enforcement and Emergency Management to work collaboratively and cohesively, as equal divisions of a comprehensive public protection service.

The primary negative impact of employing EMS personnel directly through the county is financial in nature. The cost of salaries, county benefits and pensions, uniforms, and training. Many city and county operated EMS agencies across the nation face the same dilemma. Predominantly, the reason that private, for-profit entities can operate an EMS system in a leaner financial space is there are significant savings in pension costs. Additionally, private entities exercise the ability to purchase medical supplies, ambulances, and sometimes fuel in bulk; thus, reducing overall operating costs.

If implemented, the Ross EMS Department would need to procure office space and hire an EMS leadership team to develop implementation plans and guidelines. This leadership team would be charged with developing RFPs for ambulance purchases and possible Paramedic or Supervisor rapid response vehicles. The agency would need to initiate the acquisition of capital medical equipment such as cardiac monitors, ventilators, and automated CPR devices. Additionally, the EMS leadership team would work with Ross EMS Council in establishing accounts with medical supply vendors for disposable medical supplies, hazardous waste disposal, linen service, and medical oxygen delivery.

The agency leadership would need to work collaboratively with the current Ross County EMS delivery agencies to ensure a smooth transition, and to ensure that all hardware and software needs are in place prior to implementation of the model. The agency would also need to lease, purchase, or build one (1) or more large ambulance service stations in which ambulances can be kept inside during inclement weather or when the ambulances are not in use.

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Another positive attribute of the dynamic deployment model is that under normal circumstances, ambulances that are not engaged on a call will be relocated to an area of estimated high demand based on historical data. This model not only saves lives and money, but it eliminates the need for lounges or quarters for EMS personnel. If personnel are on-duty, they are normally on the road responding to calls or are positioned in an area that will ensure rapid response times. They would normally only be at headquarters to change shifts with another crew, maintain facilities, or obtain additional supplies. In many dynamic deployment systems, the ambulance crew immediately returns to a post after a call and a supervisor or "supply truck" will meet the ambulance crew at the posting location to provide restock of extra supplies, keeping the crew at the designated post.

Another step beyond acquisition of assets and personnel have been hired and trained, is appropriate licensure of the agency.

This EMS delivery model does not intend to replace township fire departments as collaborators and first responders to assist patients and at times, provide transport as well.

This alternative delivery model would be more expensive for the county to operate. Initial capital costs would be excessive. The purchase of facilities, office space, ambulances and other capital equipment may be cost prohibitive. Additionally, as discussed earlier, the cost of county pensions for all personnel will be a considerable cost.

However, to fully consider this model, an estimate of revenue for the services provided would need to be made. If this model were adopted to include all EMS and non-EMS medical transportation volume available in the County, a substantial amount of the annual operating cost would be reimbursed. Depending on the regional payer mix and reimbursement rates, this model may or may not be cost effective, or even cost neutral.

The model described is a high-performance EMS system. The county would be in complete control over the leadership, staff, deployment models, finances, assets, and performance. This level of oversight at the county level allows for a centralized and standardized delivery of EMS. Providing EMS professionals with similar salaries and benefits as their public safety colleagues in fire and law enforcement would most likely be enticing for personnel which may assist in recruiting high quality talent that are loyal to Ross and its citizens.

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Fire Department/District Based Delivery Model

Fire Department's across the United States are actively engaged in the delivery of EMS to their communities. There are several delivery models that range from first response at the basic and/or advanced life support level that use other agencies for transportation to full transport capabilities.

The consideration of a full fire department transport-based system should be centered on:

- the needs and complexity of a community.
- the availability of outside resources.
- the capacity for additional work responsibilities.
- the commitment of the fire-based organization to take on the EMS transport responsibilities.
- appropriate funding for the level of service desired.
- assurance that there is commitment to perform at a high level.

Fire-based EMS delivery models have the endorsement of the International Association of Fire Chiefs (IAFC) and the International Association of Firefighters (IAFF). The commitment of the organizations that represent the leadership and providers is paramount to success.

The America's Burning report, authored by the National Commission on Fire Prevention in 1973, highlighted the need for better building standards, better prevention activities, and a community response focused on reducing the risk of fire in our communities. The fire service has been very successful at reducing the risk of significant fires through education and prevention. Today's challenge to communities is the increasing requests for EMS assistance. The fire service can and should use the same concepts of community risk reduction that have been successful in reducing life and fire loss to the challenges of health care and social disparity in. Our communities.

Local fire stations are usually strategically placed in communities to provide a rapid response to the needs of the community. The geographical locations within each community place the fire service in the position to assist in the delivery of EMS.
The fire service is an occupation that has limited annual turnover compared to other delivery models. The annual turnover rate in most urban fire service agencies is in the area of 2-3%. This provides longevity and experience that is difficult to replicate consistently across the EMS.

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There are several different approaches to developing a fire-based model. The primary models include:

- Dual-role cross trained firefighters EMT/Paramedics.
- Fire department based first response and outside agency transportation.
- A combination system where the fire department provides Advanced life support (ALS) paramedics to support the basic life support (BLS) transport system.

There are potential continuity advantages to the fire service including standard protocols and procedures, experience and longevity, command and control for scene safety, and continuity of training and equipment. These are not unique alone to the fire service but requires additional collaboration, cooperation, and communication with other agencies outside of the fire-based EMS administration.

It has been argued that the fire service is spread too thin to excel in the developing responsibilities of EMS due to other responsibilities for fire, technical rescue, prevention, etc. While this is a concern, the argument can be made that the fire-based model provides additional value through a single person having knowledge in multiple disciplines and is value added to the consumer rather than a single provider with a single mission.

Fire-based systems embody the high-performance models that are often talked about in other system design models. Although not a member of organizations that promote high preforming EMS systems, many fire-based systems apply the same primary characteristics that “high performance systems” speak about in their marketing information. High performance is a commitment to service quality using standards and benchmarks and not necessarily reserved for any one system.

The goal of any good public health program is to eradicate disease and improve health. The community risk reduction strategy provides opportunity to work on community health initiatives using the same concepts to reduce disparity in communities of need. The fire department community risk reduction (CCR) strategy aligns nicely with the mobile integrated health concepts adopted with any EMS systems.

Fire departments providing health care across communities was increasingly apparent during Covid. The unique response capabilities of the fire service involving emergency medical services and hazardous materials provided increased capacity for struggling health departments. Fire departments provided testing, vaccinations, and assisted with decontamination and cleaning of nursing facilities and other congregant living facilities to reduce the risk of transmission.

Fire departments can increase capacity by exploring single role EMS providers at the basic level and adding firefighter/paramedic engines or “fly cars” that provide ALS care and transport within a combined ALS/BLS system design. The “fly car” could extend ALS care into more remote areas if the need arises.

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Operating in good faith, labor organizations that explore additional responsibilities in the EMS space should work to have a positive labor/management relationship to assure that the discussions and changes in service delivery align with any collective bargaining contracts that are in place. Additionally, future collective bargaining discussions and agreements should provide language that provides opportunity for discussions on how any change in service delivery impacts the department and the members that are represented by the bargaining unit.

It should be noted, there are several grant funding opportunities available to Fire-based EMS agencies that are not routinely available to other system models. These include the Staffing for Adequate Fire and Emergency Response (SAFER) and the Assistance to Firefighters (AFG) Grants as examples.

Hospital Based Service Delivery Model

The hospital-based model of EMS delivery is one in which a critical access, community, regional or hospital system assumes full responsibility for the operations, clinical quality, management, and financial accountability of ambulance service. In some instances, hospitals create complete stand-alone operations, hiring and managing staff, coordinating dispatch services, maintaining clinical oversight, and controlling all aspects of profit and loss. In other circumstances, hospitals may contract with a third-party provider to deliver all or portions of these requisite elements. For the purpose of this analysis, the consultant will examine the pros and cons of hospitals in Ross assuming direct responsibility for the provision of ambulance service to the residents and visitors of the County.

Many hospitals across the country strive to meet the needs of their communities and deliver ambulance service as an altruistic obligation consistent with their mission. This commitment to mission is especially prevalent in non-profit and rural systems where access to care may be limited and often difficult to operate an EMS model by other means. Similarly, professionals in clinical medicine, often championed by physician thought leaders sometimes view the ability to control ambulance operations as a way to manage the continuum of care of the community as a whole or with respect to a given patient population.

Financial incentives may also play a role. In recent years (since 2012) Congress has advanced financial reforms impacting hospital payments for certain government programs. Income from programs such as Medicare and Medicaid often make up a majority of hospital revenue.

Incentives related to total care management have empowered the federal government to impose penalties upon hospitals by withholding payments under certain circumstances. This reality can gain the attention of leaders in the hospital C-Suite. Hospitals sometimes see the local operation and control of ambulance operations as a means by which to manage this risk. For these and other various reasons hospitals are sometimes motivated to operate their own ambulance service or partner with external agencies.

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It is estimated that hospital-based services make up 7% of all ambulance agencies in the country. Models of successful hospital-based systems exist in all corners of the country. The State of New Jersey actually requires all ALS systems to be hospital affiliated as a condition on licensure. Examples of thriving well-managed hospital operations include Mayo Clinic Medical Transportation, Kaiser Permanente (interfacility transport other parts of the country); Christian Hospital EMS, St, Louis; Allina Health, Minneapolis; Northwell Health, New York; UC Health EMS, Colorado; Sparrow Eaton Hospital, Michigan.

This consulting agency is not aware of any direct or indirect interest claimed by Kaiser Permanente, Providence or any other system or independent hospital to pursue ambulance operations in Ross. The commentary provided here is intended only for the purpose of providing information and analysis to the Ross stakeholders.

Evidence is clear that clinicians of all levels (including paramedics) require a reasonable frequency of patient contacts to enable them to remain proficient in their skills. It's also fair to ponder the matter of the many fire-based "first response" paramedics who do not transport patients to the hospital and therefore never set foot in a hospital as part of a care team.

Advantages to a hospital-based system include a stronger link to the healthcare system as a whole. Provider interaction with other practitioners, MDs, nurses, ancillary support staff etc. build capacity and understanding of healthcare delivery beyond the fire station. Hospital based-ambulance services also typically have an eye toward to the total transport continuum, including 9-1-1 response as well as non-emergency interfacility medical transportation.

Over a period of decades data collected by the International Academy of Emergency Dispatch reveals that the majority of ambulance requests are made for conditions requiring basic life support level of services or less.

Some fire service labor leaders from Ross have shared with the consultant team that they only consider medical responses to emergent life-threats to fall within their purview. Low acuity patients with illness or injury (or even the non-ambulatory) are often in need of medical transportation services. And as noted this patient population makes up the majority of requests from 9-1-1.

Recent EMS literature has begun addressing a phenomenon some call "toxic heroism", describing the concept that for years EMS education has focused almost exclusively on critical emergencies creating a provider expectation that all requests for ambulance service should be life threatening emergencies. Reality clearly demonstrates that this is not the case. Customer service and problem-solving skills are often as important as clinical interventions. While not immune from the mindset of toxic heroism, hospital EMS systems boast greater connectivity with the broader health care community and the understanding that not all ambulance calls are life threatening emergencies.

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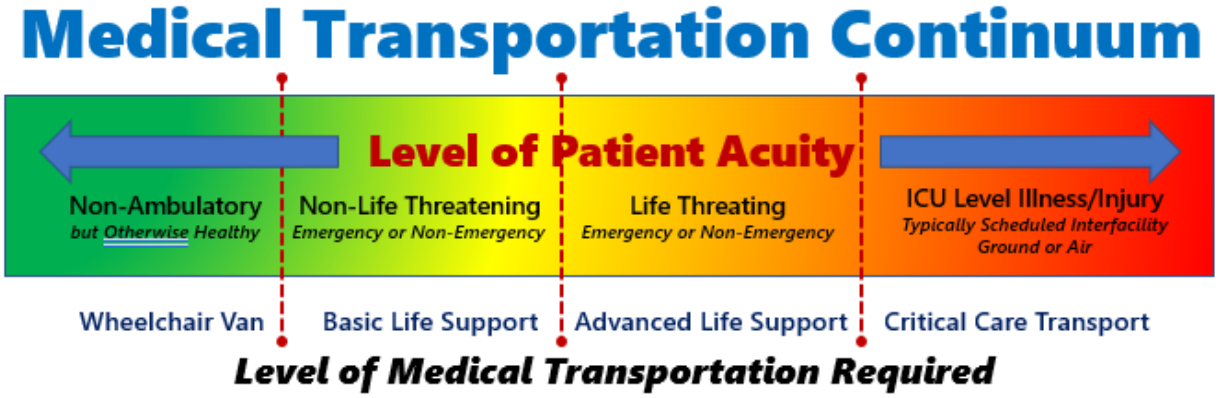

A hospital-based ambulance system in Ross has potential to drive a fundamental cultural shift in the EMS community. It would not eliminate the fire department's role as an ALS first responder, but having hospital(s) dominating the oversight, management, clinical care, and personnel, would strengthen the message to the community that ambulance care is health care.

Hospitals would assume all financial risks in the operation of ambulance service in the county. In return they would be awarded the right to exclusively bill each patient for episodic care.

While the county would be under no obligation to offer financial support, it is worthy to note that hospital systems in other parts of the country have sometimes sought financial subsidies from local government when facing financial challenges.
Funding of the existing franchise fee paid under the current contractual arrangement would likely be reconstructed and/or eliminated thereby creating an issue of capital and operating budget impact.

Discussion

For decades the United States has struggled with the age-old question of whether paramedicine should be considered part of healthcare, public safety, or public health. This question - primarily an American question - has played out across the political spectrum. In hospital board rooms, firehouses, and city councils, community leaders, labor unions and medical leadership have clashed as to which domain is the right place for EMS to domicile. Consequently, descriptions such as the "three-'legged stool" have provided a comfortable and safe landing pad for stakeholders to coalesce.

https://www.ems.gov/images/NHTSA-OEMS-What-is-EMS-Graphic.zip

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It should be noted however, arm wrestling about which realm is best suited to paramedicine has been a uniquely American debate. Many, if not most, of our western English-speaking colleagues in Canada, the United Kingdom, and Australasia, have firmly planted their flag in the healthcare domain. So much so in fact, that some of the aforementioned places have elevated pre-hospital ambulance providers to the level of independent practitioners, prescribing medications and providing out-of-hospital primary care. In contrast to America's current the paramedic shortage, places like Australia have no such issues with an abundance of graduate level paramedics.

A fully integrated EMS system, regardless of model, reduces the complexity of system design such as communication, documentation, dispatching, etc. across provider agencies. Although these issues are frequently overcome without difficulty, they require relationships and cooperation between providers to integrate onto the same systems and platforms. They become more challenging in large regional, national EMS providers that are embedded into common platforms for their operations.

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Evaluation of Options for Enhancement of EMS Delivery

Option 1: Take no Action/Maintain Status Quo

The county could choose to take no action to intervene in the EMS and ambulance delivery system in Ross County. However, the current state, and future state, without significant modification, will continue to suffer service failures. Trends like reductions in the volunteer and career EMS workforce are well researched and documented and will likely exacerbate in the years to come. Based on our review and analysis, given the current state of EMS and ambulance delivery in Ross County, taking no action is a dangerous option.

Advantages	Disadvantages
Requires little to no effort or action on the part of the county and township leaders.	EMS delivery systems across the county will continue to fail.
	Failures will be exacerbated in the future.
	Patients and the community will suffer.

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Option 2: Provide Financial Subsidy to Existing Provider Agencies

Some, but not most of the service delivery challenges within most of the agencies servicing Townships may be helped with funding from the County. However, the feedback from many of the agencies is that their primary issue is lack of volunteers.

Funding to provide meaningful support for ambulance operations would likely go directly to compensating personnel. This compensation could come in the form of stipends for on-call personnel, pay for covering actual calls, or perhaps paying wages for coverage either during peak times, or times that are difficult to cover with volunteer shifts.

While it is possible that paid and volunteer members of ambulance agencies can co-exist, often, approaches such as these tend to lead to a further decline in volunteerism, as friction is created between those volunteering and those getting paid for their time. Volunteers eventually either stop volunteering, or transition to a paid, or paid on-call position. This leads to further costs and is still a less than optimal solution.

One of the challenges with Ross County's ambulance system is the number of different agencies, each with very low response and transport volumes. Individually funding these numerous agencies is a very inefficient use of public funding and would not be a reasonable option unless agencies were willing to consolidate services to become more clinically proficient operationally effective and fiscally efficient.

Any funding provided to existing agencies should only be facilitated by an Inter-Local Agreement (ILA) that requires funded communities and agencies to comply with, document and report minimally acceptable quality assurance standards, training and education, and operational and financial reporting to facilitate objective performance reviews.

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Advantages	Challenges/Disadvantages
Creates opportunity for more stable delivery using existing agencies.	Funding mechanism will need to be developed and implemented.
Helps assure clinical, operational and financial transparency regarding the quality and effectiveness of EMS delivery in the funded communities.	Agencies and communities may be resistent to enter into the ILA.
	Compliance with ILA provisions may create legal challenges.
	Funding multiple agencies is not as fiscally efficient as other potential system design options.
	Concens may be expressed by jurisdictions that use tax levies to fund local EMS that they are being 'double taxed' for EMS delivery, specifically outside of their jurisdiction.

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Option 3: Safety-Net Countywide ALS Ambulance Service – County Operated Model

The county could establish a countywide safety-net ALS ambulance provider, either within the county, using county employed personnel, or competitively select a private provider through a Request for Proposals (RFP) process (discussed in more detail in Option 4).

The most effective use of a Countywide provider would be simultaneously dispatched to all EMS calls in communities that are served by an ambulance agency that is unable to muster a crew for a response of more than 50% of their responses. If the local agency was able to muster a crew for response, the county unit could be canceled, or, if the responding ambulance crew is a Basic Life Support (BLS) crew, but the call type is such that the patient may require Advanced Life Support (ALS) care, the County unit could be requested to continue to the call to provide a paramedic intercept for the BLS crew.

Based on the data analyzed, the county Safety-Net service would likely be simultaneously dispatched to an EMS response in the service areas of Colerain, Concord, Franklin, Liberty and Springfield.

Based on the 2022 response data, simultaneous dispatches in these service areas would result in 1,200 dispatched EMS responses annually, with the County safety-net ambulance likely arriving first on 720 (60%) of the EMS responses.

The County ALS Safety-Net resource could also be dispatched to any call in the county in which the primary provider has not responded within a defined activation period. For example, if "Agency A" is dispatched to a call, but after 3 minutes has not indicated a response, a county unit could be dispatched to help ensure an ambulance is responding to the call. If "Agency A" is able to respond prior to the county arriving, the county unit could be canceled, or continue, if there is the potential need for ALS care at the scene and "Agency A" has a BLS crew.

County Safety-Net Economic Model:
The costliest component of ambulance service delivery is the cost of readiness, that is, staffing units that are not on a call, to be available, to respond in a reasonable time. This option will require the county to staff, or contract for, a single ALS ambulance 24 hours/day, 365 days a year. It is typical in rural EMS systems that the potential revenue generated from user fees will be less than the cost of staffing the ambulance, which would require funding from non-user fees to sustain the safety net model.

However, there are operational efficiencies in economies of scale where larger areas are covered by that one unit.

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An example economic model is illustrated below.

Ross County, OH EMS Budget Statistics; Example	
Safety Net Fiscal Summary	
Net Revenue	$293,832
Expense	2024
Personnel	$714,692
Vehicles/Equipment Annual Depreciation	$164,667
Operations	$89,880
Sub-Total	$969,239
Billing Fees @ 4.5% collected Revenue	$13,222
Total Expenses	$982,461
Operating Retained Earnings	($688,629)
Staffed Unit Hours	8,760
Expense Per Staffed Unit Hour	$112.15
Transports	597
Cost per Transport	$1,645.66

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Advantages	Challenges/Disadvantages
Creates a more reliable EMS response plan with dedicated safety-net service provided by the county.	Funding mechanism will need to be developed and implemented.
Existing EMS agencies remain intact, with assured back-up automatic aid or mutual aid.	The county would need to stand-up an EMS system in a challenging human resource and financial environment.
Requires minimal effort on the part of individual jurisdictions, or their current agencies.	Personnel for the county system may come from existing EMS providers exacerbating staffing challenges in some agencies.
	Concens may be expressed by jurisdictions that use tax levies to fund local EMS safety-net services that they are being 'double taxed' for EMS delivery, specifically for responses outside of their jurisdiction.
	Not as operationally or fiscally efficient as a single, county-wide delivery model.

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Option 4: Safety-Net Countywide ALS Ambulance Service – Private Provider Model

Option 4 essentially follows the same concept and modeling as Option 3, except in this model, the county would select a private provider through a competitive Request for Proposals (RFP) process.

If the RFP is for countywide ALS Safety Net services as described in Option 3, the same challenges with cost of service delivery and revenue generated from service delivery will be present. As such, it is very likely that a private provider would require a subsidy from the county to be able to sustain service delivery, and the subsidy will be very similar to what the net loss to the county would be in the self-operated model.

An advantage to selecting a provider through an RFP process is that regional ambulance providers may be able to offer the service at a slightly lower fee due to the synergies associated with providing other services in the region.

We would caution that the private ambulance industry is suffering even greater economic and staffing challenges than government-based providers and may have difficulty recruiting and retaining staff for this model. Challenges exist with the sustainability of such arrangements. However, the potential economic risk would be lower in a contracted model, at least in the short-term.

Advantages	Challenges/Disadvantages
Creates a more reliable EMS response plan with dedicated safety-net service contracted by the county.	Funding mechanism will need to be developed and implemented.
Existing EMS agencies remain intact, with assured back-up automatic aid or mutual aid.	The county would need to develop an RFP process for potential providers and enter into a performance-based contract with a private provider.
Requires minimal effort on the part of individual jurisdictions, or their current agencies.	Personnel for the contracted county provider may come from existing EMS providers exacerbating staffing challenges in some agencies.
Reduces the administrative and human resources burden on the county using employed staff.	Concens may be expressed by jurisdictions that use tax levies to fund local EMS safety-net services that they are being ‘double taxed’ for EMS delivery, specifically for responses outside of their jurisdiction.
	Not as operationally or fiscally efficient as a single, county-wide delivery model.

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Advantages	Challenges/Disadvantages
	Commercial ambulance providers are experiencing the same, or worse, staffing challenges, and many are choosing not to provide these services without substantial subsidy.

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Option 5: Funding to Enhance Response Areas of Ambulance Agencies ('District Model')

Our data analysis reveals that some ambulance agencies in Ross County, primarily those with paid staff, are delivering reliable service to their communities. And many are also providing mutual aid to neighboring communities. The county, working collaboratively with existing townships and providers, could create ambulance response districts and fund agencies to provide automatic aid beyond their existing official jurisdictional boundaries.

Agencies with a response reliability of greater than 80% should expand their primary response area through an 'Automatic Aid'/Primary EMS response agreement with surrounding agencies/townships. As examples, the communities of Concord and Springfield could enter into an automatic aid agreement with an adjacent agency, as appropriate, to respond auto-aid to every EMS call in their communities. Similarly, Franklin could enter into an auto-aid agreement with Huntington and Liberty with Harrison.

These agreements should have sufficient funding tied to them to adequately compensate the agency providing auto-aid/primary EMS response to the receiving community.

For example, Scioto has a combination of career and volunteer staffing. Paramedics are paid, and they are augmented with local volunteers to help staff ambulances for calls. Scioto currently responds to 81% of the responses in their primary service area and does provide some mutual aid to surrounding areas. The county could provide funding for Scioto, or encourage the creation of Interlocal Agreements (ILAs) between neighboring communities that establish a funding mechanism to allow the primary response agenc to augment their staffing with additional personnel to become a regional response resource, outside of their specific primary service area.

A condition of any funding related to these agreements should the agency contracted for the primary EMS response coverate be required to publicly puplish clinical, operational and financial performance data at least on a quarterly basis.

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Advantages	Challenges/Disadvantages
Creates a more reliable EMS response by creating larger response districts, with funding by the county.	Funding mechanism will need to be developed and implemented.
Current volunteers for current ambulance districts could be transitioned to a First Medical Response (FMR) model, providing on scene care until the ambulance arrival. This could enhance volunteerism by shortening task time on EMS responses.	Primary EMS response districts would likely replace primary local response districts. Local jurisdictions and providers may not support this option.
	Personnel for the model may come from existing EMS providers exacerbating staffing challenges in some agencies.
	Not as operationally or fiscally efficient as a single, county-wide delivery model.

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Option 6: Ross County as a Regional Ambulance Staffing Resource

This option is a hybrid combination of the county providing the actual safety-net ambulance service but uses only the staffing model and use of existing ambulance resources to provide regional coverage.

The county could provide ALS staffing with one EMT and one paramedic and use the ambulances from one or all those agencies to provide a dedicated regional resource for those response areas. As part of the arrangement, the local agencies would provide the ambulance, fuel, equipment, and supplies, with the county supplying the staff. This would reduce the cost to the county by not purchasing ambulances and equipment, but the residents in those areas would likely have significantly improved ambulance service reliability.

Like the flexible deployment models described earlier, the county staffing of the regional resources could either be full time or be determined through an analysis of response frequency with volunteer availability.

Advantages	Challenges/Disadvantages
Creates a more reliable EMS response by supplementing staffing paid by the county for jurisdictions struggling with staffing. with funding by the county.	Funding mechanism will need to be developed and implemented.
The cost of operating this system will be less than providing the full ambulance model, since the infrastructure costs would be covered by the partnering agencies.	Local EMS leadership and authorities having Jurisdiction may not desire to establish this model.
Partnerships would be with community recognized personnel and vehicles.	Personnel for the model may come from existing EMS providers exacerbating staffing challenges in some agencies.
	Not as operationally or fiscally efficient as a single, county-wide delivery model.
	Not all areas of the county would benefit from the service.
	Contracting complexities for ‘shared services’ and ambulances staffed with contracted personnel.

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OPTION 7: CONSOLIDATION

Efficient emergency response ensures that patients receive timely medical attention, reducing the risk of complications and improving overall outcomes. When EMS services are dispersed across different municipalities within a county, coordination becomes challenging, resulting in delays and potential gaps in coverage.

Countywide EMS services aim to address the challenges posed by fragmented emergency response systems. By consolidating EMS services under a unified Countywide framework, a more coordinated and efficient approach to emergency medical care can be achieved. This consolidation involves centralizing command and control, merging dispirit agencies into a single operational force, standardizing functional protocols, and ensuring seamless, consistent, and optimal delivery throughout the County.

One of the primary advantages of consolidating EMS services on a Countywide level is the realization of economies of scale. By pooling resources and centralizing operations, counties can achieve cost savings through bulk purchasing of medical supplies, shared training programs, optimized staffing, efficacious station locations, efficient demand response, and robust surge capacity. These operational and cost efficiencies translate into improved service delivery and better allocation of limited resources.

Consolidating EMS services eliminates jurisdictional boundaries and allows for a more streamlined emergency response. Rather than multiple EMS providers operating independently, a unified system ensures better coordination and resource deployment. This results in reduced response times, improved coverage, and enhanced overall efficiency.

Implementing Countywide EMS services is not without its challenges. One significant consideration is the need for collaboration and agreement among the various municipalities within a county. This requires effective communication and a unified vision for the improvement of emergency medical care. Additionally, transitioning to a Countywide system may require financial investments, staff training, and potential changes to existing protocols, which can pose logistical and administrative challenges.

Despite a lack of adequate response from all townships regarding detailed EMS financial information, a comparison of the current state with a “unified” state was still made. This comparison was based on extrapolated industry norms [1] [2] and the following budgeting assumptions:

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Budgeting Assumptions

The following assumptions were made to calculate a projected budget for a unified EMS system in Ross County. To compare to current operations, the fiscal data provided by the County EMS agencies, though incomplete, was condensed into an aggregate operating statement. For missing information, Cambridge had to make reasonable estimates based on industry norms and extrapolate other data. Therefore, some deviation from actual circumstances may be present in these presentations. We included the response volume for the City of Chillicothe due to the critical role that the city would likely play in a unified EMS system for Ross County.

Current	Variable Cost Input Factors	Unified
77,964	Population	77,964
12,973	Volume	12,973*
75.0%	Transportation Rate	75.0%
unknown	Average Miles/Dispatch	15
26	Number of EMS Stations	11
18	Number of EMS Units, Undifferentiated	variable
	Number of Transport Ambulance Units; BLS	0
	Number of Transport Ambulance Units; ALS	14
	Number of Non-Transport Units; BLS	0
	Number of Non-Transport Units; ALS	0
	Number of Field Supervisor Units	5
	Number of Directors	1
	Number of Directors of Operations	1
	Number of Admin. Assistants	2.8
	Number of Billing Clerks	4.7
	Number of Materials Management Techs	2.1
	Number of Maintenance Techs	2.1

* Includes Chillicothe. Without Chillicothe, the volume would be 6,102

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Wages	Rate per Hour	*Annual Total Work Hours*	*Needed/Unit or Fixed*
EMT Salary	$19.00	1,872	5.00
Paramedic Salary	$27.00	1,872	5.00
Supervisor Salary	$35.00	1,872	1.00
Operations Director Salary	$45.00	2,080	1.00
Director Salary	$55.00	2,080	1.00
Admin Clerk Salary	$13.00	2,080	0.20
Billing Clerk Salary	$13.00	2,080	0.33
Materials Mngmnt Technician	$13.00	2,080	0.15
E Vehicle Tech-Auto Maintenance	$20.00	2,080	0.15
Per Case Expenses	**Per Case**		
Revenue/Transport adjstd for payor mix	$400		
Expense/Transport; Operating	$962		
Facilities Costs:	**Per Facility**		
Maintenance & Repairs	$4,000		
Utilities (water, Sewer, Electric, Gas, Cable)	$5,000		
Annual Non-Salary & Benefits; Operations	**Cost/Unit**		
Non-Transport BLS Unit	N/A		
Transport BLS Unit	N/A		
Non-Transport ALS Unit	N/A		
Transport ALS Unit Annual Vehicle Maintenance	$10,000	Variable based on Number of Units	
Supervisor Unit Annual Vehicle Maintenance	$5,000	Variable based on Number of Units	
Supplies Cost per Case	$100	Variable based on volume	1,068,018
Insurance & Subscriptions per Unit Annually	$8,000	Variable based on Units	
Training & Education Cost per Employee Annuall	$800	Annually per operations staff employee	
Capital Purchase:	**Unit Cost**	Annual Depreciation Expense	Years of Service
Vehicle	$130,000	21,667	6
Defibrillator-Monitor	$39,000	6,500	6
Self-Load Stretcher	$46,000	7,667	6
ePCR & Other Equipment	$18,000	3,600	5
Building Depreciation Costs	$0	0	30

Table of basic budgetary assumptions

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Ambulance District Economic Model

Based on 2022 Response Data

Assessed to Jurisdictions

Agency/Jurisdiction	Response Volume	Fee	Response Fee	Transport Volume	Fee	Transport Fee	Total	Population	Fee per Capita
Colerain	218	$750	$163,500	164	$500	$81,750	$245,250	2,017	$121.59
Concord	409	$750	$306,750	307	$500	$153,375	$460,125	4,743	$97.01
Franklin	193	$750	$144,750	145	$500	$72,375	$217,125	1,439	$150.89
Jefferson	82	$750	$61,500	62	$500	$30,750	$92,250	1,064	$86.70
Liberty	101	$750	$75,750	76	$500	$37,875	$113,625	2,623	$43.32
Springfield	383	$750	$287,250	287	$500	$143,625	$430,875	2,573	$167.46
Twin	327	$750	$245,250	245	$500	$122,625	$367,875	3,492	$105.35
Total	**1,713**		**$1,284,750**	**1,285**		**$642,375**	**$1,927,125**	**17,951**	**$107.35**

Paid to Contracted Ambulance District Provider

	Response Volume	Fee	Response Fee	Transport Volume	Fee	Transport Fee	Total
	1,713	$600	$1,027,800	1,285	$400	$513,900	**$1,541,700**

Collected from Jurisdictions	$1,927,125
Paid to Provider(s)	$1,541,700
County Admin Fee	$385,425

These assumption inputs produced the following operating statement comparison (next page):

This comparison reveals that a unified EMS system for the County would probably be more costly than the current services provided. However, this is to be expected since the current system is both inadequate in service and staffed by numerous volunteer practitioners. Since additional EMS units are needed to provide sufficient response to EMS demand, additional expenses will be incurred in the form of ambulances, facilities, and physical assets like medical equipment. In addition, because the current volunteer staffing force has proven to be incapable of providing nominal response to emergencies, salaried personnel are needed.

By implementing a robust, centralized, and sophisticated billing and collections process throughout the County for all EMS services, the subsidy required from taxes and levies to fund the operation can be minimized. The current funding each township/town provides to support its individual EMS service, would be replaced according to the following, prorated subsidies, based on population. Alternatively, substituting EMS volume[45] for population may be a more equitable method for cost allocation. This chart reflects both allocation methods, for comparison purposes.

[45] Buckskin and Paint Townships did not report volume, therefore estimates based on their populations were made.

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	Portion of Tax Subsidy by EMS Volume w/o Chillicothe	Portion of Tax Subsidy by Population w/o Chillicothe
Colerain	$150,313	$171,401
Concord	$353,464	$286,098
Deerfield	$110,369	$83,768
Franklin	$123,410	$160,447
Green	$386,924	$340,225
Harrison	$94,123	$57,349
Huntington	$458,690	$333,781
Jefferson	$79,293	$57,993
Liberty	$193,537	$88,922
Paxton	$142,935	$187,510
Scioto	$447,735	$804,168
Springfield	$194,804	$365,355
Twin	$260,235	$341,514
Union	$936,086	$653,387

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	Unified Operation Fixed Costs	Unified Operation Variable Costs	Unified Operation TOTAL	Unified Ops w/o Chillicothe	Current System TTL Comparison
Revenue					
Taxes to Fund Operations Only (less depreciation)		3,931,919	3,931,919	3,931,919	4,932,812
Billing; Net Rev after Bad Debt & Contractuals		3,891,900	3,891,900	2,676,156	3,305,324
Grants & Miscellaneous		0	0	0	205,734
Investment Interst Income		20,000	20,000	20,000	19,415
TOTAL Revenue		**7,843,819**	**7,843,819**	**6,628,075**	**8,463,285**
Expenses					
Salaries; Management	208,000		208,000	208,000	250,000
Salaries; Administration	158,634		158,634	158,634	114,785
Salaries; Operations		4,736,160	4,736,160	3,680,834	3,873,545
Benefits; Management	52,000		52,000	52,000	75,000
Benefits; Administration	39,658		39,658	39,658	34,436
Benefits; Operations		1,184,040	1,184,040	1,184,040	1,166,504
Administration & Dispatch/Communications	0		0	0	94,793
Training & Continuing Education		88,000	88,000	88,000	14,653
Supplies; Medical		972,975	972,975	972,975	436,709
Leases, Subscriptions & Insurance		88,000	88,000	88,000	320,854
Maintenance & Repairs; Equipment		11,000	11,000	11,000	35,678
Maintenance & Repairs; Facilities		44,000	44,000	44,000	46,777
Maintenance & Repairs; Vehicle Parts		135,000	135,000	135,000	77,591
Utilities		55,000	55,000	55,000	51,747
Vehicle Fuel		71,352	71,352	71,352	320,854
Sub-TOTAL Operating Expenses	**458,292**	**7,385,527**	**7,843,819**	**6,788,493**	**6,913,925**
Depreciation		433,767	433,767	433,767	313,492
Interest Expense	0	0	0	0	43,262
TOTAL Expenses	**458,292**	**7,819,293**	**8,277,585**	**7,222,259**	**7,270,679**
Net Income; Operation	*(458,292)*	*458,292*	*0*	*(160,418)*	*1,549,360*
Net Income; Fully Loaded	*(458,292)*	*24,525*	*(433,767)*	*(594,185)*	*1,192,606*

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Advantages	Challenges/Disadvantages
Creates a dedicated, single-role EMS agency, which would be more clinically proficient, operationally effective, and fiscally efficient.	Funding mechanism will need to be developed and implemented.
The county could concolidate clinical oversight, medical direction and quality assurance more effectively.	Local EMS leadership and authorities having Jurisdiction may not desire to establish this model.
The system could be structured as a 'public utility model' (PUM), with a public board comprised of medical, operational and financial expertise, with board representation appointed by both the county and the local jurisdictions.	Legally and structurally complex to establish, however, there are numerous systems upon which examples can be used.
	Would require substantial start up period, likely 18-24 months.

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Implementation Process

Based on discussions with the EMS Steering Committee from Ross County, Cambridge Consulting Group developed the following implementation matrix for Option 5: Funding for Enhanced Coverage Areas (the District Model) of the proposed suggestions for enhancement of the County's EMS system.

Phase 1 – Establish a Ross County Ambulance Response District Steering Committee

Purpose:

- Utilizing the process in ORC 505.71, create regional Ambulance Response Districts in Ross County, based on geography, response volume, and response reliability for agencies in and around each township/city.
- Negotiate agreements to establish the funding mechanism for Automatic Aid provided by a county contracted Ambulance District primary response agency.
- Comprised of elected and appointed officials from Ross County, each township, and the City of Chillicothe, including the County Prosecutor.
- Committee Chair: To be determined by consensus.

Phase 2 – Invite Appointments to Committee

- Communicate with all jurisdictions in the county about the creation of the Steering committee.
- Request that the jurisdiction appoint a member to the committee.
- Committee member appointees must be elected officials.
- The committee may choose to have ambulance agency representatives as non-voting advisors.

Phase 3 – Map Response Districts

- Review response frequency and create up to four or five geographic EMS Response Districts in Ross County.
    - (i.e.: Central, Northwest, Northeast, Southwest, Southeast).
- Identify agencies with the highest response reliability (i.e.: ability to reliably respond to EMS requests) with logical geographic proximity to, or within the EMS Response district.

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Phase 4 – Agency/Jurisdiction Participation

- Determine willingness for the agency with the highest response reliability to be the primary EMS agency dispatched to EMS requests within the district, with funding.
- Negotiate payment/fee schedule (see below).
    - If no reliable response agency is identified, the committee could solicit proposals to establish a primary EMS Response District agreement with a private ambulance provider.

Phase 5 – Fee Schedule

- Establish schedule of fees to be assessed to each jurisdiction for an Automatic Aid response.
- Identify ambulance agencies that responded to less than 80% of the EMS responses in their jurisdiction.
    - Based on the Cambridge Consulting Group's evaluation, this would likely include:
        - Colerain
        - Concord
        - Franklin
        - Jefferson
        - Liberty
        - Springfield
        - Twin
- Fees would be assessed by and paid to the County and passed through to each of the contracted District Ambulance Providers, based on response volume, and compliance with required provisions within the agreement.
- Required provisions should include compliance with reporting requirements such as compliance with clinical/protocol clinical bundle compliance and reporting of training and quality assurance standards.

Recommended Fees for Automatic Aid:

- $750 assessed to the jurisdiction receiving Automatic Aid for a contracted District Ambulance Provider response.
- $500 additional fee assessed to the jurisdiction receiving the Automatic Aid for each response that results in the contracted District Ambulance Provider transporting a patient by ambulance to a receiving facility.

Recommended Payments to contracted District Ambulance Provider:

- $600 per response.
- $400 additional payment when the contracted District Ambulance Provider transports a patient by ambulance to a receiving facility.

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- Payments would be in addition to any patient services revenue generated by the responding agency.

Ambulance District Economic Model
Based on Amalgamation of 2020, 2021 & 2022 Response Data

Agency/Jurisdiction	Response Volume	Assessed to Jurisdictions Fee	Assessed to Jurisdictions Response Fee	Transport Volume	Fee	Transport Fee	Total	Population	Fee per Capita
Colerain	478	$750	$358,500	359	$500	$179,250	$537,750	2,017	$266.61
Concord	1,229	$750	$921,750	922	$500	$460,875	$1,382,625	4,743	$291.51
Franklin	571	$750	$428,250	428	$500	$214,125	$642,375	1,439	$446.40
Jefferson	252	$750	$189,000	189	$500	$94,500	$283,500	1,064	$266.45
Liberty	721	$750	$540,750	541	$500	$270,375	$811,125	2,623	$309.24
Springfield	647	$750	$485,250	485	$500	$242,625	$727,875	2,573	$282.89
Twin	845	$750	$633,750	634	$500	$316,875	$950,625	3,492	$272.23
Total	4,743		$3,557,250	3,557		$1,778,625	$5,335,875	17,951	$297.25

Paid to Contracted Ambulance District Provider

Response Volume	Fee	Response Fee	Transport Volume	Fee	Transport Fee	Total
4,743	$600	$2,845,800	3,557	$400	$1,422,900	$4,268,700

Phase 6 – Agreement Negotiation

- Develop a uniform interlocal Automatic Aid agreement between the County and the townships/city/agency to facilitate the contracted District Ambulance Provider being automatically dispatched to EMS responses within the assigned district.
    - Other agencies could be dispatched as well, based on the desire of the jurisdiction, but in all cases, the district responder would be the designated primary response agency.
- If the secondary response agency arrives on scene, they can cancel the response of the contracted District EMS Provider.
- Response fee still applies.

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RECOMMENDATIONS

This section of the report provides the detailed recommendations that are considered feasible options for improving the current Ross County EMS system.

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RECOMMENDATIONS

OVERALL SYSTEM RECOMMENDATIONS

S1. Based on response volume, geography, and demographics of Ross County, the Cambridge Consulting Group believes that a single, countywide EMS system would result in the most clinically proficient, operationally effective, and financially efficient EMS system design. Governance could be a shared model, with townships and other stakeholders represented in the governance and operation of the system. While this would be the most effective system, it is also the most complex and time consuming to implement. Therefore, as an interim step, the county should facilitate agencies and townships collaborating to establish coordinated, cooperative arrangements among the existing townships and EMS organizations to establish several primary EMS response districts, based on response reliability, geography, and response volume.

S1.1. Agencies with a response reliability of greater than 80% should expand their primary response area through an 'Automatic Aid'/Primary EMS response agreement with surrounding agencies/townships with historically low response rates.

S1.1.1. For example, the communities of Concord (43% response rate) and Springfield (28% response rate) could enter into an automatic aid agreement with Chillicothe (100% response rate), Union (98% response rate), or Green (95% response rate) to respond auto-aid to every EMS call in their communities.

S1.1.2. Similarly, Franklin (37% response rate) could enter into an auto-aid agreement with Huntington (95% response rate) and Liberty (66% response rate) with Harrison (93% response rate).

S1.2. These agreements should have sufficient funding tied to them to adequately compensate the agency providing auto-aid/primary EMS response to the receiving community.

S2. If the county were to establish the recommended ***countywide*** system, the system should plan on the eventual placement of at least 11 EMS stations (excluding the three stations currently used in the City of Chillicothe and those operated by the Paint Creek Joint EMS/Fire District in Buckskin & Paint), strategically located throughout the County to provide the maximum coverage and minimum response times to as many incidents as possible. Cambridge Consulting Group has analyzed the provided dispatch data in detail and determined the optimal location for each EMS station.

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S2.1. The County should consider initial placement of four EMS stations (as indicated on the map below), creating four response districts, located to support the jurisdictions exhibiting the most use of mutual aid assistance. This would immediately improve the response to EMS cases in those townships while simultaneously relieving the burden currently placed on neighboring jurisdictions to provide mutual aid. Three of the district units could be housed at existing EMS stations, while the fourth (the Franklin-Liberty-Jackson unit) would require a new facility since none exists close to its optimal location.

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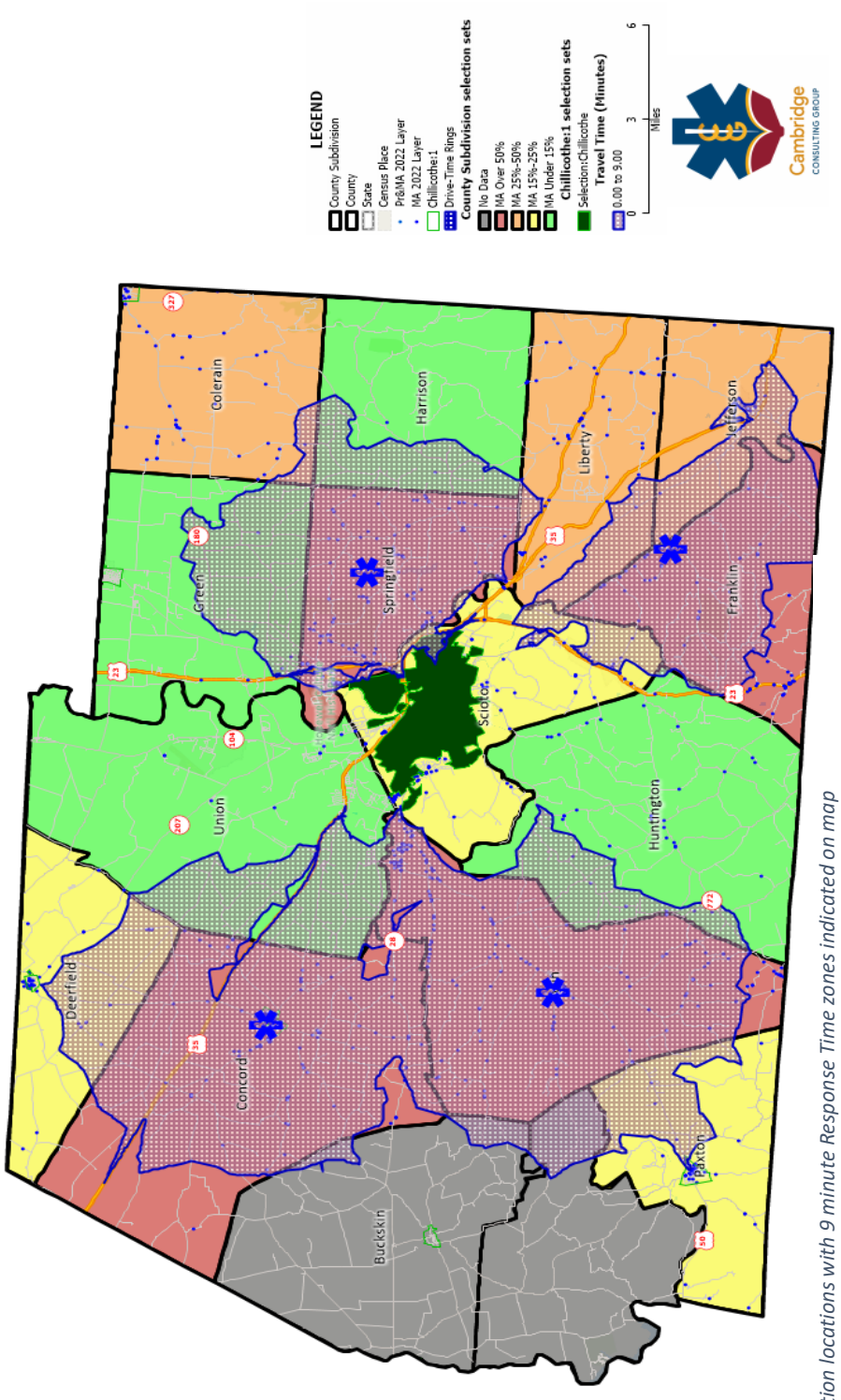
Ross County EMS
9:00 Minute Response Times; 4 Stations



Station locations with 9 minute Response Time zones indicated on map

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S2.2. The County service should initially be a hybrid workforce model, allowing volunteers to staff crews when they are available and meet County requirements. Volunteers should be "at station" and not responding from home if they are a scheduled crew member.

S2.3. Volunteers may be permitted to respond (in their personal vehicles, or with local EMS apparatus) to the scenes of calls within their local jurisdictions even when their agency is unable to muster a crew and the County unit(s) is assuming the assignment. Rules should be established regarding what insignia and identifications the volunteers must wear to be appropriately recognized and avoid confusion or misrepresentation at the scene of incidents.

S2.4. The County EMS unit(s) should initially respond to mutual aid requests only, not as the primary responding unit, unless otherwise contracted by a local government.

S2.5. Local EMS agencies should be allowed to contract with the County EMS service to respond as the primary EMS agency during specific time periods when the local agency expects no crews to be available.

S2.6. The County should assess a fee to the local government for cases handled or periods of time covered as the primary service. These fees should cover the actual cost to the County for servicing those incidents.

S2.7. All agencies in Ross County should be required to establish uniform mutual aid agreements that assesses a fee of at least $1,000 be paid by the community (not the agency) receiving mutual aid requests for a primary EMS response and no fee for a mutual aid request for a second, simultaneous call.

S2.8. The County should bill in addition to the assessed fees, for all cases handled by the County EMS unit(s).

S2.9. The initial number of County EMS unit(s) should be sufficient to address the current inadequacy of EMS response throughout the County. The following is recommended:

S2.9.1. As local EMS agencies cease service, the County should absorb that cognizant area within the County EMS system, adding units as necessary.

S2.9.2. The County system should be constantly readjusted, and the EMS unit(s) stations and posts should be modified to account for the changes in EMS call volume (amount, chronology, and geography).

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S2.9.3. If a Countywide EMS system were to be placed into service all at once, replacing all existing services (except Chillicothe FD), its EMS units should be stationed according to the following map.

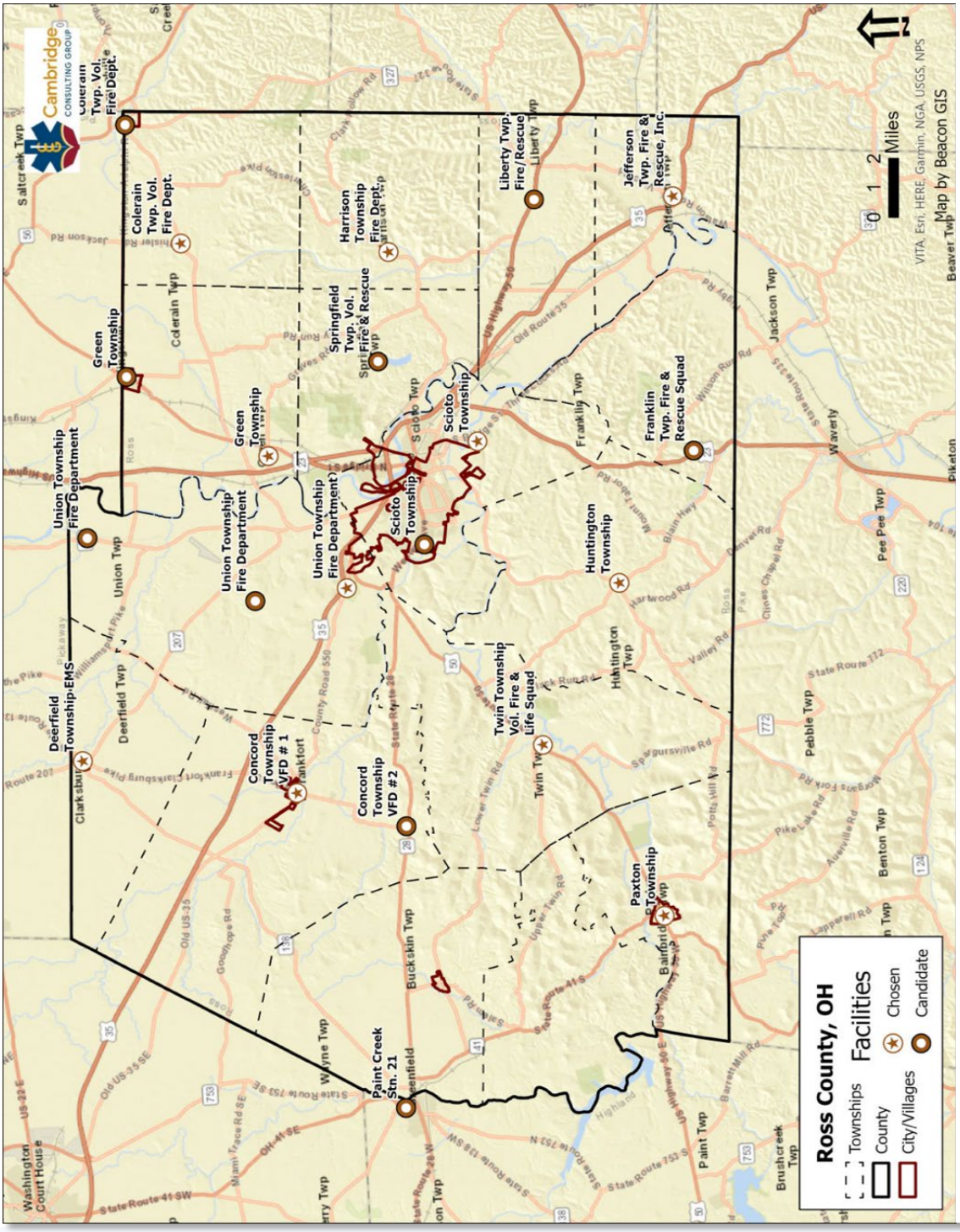

Figure 10 Recommended EMS Station Locations with Unified System

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S2. Ross County, in collaboration with local EMS agencies, should review existing response procedures and undertake a process to reduce HOT ambulance responses to less than 30% of overall EMS responses.

S3. Ross County and the county's ambulance agencies should establish robust continuing relationship with the executive management of all major receiving hospitals, including regular meetings with their Chief Executive Officer, Chief Medical Officer, Chief Operations Officer, and Chief Nursing Officer to enhance collaborative relationships and share information regarding hospital and EMS agency operations.

S4. Ross County and its ambulance agencies should work toward the inclusion of area ambulance agencies in clinical service line meetings to enhance clinical and operational integration for quality assurance purposes to enhance pre-hospital care collaboration.

S5. Ross County should reorganize the "county medical directors' committee" into a formal EMS System Medical Advisory Board (MAB). All County EMS agencies' medical directors should be required to be voting members of the MAB and the focus of the group should be on establishing standardized, Countywide EMS medical treatment protocols, providing continuing education to practitioners, and conducting monthly clinical care quality assurance. The group should also be required to recommend to the County, on a continuing basis, changes in EMS equipment and supplies. The MAB should submit an annual report to the County regarding its activities.

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Dispatching & Communications Recommendations

D 1. The County and City of Chillicothe should combine their independent PSAPs into one city/county single PSAP.

D 2. Ross County and Chillicothe should collaborate on a call taking and dispatch process that minimizes the need for 911 EMS call transfers. This could be accomplished by allowing the County to dispatch Chillicothe EMS response units directly, without the need to transfer the call to Chillicothe PD.

D 3. Ross County should optimize data tracking for EMS responses by more reliably capturing unit "Enroute" times. This would facilitate on-going data and performance reporting for the Ross County EMS system.

D 4. Ross County should change data extract processes to capture the 'seconds' field for all time fields. This would greatly enhance the accuracy of response time reporting for the Ross County EMS system.

D 5. Chillicothe should optimize data tracking for EMS responses by capturing unit "Call Received" times. This would facilitate on-going data and performance reporting for the Ross County EMS system.

D 6. Chillicothe should change data extract processes to capture the 'seconds' field for all time fields. This would greatly enhance the accuracy of response time reporting for the Ross County EMS system.

D 7. The County and local EMS agencies should review and revise dispatch processes to clearly delineate that the County PSAP is responsible for resource allocation to EMS responses using the APCO system to its fullest capability.

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Quality Improvement and Management Recommendations

Q1. Due to the smaller size of EMS agencies is Ross County, Cambridge recommends that a Ross County EMS Quality Committee (RCEMSQC) be established. This should be done as a collaboration between all the EMS agencies and emergency medical dispatch entities in Ross County.

Q2. Each EMS provider agency and each communications center that provides emergency medical dispatch services (e.g., caller interrogation, triage, pre-arrival instructions) should fully participate in the RCEMSQC.

Q3. RCEMSQC should operate in a manner that is in full compliance to the letter and spirit of Section 4765.12 of the State of Ohio Regulations for EMS.

Q4. RCEMSQC should operate with formally documented policies, procedures, and minutes to that the information it gathers, reviews, and generates is fully protected from legal discovery per Section 4765.12.

Q5. RCEMSQC should engage the services of a patient safety organization to take advantage of the broader legal protections and support services they offer under Federal law (https://pso.ahrq.gov).

Q6. RCEMSQC should fully engage in both quality assurance activities and formal quality improvement projects.

Q6.1. The initial focus should primarily be clinical, but as the program matures or as other needs or issues arise, the scope should expand to include more non-clinical issues.

Q7. Formal training in quality management should be sought for as many members of the RCEMSQC as possible, including the EMS medical directors.

Q8. Ross County, along with community and healthcare stakeholders should establish an "EMS System Performance Committee" comprised of EMS agency leadership, Medical Directors, hospital emergency department medical directors, and community stakeholders (elected and appointed officials, hospital administrators, community leaders, first responders) to undertake a process to identify key performance indicators that should be used to measure the clinical and operational effectiveness of the EMS system. The EMS System Performance Committee would also provide external accountability for how the system operates and performs.

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Q9. Ross County, along with community and healthcare stakeholders should establish and report on clinical performance, to include metrics on compliance to clinical bundle for conditions such as cardiac arrest, advanced airway management, STEMI, stroke, and trauma. In addition to the internal benefits of performance feedback, the performance metrics can demonstrate the level of clinical quality being provided to local communities by their EMS agencies and the community-wide systems of care. Examples of clinical bundles are represented below.

Clinical Bundle Performance Dashboard

Agency:

Ventilation Management	Goal	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Current Avg.	Goal
% of cases with etCO2 use for non-invasive ventilation management (CPAP, BVM) when equipped										
% of cases with etCO2 use for invasive ventilation management (KA, ETT, Cric)										
% of successful ventilation management as evidenced by etCO2 waveform throughout the case										
% of successful King Airway placement										
% of successful endotracheal tube placement										
System response time < 5 mins for Dispatch-presumed compromised airway										

STEMI	Goal	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Current Avg.	Goal
% of suspected STEMI patients correctly identified by EMS										
% of suspected STEMI patients w/ASA admin *(in the absence of contraindications)*										
% of suspected STEMI patients w/NTG admin *(in the absence of contraindications)*										
% of suspected STEMI patients with 12L acquisition within 10 minutes of patient contact										
% of suspected STEMI patients with 12L transmitted within 5 minutes of transport initiation										
% of suspected STEMI patients with PCI facility notified of suspected STEMI within 10 minutes of EMS patient contact										
% of patients with Suspected STEMI Transported to PCI Center										
% of suspected STEMI patients with EMS activation to Cath Lab intervention time < 90 minutes										

Stroke	Goal	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Current Avg.	Goal
% of suspected Stroke patients correctly identified by EMS										
% of suspected Stroke patients w/BGL measured										
% of suspected Stroke patients w/CSS measured										
% of suspected Stroke patients w/positive CSS scores receiving Los Angeles Motor Score (LAMS) measured										
% of suspected stroke patients with stroke facility notified of suspected stroke within 10 minutes of EMS patient contact										
% of suspected stroke patients w/LAMS scores 4 - 5 transported to Comprehensive Stroke Center										

Trauma	Goal	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Current Avg.	Goal
% of patients meeting Trauma Alert criteria correctly identified by EMS										
% of suspected Trauma Alert patients with trauma facility notified of trauma alert within 10 minutes of EMS patient contact										
% of suspected Trauma Alert patients with scene time < 10 minutes (*in the absence of extrication delay*)										

Q10. The County should manage the quality management program and staff it with a full-time EMS quality manager to lead the program in collaboration with a County EMS Medical Director.

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Education and Training Recommendations

E1. Ross County should establish a Countywide competency-based EMS education/training program to develop, administer and continuously assess EMS education and training based on national and state scope of practice models, evidence-based medical practices, system medical direction needs assessments, and quality management processes.

E2. Ross County should establish Countywide guidelines for meeting state-required licensing levels participating in quality management process and providing special training and support to personnel in need of specific training.

E3. Ross County should establish a Countywide process to ensure that EMS agencies meet the initial, recurrent, and inter-agency competency- based training standards as established by Ross County.

E4. Ross County should establish a Countywide EMS education schedule and calendar.

E5. Ross County should establish a Countywide process for tracking and documentation of EMS education and training attendance.

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Options for EMS Education/Training Recommendations E1 through E5 beginning with the highest benefit option.

Option 1 for Recommendations E1 through E5

Opt 1:1. Establish a Countywide EMS Education/Training Department under Ross County jurisdiction with at least two full-time EMS Education/Training positions. (titles/rank as determined by Ross County)

Opt 1:1.1. Ross County EMS Education/Training Department would be responsible for:

Opt 1:1.1.1. The development, implementation, and maintenance of the Countywide EMS Education and Training program(s)

Opt 1:1.1.2. Establishing and managing an EMS Education/Training Advisory Council which will consist of representation from each agency participating in the Ross County EMS system, a representative of the EMS Medical Directors, and an EMS Quality Management representative.

Opt 1:1.1.3. Coordinate EMS Education/Training program selection, and development with Ross County Medical Director(s)

Opt 1:1.1.4. Coordinate EMS Education/Training program selection, development with Countywide quality management process.

Opt 1:1.1.5. Coordinate EMS Education/Training scheduling and calendar

Opt 1:1.1.6. Coordinate process for tracking and documentation of EMS Education/Training attendance

Opt 1:2. Option 1 has a budget impact in that it requires the establishment of an EMS Education/Training Department and at a minimum 2 full-time equivalent positions. Three full-time equivalent positions would be optimal, one with administrative and operational responsibilities, one with program development and implementation responsibilities and an administrative support specialist.

Opt 1:2.1. Ross County EMS should establish the EMS Education/Training Department

Opt 1:2.1.1. Operational and logistical expenses should be the budget responsibility of Ross County EMS.

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Opt 1:2.1.2. Develop and hire one EMS Education/Training supervisor (title/rank as determined by Ross County) in a full-time equivalent position to implement and manage the EMS Education/Training Department and Advisory Council in addition to having, EMS education/training instruction responsibilities.

Opt 1:2.1.3. Develop and hire a second full-time equivalent position (title/ rank as determined by Ross County) to develop EMS Education/Training programing and provide EMS education/training instruction.

Opt 1:2.1.4. Develop and hire one administrative support specialist to provide logistical and organizational support to EMS Education/Training department and personnel.

Opt 1:2.1.5. Full-time equivalent position – salary, benefits, and retirement package as per Ross County Human Resources policies.

Option 2 for Recommendations E1 through E5

Opt 2:1. Design and establish a unified Countywide EMS Education/Training Cooperative.

Opt 2:2. The EMS Education/Training Cooperative would consist of one EMS education/ training representative from each agency participating in Ross County EMS system, one Ross County representative as well as at least one Medical Director and one Quality Management representative.

Opt 2:2.1. The EMS Education/Training Cooperative should be responsible for

Opt 2:2.1.1. The development, implementation, and maintenance of the Countywide EMS Education/Training program(s),

Opt 2:2.1.2. Coordinate EMS Education/Training program selection, and development with Ross County EMS agency Medical Director(s),

Opt 2:2.1.3. Coordinate EMS Education/Training program selection, development with Countywide quality management process,

Opt 2:2.1.4. Coordinate EMS Education/Training scheduling and calendar,

Opt 2:2.1.5. Coordinate process for tracking and documentation of EMS Education/Training attendance,

Opt 2:2.2. The Ross County representative would be the Chairman of the EMS Education and Training Cooperative to assure operational planning and logistics are appropriate.

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Opt 2:3. Option 2 has a minimal budget impact to Ross County EMS. It would however require each agency participating in the Ross County EMS system's cooperation by contributing a qualified EMS Education/Training officer with specific time designation to the operation and maintenance of the Ross County EMS Education/Training Cooperative, spreading the budget impact over all the EMS, Fire and First Response Agencies.

Opt 2:3.1. A county- wide EMS Education/Training cooperative would be established and design the rules and responsibilities of the cooperative members.

Opt 2:3.2. Each EMS, Fire and first response agencies would support the cooperative with personnel and financing options as outlined in the rules and responsibilities of the cooperative.

Opt 2:4. Option 2, being a cooperative process, would require consensus and by-in from each participating agency and potentially their medical directors, quality management officers and possibly chief officers and/or elected officials.

Opt 2:4.1. Many participants in a cooperative process can be cumbersome and lead to lengthy decision-making processes that have the potential to stall or not support consensus.

Option Three for Recommendations E1 through E5

Opt 3:1. Ross County EMS develops an RFP for acquiring the services of a commercial EMS Education/ Training company/organization to establish and provide a Countywide EMS Education/Training program.

Opt 3:2. The contracted commercial EMS Education/Training entity would be responsible for:

Opt 3:2.1. The development, implementation, and maintenance of the Countywide EMS Education/Training program(s).

Opt 3:2.2. Establishing and managing an EMS Education/Training Advisory Council which will consist of would consist of one EMS education/ training representative from each agency participating in Ross County EMS system, one Ross County representative as well as at least one Medical Director and one Quality Management representative.

Opt 3:2.3. Coordinate EMS Education /Training program selection, and development with Ross County EMS Medical Director(s).

Opt 3:2.4. Coordinate EMS Education/Training program selection and development with Ross County EMS quality management process (representatives).

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Opt 3:2.5. Coordinate EMS Education/Training scheduling and calendar.

Opt 3:2.6. Coordinate process for tracking and documentation of EMS Education/Training attendance.

Opt 3:3. Option 3 could have considerable budget impact and has the potential for political impact.

Opt 3:3.1. Actual budget impact would be dependent on contracting requirements.

Opt 3:3.2. How the expense of the contract is distributed can be complicated.

Opt 3:3.2.1. Will Ross County EMS absorb full budget impact?

Opt 3:3.2.2. Can all EMS and first response agencies be required to contribute to budget resolution?

Opt 3:3.2.2.1. Will this required contributing process need to be approved outside of the agency chief officer? Elected officials?

Opt 3:3.2.3. Will budget impact be based on the number of agencies or the number of participating personnel?

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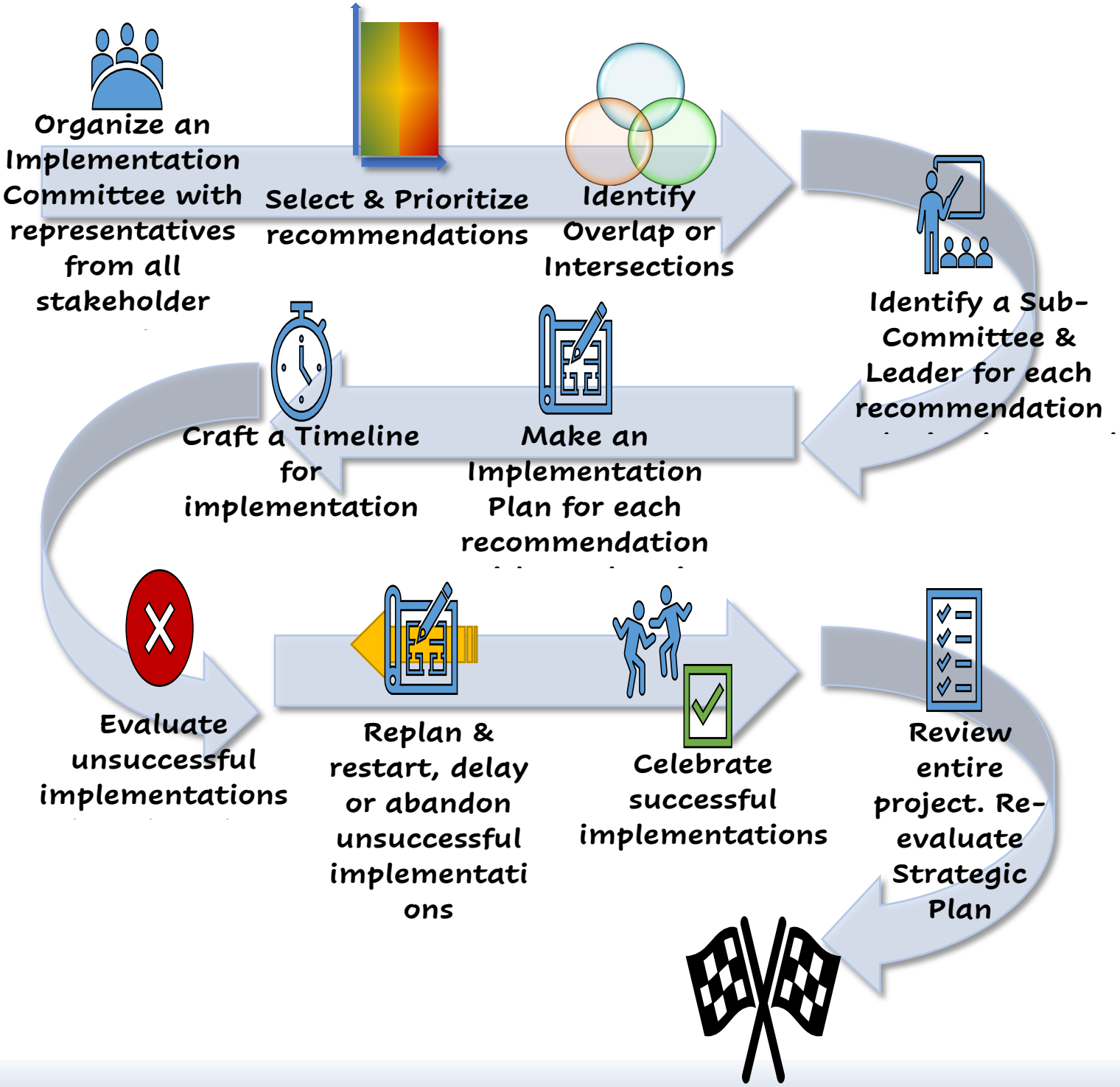
Pathway to Achievement



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THE PATHWAY EXPLAINED

The process of steps to achieve the plan is referred to as The Pathway. As illustrated in the graphic, this action plan contains the following elements, which need to be taken in a particular order. Doing so allows for the maximum possibility of successfully implementing each of the recommendations within the strategic plan.

1) The organization selects a Leader to spreadhead and manage the implementation of the strategic plan.

2) The Leader identifies each person, called a stakeholder, who is important to the accomplishment of the plan. These persons may be those directly associated with the provision of EMS within the community, representatives of EMS provider agencies and governmental officials who oversee these services. Stakeholders may also include individuals who are tangential to the EMS system, but still important to its success. These may include members of the business community, patient advocates, patient safety organizations, public service groups, and others.

3) The working committee of stakeholders, facilitated by the Leader, first endeavors to identify the relative importance and priority of each recommendation, placing it in a matrix which shows the effort and time expected to accomplish each. This becomes the order of pursuit the group will use in scheduling actions for each recommendation.

4) The group then identifies any areas of overlap among the recommendations to highlight where duplicative or redundant activity may occur. It is often efficient to use a Venn diagram to reveal these intersections.

5) Subcommittees should be created for each recommendation, or for groups of recommendations that are similar in nature and will require resources to accomplish.

6) A facilitator for each group should be identified to keep the sub-group focused on their targets and deliverables.

7) Each subcommittee should create an implementation plan that includes a timeline, progressive milestone accomplishments, projected budget or costs, and an achievement description.

8) The launch of each effort toward achieving a recommendation should be coordinated through the main committee.

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9) As efforts are pursued to achieve each recommendation, status reports should be made to the main committee. This enables the larger group to modify plans in progress or pending launch to avoid conflicts or counterproductive efforts colliding. It also permits early recognition of failure or the diversion from an established goal that a particular initiative may encounter. Again, adjustments to the implementation plans for the affected sub-groups should then be made by the main committee.

10) Identified failures should be relegated to the associated subcommittee for root cause analysis and finding reported to the main committee. A decision should be made to re-plan the failed initiative(s), set it aside to relaunch later that may be more efficacious, or abandon it altogether.

11) As initiatives succeed, the group should celebrate and advertise its accomplishment(s).

12) Periodically and at the end of the entire process and reevaluation should be made to judge the overall success of the project and identify further reviews that may be needed.

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PLANNING PROCESS FOR QUALITY IMPROVEMENTS RECOMMENDATIONS

Regardless of the quality management program being developed as collaboration of separate agencies or within a County EMS Agency that does all transport, several steps should be taken in following order:

1) Establish the EMS System Performance Committee (EMSSPC)with senior leaders inside and outside of EMS. These should be high-level decision makers with the ability to make commitments and allocate resources from their respective organizations.

    a) Obtain appropriate training at a leadership level for quality management.

    b) Informed by the leadership training, determine the high-level clinical, operational, and financial metrics that can be used to evaluate performance of the overall EMS system.

2) The Ross County EMS Quality Committee (RCEMSQC) be established. This should be done as a collaboration between all the EMS agencies (transport and non-transporting) and emergency medical dispatch entities in Ross County. The people on this committee should be more operational with day-to-day responsibility for quality management in their respective organizations.

    a) This group would develop performance measures to be used by the various organizations internally for on-going monitoring. These should contribute to or complement the system-level metrics developed by the EMSSPC.

        i) For example, the EMSSPC might identify the out-of-hospital cardiac arrest survival rate as a system level clinical metric. The RCEMSQC might focus on compression rate compliance as a metric for each agency to monitor internally and then aggregate. The compression rate contributes to the results of the survival rate metric.

    b) This group would propose system-level improvement projects to the EMSSPC to secure their support and obtain needed resources. This EMSSPC would also provide external accountability for performance levels and improvement project results.

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3) If a County EMS system is implemented, the County should manage the quality management program and staff it with a full-time EMS quality manager to lead the program in collaboration with a County EMS Medical Director.
   a) Hire a part-time County EMS Medical Director

      i) Consider an RFP process with specification of the desired training, background as well as the duties and deliverables.

   b) Hire a full-time EMS Quality Manager.

4) Obtain quality management training and support.

   a) Engage an appropriately qualified firm to provide coaching and support services to the quality management program. They may also be able to provide training services. Ideally, they should be well-versed in EMS, but strong healthcare quality capabilities may be acceptable if an EMS specific firm is not available.

   b) Leadership level training for the EMSSPC members.

   c) Operational level training (e.g. Six Sigma Green Belt) for all RCEMSQC committee members.

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PLANNING PROCESS FOR EDUCATION RECOMMENDATION OPTIONS REVIEW AND SELECTION

1) Complete a SWOT analysis to determine which recommendations option(s) would best meet the clinical, operational, and logistical needs of Ross County.

    a) Considerations

        i. Rules and regulations of Ohio Health Authority Office of EMS & Trauma Systems.
        ii. Operational rules, regulations, and responsibilities of Ross County.
        iii. Territorial and political boundaries and expectations.
        iv. Review and determine budget/finance platform based on options selected.
        v. Establish timeline for implementation of selected option.
        vi. Determine membership options for process development and operational team.
        vii. Consult Ross County legal and human resources departments.

2) If Option One [Establish a Countywide EMS Education/Training Department under Ross County jurisdiction with at least two full-time EMS Education/Training positions. (titles/rank as determined by Ross County)] recommendations One through Five is selected,

    a) Establish timeline and hiring process for Ross County EMS Education/Training Department personnel.

    b) Develop and establish budget process for Ross County EMS Education/Training Department.

        i. Full-time equivalent position – salary, benefits, and retirement package as per Ross County Human Resources policies
        ii. Equipment and supply needs and acquisition
        iii. Office space
        iv. Vehicle and fuel
        v. EMS Education Training tracking and documentation process and/or software
        vi. EMS Education/Training Advisory Council

    c) Develop and establish Ross County EMS Education/Training Department operational rules and responsibilities.
    d) Establish timeline establishment and implementation of Ross County EMS Education/Training Advisory Council.

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e) Develop and establish Ross County EMS Education/Training Advisory Council rules and responsibilities.
f) Establish Countywide standards as noted in Recommendations Two and Three
g) Research, develop and establish process for enactment of Recommendations Four and Five.
h) Develop and establish Countywide EMS Education and Training implementation timeline.
i) Establish and implement process for Countywide EMS education/Training schedule and calendar.
j) Establish and implement Countywide process for tracking and documentation of EMS education/training attendance.

3) If Option Two - Design and establish a Countywide EMS Education/Training Cooperative. Recommendations One through Five is selected:

a) Develop and establish Ross County EMS Education/Training Advisory Council rules and responsibilities.
b) Establish development process timeline for Ross County EMS Education/Training Advisory Council.
c) Develop and establish budget process for Advisory Council.
d) Establishing Countywide standards as noted in Recommendations Two and Three.
e) Develop and establish Countywide EMS Education/Training implementation timeline.
f) Establish a Countywide EMS Education/Training schedule and calendar.
g) Establish a Countywide process for tracking and documentation of EMS education/training attendance.

4) If Option Three - Ross County EMS develops an RFP for acquiring the services of a commercial EMS Education and Training company to establish and provide a unified Countywide EMS Education and Training program Recommendations One through Five is selected:

a) Research, develop and implement RFP.
b) Establish process to obtain EMS, Fire and first response agency buy-in.
c) Establish process to obtain EMS, Fire and first response agency budgeting support as needed.
d) Select and establish a team to evaluate RFP and recommend options.
e) Establish timeline for contract acquisition.
f) Establish timeline for start of Countywide EMS Education/Training program.
g) Determine budget impact and how it will be distributed.

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The Cambridge Consulting Group Engagement Team for the project:

Matt Zavadsky, MS-HSA
Engagement Manager

Brian LaCroix, BS, FACPE
Executive Advisor

Vincent Robbins, FACPE, LFACHE
Executive Advisor

Dr. Mark Merlin, DO
Senior Advisor

David Shotwell, Esq.
Senior Advisor

Mic Gunderson, FAEMS
Senior Advisor

Chief Jim Davis, RN, EdD
Senior Advisor

John Todaro, NRP, RN, BA
Associate Advisor

Jeff Behm, MBA, FACPE
Associate Advisor

Michael Touchstone, BSHS, FACPE
Subject Matter Expert

Robert McNally
Subject Matter Expert

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End Notes:

[i] Craig, Alan., Schwartz, Brian. and Feldman, Michael. "Development of Evidence-based Dispatch Response Plans to Optimize ALS Paramedic Response in an Urban EMS System" *Paper presented at the annual meeting of the National Association of EMS Physicians, Registry Resort, Naples, FL*, <Not Available>. 2009-05-25 <http://www.allacademic.com/meta/p55915_index.html>

[ii] St. John, Dorothea and Shephard, Reggie. "Emergency Medical Services-EMS dispatch and response" Fire Chief Magazine, August 1983, 2010 http://www.emergencydispatch.org/articles/emsdispatch1.htm

[iii] BLS, the first tier of EMS, is usually provided by emergency medical technicians (EMT) who are trained to render non-invasive, urgent, low level on-scene medical care such as splinting fractures, bandaging wounds and administering CPR. However, since volunteer EMS agencies are exempt from state regulation and licensure, there is no legal obligation that those agencies provide EMTs, or any level of trained individual for that matter, when rendering care.

[iv] ALS, the higher tier of EMS, is provided by paramedics who are required by regulation to be certified to render advanced medical care out-of-the-hospital, including invasive therapies like IVs and medication administration, defibrillation and cardioversion, endotracheal intubation and chest decompression, under the command of a physician.

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