500 West Big Beaver
Troy, MI 48084
troymi.gov

CITY COUNCIL AGENDA ITEM

Date: April 17, 2025

To: Frank Nastasi, City Manager

From: Robert J. Bruner, Deputy City Manager
Peter Hullinger, Fire Chief

Subject: Emergency Medical Services (EMS)

On March 10, 2025, the City Council held a special meeting regarding the City's emergency medical services (EMS). The purpose of this report is to provide the City Council with information and updates since that meeting.

The City most recently issued a request for proposal (RFP) for emergency medical services (EMS) in 2022 (RFP-COT 22-19). The term of the City's current agreement with Universal Ambulance Services (Universal) will end December 31, 2025. Accordingly, city staff is preparing a new RFP.

Current Deployment Plan and Prices

For many years, the service agreements included both Advanced Life Support (ALS) ambulances and Paramedic First Responder (PFR) units. The Deployment Plan included a specific number of PFR units paid for on an hourly basis but no fee for ambulance service. Instead, the provider billed patients for ambulance services and those costs are often covered by Medicare and/or private medical insurance.

The Deployment Plan changed effective January 1, 2024 after the City Council approved an amendment to agreement on December 11, 2023 (Resolution #2023-12-177). The amendment reduced the required number of PFR units from three to one and added a minimum of three ALS ambulances. Although the Deployment Plan requires a minimum of three ALS ambulances, the provider only bills for two so the overall number of units and hourly rate did not change.

Current Prices

24 hours x 365 days = 8,760 hours x $31.00 per hour = $271,560 per unit per year
$271,560 per unit per year x three (3) units = $814,680 annually

Current Response Times

The service agreement requires a paramedic on scene (either from a PFR Unit or an ambulance) within 5 minutes 00 seconds and an ALS ambulance response time of 8 minutes 00 seconds for at least ninety percent (90%) of emergency responses every month. Response time is defined as the time between the receipt of the call at the provider's dispatch center and the responding unit's arrival on scene. It does not include the time between the receipt of the call at the City's 9-1-1 call center and the transfer of the call to the provider's dispatch center.

On November 20, 2023, the City Council approved an agreement with Fitch and Associates (Resolution #2023-11-166-J-5). Fitch and Associates completed an evaluation of the EMS system utilizing five

years of historical data between 2019-2023. The EMS Feasibility Study dated September 2024 (attached) explains each component of response time:

- Dispatch Time: The time from receipt of the 9-1-1 call until an EMS unit is notified to respond.
- Turnout Time: The time between the EMS unit being notified of a call (dispatched) and when the EMS unit begins driving to the incident.
- Travel Time: The time the EMS unit spends driving to the incident until it is on-scene.
- Response Time: The total time from receipt of the 9-1-1 call to the EMS unit's arrival on-scene.

The Feasibility Study found dispatch time was 198 seconds (3.3 minutes) for all emergent calls at the 90th percentile. National Fire Protection Association (NFPA) Standard 1710 (attached) includes 64 second "Alarm Processing Time" at the 90th percentile. Dispatch time for a private EMS provider will always be longer than a public EMS provider because calls must be transferred from the City's 9-1-1 call center to the private EMS provider. Private EMS providers cannot use the public computer-aided dispatch (CAD) system.

The Feasibility Study found turnout time was 90 seconds (1.5 minutes) for emergent incidents. NFPA Standard 1710 includes 60 second (1 minute) turnout time for EMS. The components or tasks that contribute to total turnout time depend on how EMS units are deployed. For example, turnout time for EMS units responding from a station includes the time it takes for personnel to get into a vehicle. Turnout time for EMS units responding with personnel already in a vehicle waiting for a call do not include that time and they may be able to turnout more quickly.

The Feasibility Study found travel time was 606 seconds (10.1 minutes) for the arrival of any EMS unit. NFPA Standard 1710 includes 240 second (4 minute) travel time at the 90th percentile for Basic Life Support (BLS) first response and 480 second (8 minute) for Advanced Life Support (ALS) arrival.

Proposed Deployment Plan and Response Times

Based on the amendment to the current agreement and market research, city staff plans to change the deployment plan and response times in the new RFP. The new RFP will not include Paramedic First Responder (PFR) units. This model served the community well in the past but is no longer sustainable. Instead, the new RFP will require Advanced Life Support (ALS) ambulances only.

The current agreement defines response time as the time between the receipt of the call at the provider's dispatch center and the responding unit's arrival on scene. A private EMS provider cannot be held responsible for the time it takes to transfer calls from the City's 9-1-1 call center to the private EMS provider. However, it is important for the City and the provider to work together to reduce dispatch time as much as possible.

NFPA Standard 1710 includes 60 second (1 minute) turnout time for EMS, 240 second (4 minute) travel time for Basic Life Support (BLS) first response and 480 second (8 minute) for Advanced Life Support (ALS) arrival. Since the PRF units and their corresponding 5-minute response time will be eliminated, an ALS ambulance will be the first and only EMS unit responding. The Feasibility Study found a deployment plan with four ambulances could provide a 360 second (6 minute) travel time for nearly

92% of the incidents. Adding the 60 second (1 minute) turnout time for EMS creates a total response time of 420 seconds (7 minutes) for the new RFP.

Proposed Pricing

The new RFP will request both performance-based and unit-based pricing.

Performance Based Pricing: Based on the analysis of historical data between 2019-2023, the EMS provider did not meet the response time performance objectives in the agreement. In order to prevent this from happening in the future, the cost of third-party audits will be included with performance-based pricing. Performance-based pricing is intended to allow the provider to meet the response time performance objectives in a cost-effective manner. It is not intended to minimize costs at the expense of performance.

Unit Based Pricing: The 2022 RFP required providers to include a proposed deployment plan indicating the number of dedicated ambulance units and dedicated first responder units required to meet the response time standards.

The Paramedic First Responder Service proposal included three (3) dedicated units during peak times and two (2) during off-peak times for 21,900 payable hours annually to meet the five (5) minute response time standard (21,900 hours x $31.00 per hour = $678,900 annually). However, the agreement ultimately included three (3) dedicated units at all times (26,280 hours x $31.00 per hour = $814,680 annually).

The Advanced Life Support Ambulance Service proposal included one dedicated ambulance unit at no additional cost to meet an eight (8) minute response time standard. In order to meet a six (6) minute response time standard, the vendor proposed replacing the PFR units with five (5) dedicated ambulance units during peak times and three (3) units during off-peak times at a cost of $336,000 per month ($4,032,000 annually).

In summary, proposal pricing ranged between $678,900 (21,900 PFR unit hours) and $4,032,000 (35,040 ALS unit hours) annually depending on the Deployment Plan and response time.

The Feasibility Study found a deployment plan with five (5) dedicated ambulances during peak times and four (4) during off-peak times (39,420 total unit hours) is required to meet a 6-minutes travel time to 90% of incidents. Accordingly, the new RFP will request ALS unit-based pricing for 35,040 hours, 39,420 hours, and 43,800 hours annually. That is equivalent to four (4), four and one-half (4.5), and five (5) units 24 hours per day, 365 days per year.

The 2022 RFP was issued in August, proposals were due in September, and the City Council awarded the contract on December 5, 2022. City staff is working to expedite the process and will provide updates as necessary.

Executive Summary

The City of Troy has completed an evaluation of the EMS system utilizing five years of historical data between 2019-2023. The evaluation included comprehensive quantitative data and Geographic Information System (GIS) analyses to determine the distribution, concentration, and reliability of fixed and mobile response forces emergency medical services (EMS).

A comprehensive assessment of the estimated revenues within the city's EMS system demand was completed so that the city and department leadership can consider policy options to meet expectations and introduce high transparency with the public.

This executive summary highlights the most substantive recommendations and alternatives developed for consideration.

Overall, five interwoven themes were utilized to evaluate potential EMS system configurations. These included various configurations of financial estimates, staffing, and alternative response time objectives.

Options for improving the performance between 2 to 4 minutes were evaluated, with a 6-minute travel time providing the best performance while balancing the return on investment.

Once fully implemented, the City of Troy's citizens and visitors would receive improved EMS response capability, reduced reliance on fire apparatus for EMS incidents, and maintained or improved response time performance for the most critical EMS incidents.

Substantive alternatives include creating a transport model for the City of Troy that can respond to and transport over 90% of the requests for EMS services within the community.

Adopting a properly resourced EMS system design will improve response times and provide for long-term operational and fiscal sustainability.

In addition, there is an opportunity for greater efficiency in providing EMS that can reduce the number of resources sent to incidents.

Finally, the recurring estimates for the net impact to the general fund after the first year of start-up would be between $2.3m and $2.6m.

Considering the analyses completed in this report, it is anticipated that any EMS provider will require public subsidy to continue providing services in the future.

Top Five Priorities

1. Ensure long-term fiscal and operational sustainability for the provision of EMS.
2. Improve EMS system response time by up to 4 minutes to a 6-minute travel time goal.
3. Evaluate and select the desired system design, response time objectives, and employee schedules.
4. Develop objective, transparent, and accountable performance criteria.
5. Outsource EMS billing to a 3rd party vendor.

Historical Performance

The department understands the relative opportunity to improve the citizens' experience by maximizing the efficiency of the dispatch interval and turnout time. Dispatch Time is defined as the time from when the 911 center receives a request for service until the fire department is notified to respond. Turnout Time is defined as the time between the fire department being notified of a call (dispatched) and when they are actually driving to the incident.

The National Fire Protection Association (NFPA) 1710 and 1225 recommend a 64- and 60-second dispatch time, respectively. The current performance is 3.3 minutes for all emergent calls at the 90th percentile.

Similarly, the NFPA and the Commission on Fire Accreditation International (CFAI) recommend a turnout time of 60 seconds for EMS incidents and between 80 and 90 seconds for non-EMS incidents, respectively. The current performance is 1.5 minutes for emergent incidents.

Recommendations

The department should explore opportunities to improve the historical dispatch time, as evidenced by AMH.

The department should identify and adopt the desired response time.

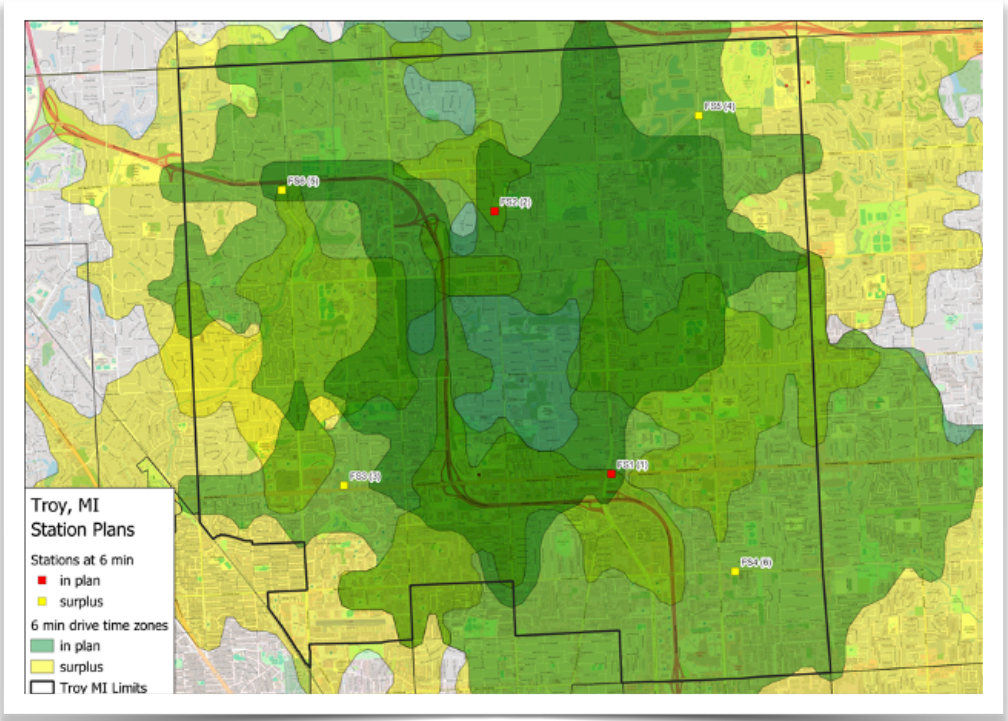
Travel Time is measured from when the apparatus and crews make a notification that they are driving to the incident until they notify that they are on-scene. NFPA 1710 recommends a 4-minute travel time at the 90th percentile for BLS first response and 8 minutes for ALS arrival. CFAI had historically provided for a 5.2-minute travel time at the 90th percentile. The current performance is 10.1 minutes for the arrival of any AMH unit.

Response Time is the total time from 911 receipt to arrival, which is 13.5 minutes for emergencies.

2023 90th Percentile Response Time Performance

Response Status	Call Severity	Dispatch Time (Minutes)	Turnout Time (Minutes)	Travel Time (Minutes)	Response Time (Minutes)	Sample Size[1]
Emergent	A	14.4	2.1	11.7	25.5	117
	B	3.4	1.6	10.9	13.6	1,432
	C	3.3	1.6	9.8	13.4	2,234
	D	3.0	1.5	9.9	13.0	2,373
	E	2.9	1.2	9.1	12.2	154
	O	--	--	--	--	6
	Not Reported	--	--	--	--	4
	Total	**3.3**	**1.5**	**10.1**	**13.5**	**6,320**
Non-Emergent	A	12.4	2.7	17.8	26.3	3,072
	B	13.7	2.3	16.3	21.5	572
	C	15.4	3.7	15.0	29.4	82
	D	13.1	2.1	13.2	23.7	39
	E	--	--	--	--	7
	O	5.7	2.0	17.9	23.3	145
	Not Reported	10.3	2.8	12.7	25.3	80
	Total	**12.5**	**2.6**	**17.5**	**25.5**	**3,997**
Total		**5.6**	**1.8**	**13.7**	**18.8**	**10,317**

Distribution Study



Observation

An adequately resourced and deployed EMS system can improve travel time by 4 minutes at the 90th percentile.

Response-time elements were evaluated for the city jurisdiction. The system should be able to provide coverage for a 6-minute travel time by deploying from two of the city's fire stations.

The system-level total response time for emergency responses for the arrival of any AMH unit was 13 minutes at the 90th percentile. This corresponds with a travel time of 10.1 minutes at the 90th percentile.

Overall, a properly resourced and deployed EMS system can improve travel time by 4 minutes at the 90th percentile.

	Call Severity	Dispatch Time (Minutes)	Turnout Time (Minutes)	Travel Time (Minutes)	Response Time (Minutes)
	A	14.4	2.1	11.7	25
	B	3.4	1.6	10.9	13
	C	3.3	1.6	9.8	13
	D	3.0	1.5	9.9	13
	E	2.9	1.2	9.1	12
	O	--	--	--	
	Not Reported	--	--	--	
	Total	**3.3**	**1.5**	**10.1**	**13**
	A	12.4	2.7	17.8	26
	B	13.7	2.3	16.3	21
	C	15.4	3.7	15.0	29
	D	13.1	2.1	13.2	23
nt	E	--	--	--	
	O	5.7	2.0	17.9	23
	Not Reported	10.3	2.8	12.7	25
	Total	**12.5**	**2.6**	**17.5**	**25**
Total		**5.6**	**1.8**	**13.7**	**18.8**

Concentration Study

The concentration of resources sufficient to respond to the frequency and duration of the community demand is utilized to evaluate the efficacy of the deployment strategy for the identified risk. Analyses reveal that the system has an average hourly demand of approximately 1.2 requests for EMS service per hour during peak periods. The system made 12,976 responses to 7,554 EMS incidents at an average of 1.8 responses per call. This reflects assigning and reassigning multiple units on a single incident, incidents with multiple patients, and other multiple-unit responses, such as a BLS unit and an ALS fly car or the first response unit's participation. Overall, it is a reasonable average resource commitment given the nature of the deployment model.

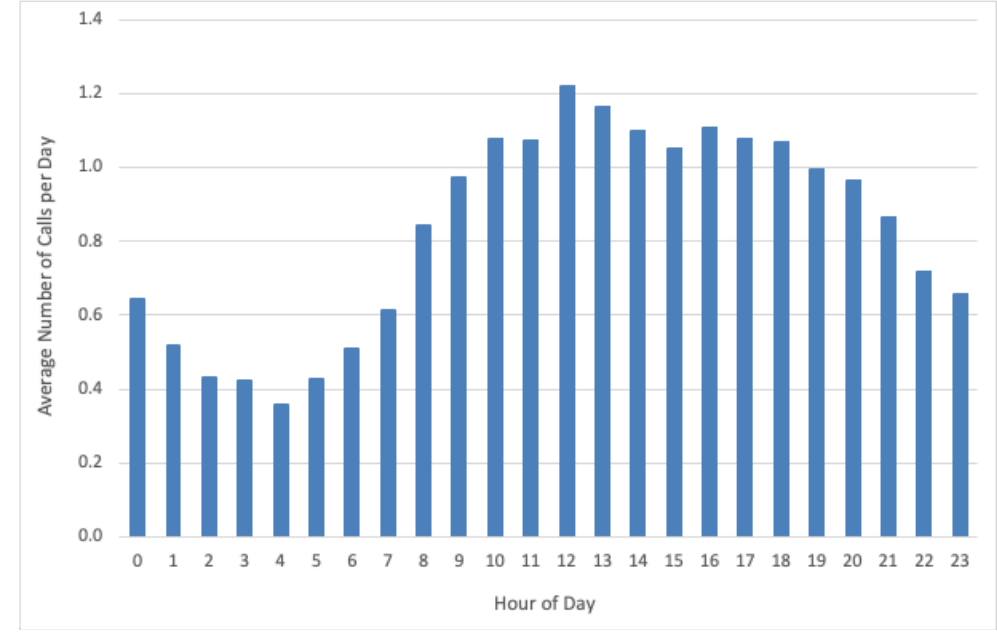
Observation

There may be an opportunity to align better the number of resources assigned to the severity of the EMS incident.

Call Type	Number of Calls[1]	Number of Responses[2]	Average Responses per Call	Average System Busy Minutes per Call[3]	Total Busy Hours	Responses with Time Data[4]	Average Busy Minutes per Response	Average Calls per Day	Average Responses per Day
Breathing Difficulty	562	1,146	2.0	59.1	761.2	1,146	39.9	1.5	3.1
Cardiac and Stroke	815	1,653	2.0	57.8	1,105.6	1,653	40.1	2.2	4.5
Fall and Injury	1,637	2,957	1.8	51.9	1,771.1	2,957	35.9	4.5	8.1
Illness and Other	2,609	4,270	1.6	50.1	2,553.7	4,270	35.9	7.1	11.7
MVA	406	876	2.2	43.3	435.4	876	29.8	1.1	2.4
Overdose and Psychiatric	498	676	1.4	53.2	463.8	676	41.2	1.4	1.9
Seizure and Unconsciousness	727	1,398	1.9	56.7	922.7	1,398	39.6	2.0	3.8
Total	**7,254**	**12,976**	**1.8**	**52.6**	**8,013.5**	**12,976**	**37.1**	**19.9**	**35.6**

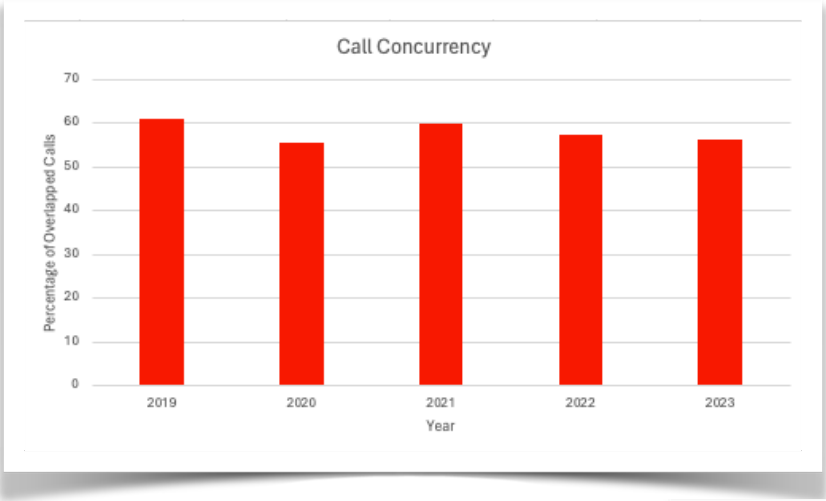
However, it is also reasonable to assume that the resource commitment per incident will be closer to 1.0 if the system is fully resourced with ambulances.

In other words, if there was greater confidence in the availability of resources and compliance with the desired response time, there may be opportunities to align better the number of resources sent to each level of EMS severity.



EMS System Resiliency and Deployment

The highest rate of call concurrency occurred in 2019 at 60.9%. In other words, approximately 39% of the time a call can occur within Troy's jurisdiction and it can be completed before a second or greater call occurs. The rate of call concurrency over the 5-years has remained consistent at 58.1%.

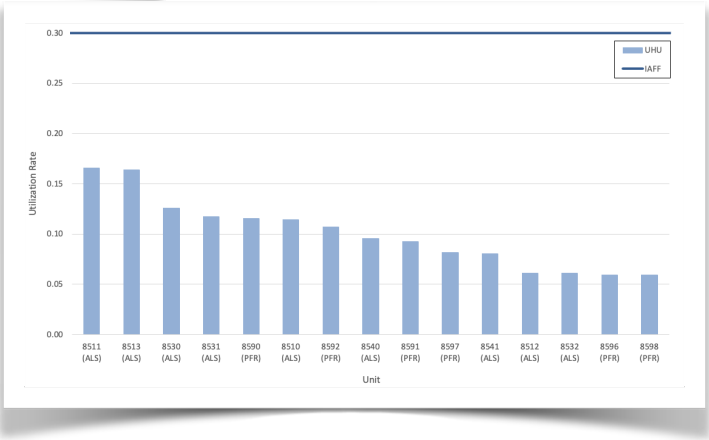


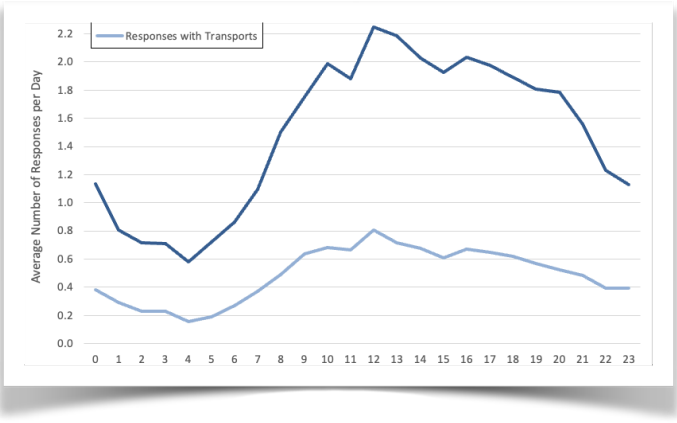
Recommendations

1. While deploying 12-hour shifts, the upper threshold for UHUs should be 45% as a planning threshold with a do-not-exceed value of 50%.
2. If the department considered 24-hour shifts, it is recommended that 0.25 UHUs, or 25%, is utilized as a planning threshold with a do-not-exceed value of 30%.

Unit Hour Utilization (UHU) is an objective measure of time on task for deployed resources. Historically, the system UHU has been well below the upper threshold for workload. In other words, the workload is not a limiting factor for any challenges to performance.

The current EMS system did not have an individual unit with a UHU greater than 17%.

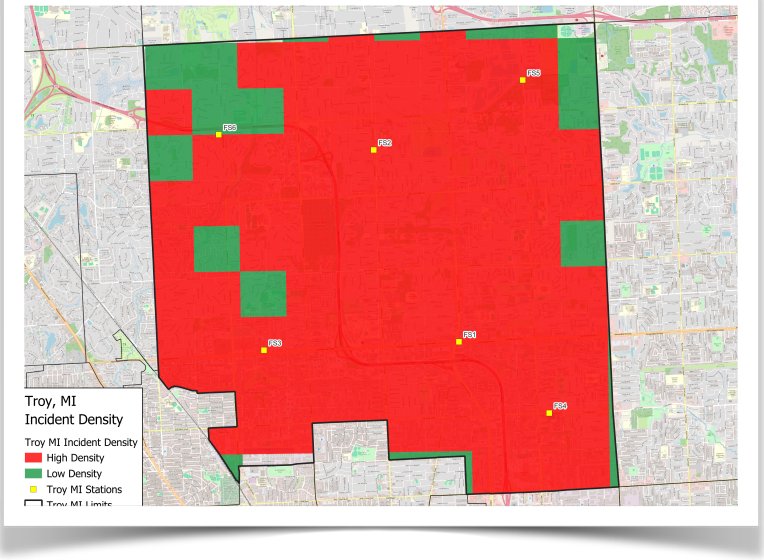




Transport rates, as a function of the number of responding units, were evaluated across the course of the 24-hour period.

Due to the deployment strategies currently employed, there may be an opportunity to better align the resources to risk.

Commensurate Risk Model and Projected Growth



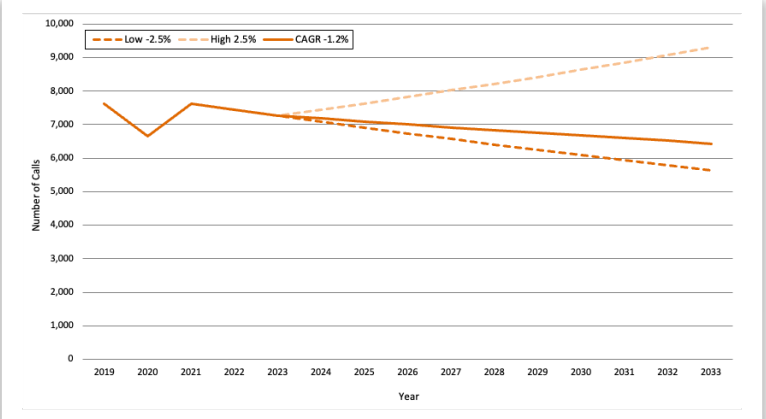
The call density analysis calculates the relative concentration of incidents based on approximately 0.5 geographic areas and at least half of the adjacent 0.5 grids. This assessment is based on call density, not population. The red areas are high-density service areas, and the green areas are low-density.

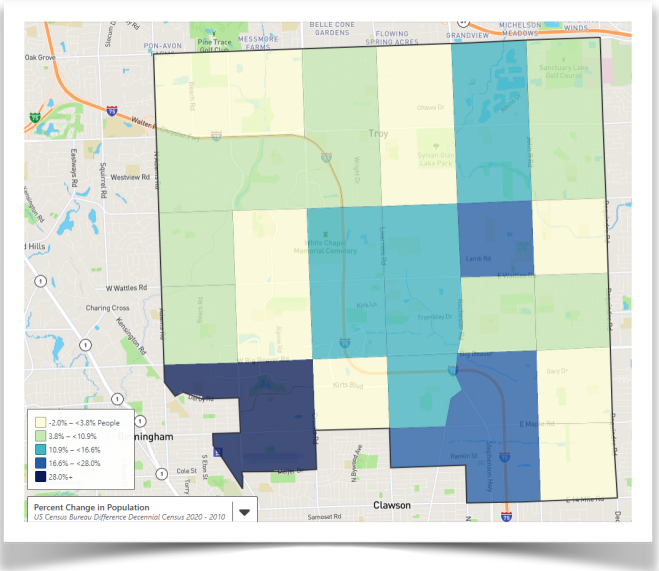
Recommendation

The system should continue to monitor changes in the environment related to population growth and increased community demand.

Population growth projections through 2031 were evaluated. The City of Troy had the greatest projected increase in population at a rate of nearly 4%. The city's southwest corner is projected to grow most at a significant >28% increase.

The figure below depicts observed annual call volume from 2019 to 2023 and projected growth in annual call volume from 2023 to 2033. Projections were made based on the Compound Annual Growth Rate (CAGR; -1.2%), or annualized average, derived from five years of observed call volume data, as well as one lower and one higher hypothetical annual growth rate scenario to provide a plausible range around the CAGR.





Interpreting growth data with a small sample size should be used with caution. The system should maintain a 5-year rolling average growth rate to assist in action planning and decision-making.

In addition, calls provided by outside agencies were not available in the analyzed data set, which understates the true demand.

Assessment of Patient Transports

The transport rates and call durations were evaluated to articulate the overall demand for services, and the call durations were utilized for all subsequent deployment modeling.

Observation

The transport rates, consistency throughout the 24 hours, and the at-hospital time commitments are within the national experience.

Transports Rates by the Medical Priority Dispatch (MPDS) Determinant

The transport rates were evaluated by MPDS determinants. The determinant with the highest transport rate was Delta incidents, which are emergent higher acuity incidents, at 75.8%. The second highest rate of transports was for Charlie incidents, which are traditionally defined as non-emergent Advanced Life Support (ALS) events. The overall transport rate was 57.8%.

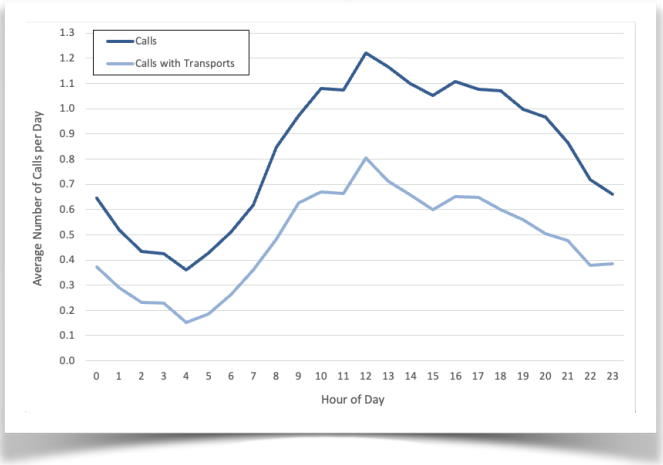
Call Type	Non-Transport		Transport			
	Average Call Duration (Minutes)	Number of Calls	Average Call Duration (Minutes)	Number of Calls	Total Number of Calls	Transport Rate (%)
A	31.1	1,445	74.5	1,448	2,893	50.1
B	23.2	691	71.4	714	1,405	50.8
C	33.7	373	68.6	942	1,315	71.6
D	32.9	321	71.4	1,007	1,328	75.8
E	51.5	52	91.0	37	89	41.6
O	34.9	97	69.4	48	145	33.1
Not Reported	42.7	88	86.2	3	91	3.3
Total	**30.7**	**3,067**	**72.0**	**4,199**	**7,266**	**57.8**

Transport rates were evaluated over a 24-hour period. The evaluation intends to look for consistency. In other words, the assumption is that a consistent transport rate indicates clinically based decision-making. Conversely, if the transport rate drops during peak periods or overnight, clinician-focused decisions might influence the system's performance.

Transports Destinations and Ambulance Wall Times

Beaumont and Cornwell Health account for 94% of the patient transport destinations. At the 90th percentile, the wall time for all facilities is 38.9 minutes. While best practice may be closer to 20 minutes, this is a reasonably at-hospital duration.

Transport Destination	Number of Responses	Wall Time (Minutes)	
		Average	90th Percentile
Beaumont Hospital - Troy	2,521	24.5	36.9
Corewell Health William Beaumont University Hospital - Royal Oak	1,504	28.5	41.6
Ascension Providence Rochester Hospital	70	26.0	37.7
Trinity Health - Oakland (St. Joseph Mercy)	64	23.8	37.5
Ascension Macomb-Oakland Hospital - Madison Heights	34	19.2	30.6
Not Reported	27	29.2	51.0
Ascension Providence Hospital - Southfield	12	25.5	41.4
Henry Ford West Bloomfield Hospital	11	26.9	40.4
Henry Ford Macomb Hospital - Clinton Township	8	17.7	--
Ascension Macomb-Oakland Hospital - Warren	4	27.2	--
Children's Hospital of Michigan - Troy	3	20.0	--
Ascension Macomb-Oakland Hospital - ER	2	16.0	--
Henry Ford Hospital - Detroit	2	23.1	--
McLaren Oakland Hospital	2	19.2	--
Ascension (Not Otherwise Specified)	1	23.4	--
Beaumont Hospital - Farmington Hills	1	31.3	--
Other	1	0.1	--
Total	**4,267**	**25.9**	**38.9**



Finally, many variables, such as technology and/or personnel management, may influence the duration of the stay at the hospital.

Efficacy of Response Time Objectives

A sensitivity to response time has long been a primary driver of EMS system design and resourcing. The prevailing result is an institutional belief that faster is better, where patient outcomes positively correlate with response times. A 1979 study out of King County, Washington, became a foundational piece for developing NFPA 1710 and the CFAI Accreditation Standards. The study concluded that BLS delivered in 4 minutes and ALS delivered within 8 minutes, which positively correlated with patient outcomes. Thus, this set the bar for the standards still influencing system design today. However, the King County study only focused on non-traumatic sudden cardiac arrest (SCA), yet its standards were extrapolated to all call types. A follow-up study by Weaver et al. (1984) became the foundation for the 90th percentile standard of 8 minutes 59 seconds adopted by the American Ambulance Association (AAA). Again, this study focused on witnessed SCA presenting with V-Fib, yet the standard was extrapolated to all call types.

Observations

Evidenced-based clinical research coalesces around a response time of 5 minutes or less to have a statistically significant impact on the risk of mortality for the small proportion of high-acuity incidents.

Response time changes above 6 minutes have limited clinical return on investment and are largely a policy decision.

Much has changed in EMS since these studies, including an expanded body of research regarding the influence of response time on patient outcomes. Empirical research has expanded the scope to include a much wider representation of call types and responses while still considering response times compared to patient outcomes. The culmination of the research indicates that the threshold for response time to influence patient outcome resides around the 5-minute mark. In other words, if a system cannot respond in less than 5 minutes, they are unlikely to positively influence patient outcomes by purchasing any level of performance that cannot meet 5 minutes. However, it is important to recognize that the 5-minute threshold is associated with high-acuity incidents that account for a small proportion of the total calls. A summary of the relevant research is provided below.

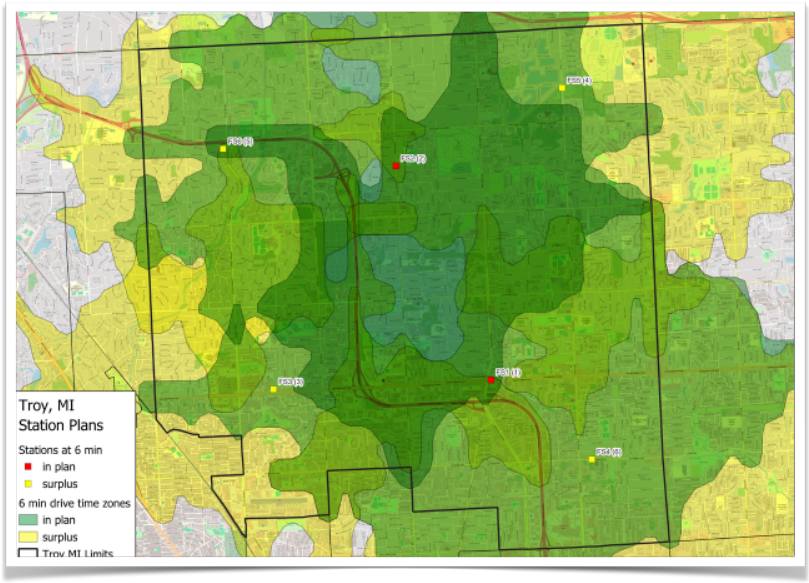
Author	Density	Sample Size	Response Time Threshold	Does Response Time Impact Patient Outcome
Blackwell (2002)	ALS Urban	5,424	5 minutes	Yes < 5 minutes; No > 5 minutes
Pons (2005)	ALS Urban	9,559	4 minutes & 8 minutes	No < 8 minutes; Yes < 4 minutes in intermediate/high risk of mortality
Blackwell (2009)	ALS Urban; BLS MFR	746	10:59	No > or < 10:59
Blanchard (2012)	ALS Urban	7,760	8 minutes	No > or < 8 minutes
Weiss (2013)	Metro/Urban and Rural	559	N/A Continuous Variable	No relationship between time and clinical outcomes
Pons (2002)	ALS Urban	3,490	8 minutes	No > or < 8 minutes after controlling for severity of injury
Newgard (2010)	ALS Urban	3,656	4 minutes & 8 minutes and Golden Hour	No time intervals were statistically related to mortality including response time, on-scene time, transport time, or total EMS time
Band (2014)	ALS Urban; BLS MFR	4,122	N/A Continuous Variable	Adjusted for severity of injury, no significant difference between PD and EMS. In patients with severe injuries, gunshot, or stabbing more likely to survive if transported by POLICE.

Additional research has examined the efficacy of emergency, or lights and sirens, responses. While emergency responses do produce statistically quicker responses and transports, very few have clinical implications for patient outcomes. Studies also found that emergency responses were warranted in less than 10% of ambulance transports, and hospitals didn't utilize the time savings created upon arrival to the emergency department. At the same time, community risk increases with emergency responses as units navigate against the established traffic practices. Research has shown that most accidents involving emergency vehicles occur while they are responding lights and sirens.

Establishing Performance Expectations

6-Minute Travel Time

Analyses suggest that the department could utilize a deployment strategy with a minimum of 2 stations staffed with a total of 4 ambulances to meet a 6-minute travel time for nearly 92% of the incidents.



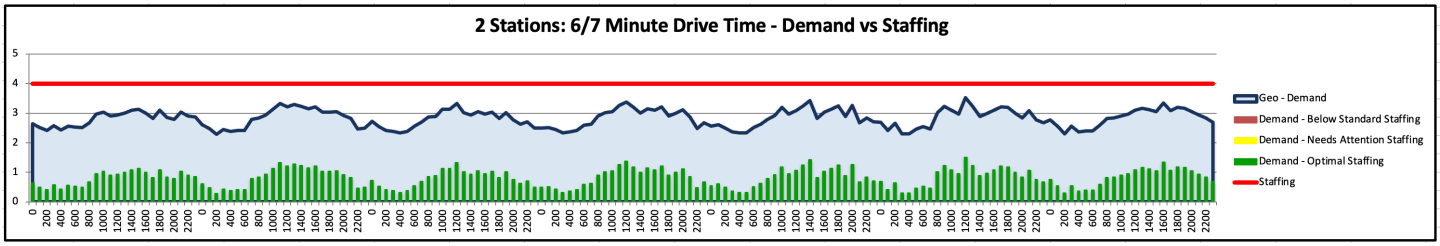
The current travel time for any AMH unit arrival is 10.1 minutes at the 90th percentile. Therefore, there is an opportunity for an overall approval of ambulance arrivals by approximately 4 minutes.

Regarding the marginal utility analyses below, each station location's relative contribution to accomplishing a 6-minute travel time is outlined in the last column labeled "Percent Capture". This cumulative value demonstrates that, if properly resourced, Stations 1 and 2 could capture nearly 92% of the city's EMS calls within 6 minutes.

If all four ambulances are available, they should be located at Stations 1, 2, 3, and 5 in priority order. In other words, if only one resource is left in the city, it should be placed at Station 1.

Rank	Station	Drive Time (Min)	Station Capture	Total Capture	Percent Capture
1	FS1	6	5,653	5,653	77.80%
2	FS2	6	974	6,627	91.21%
3	FS3	6	352	6,979	96.05%
4	FS5	6	77	7,056	97.11%
5	FS6	6	39	7,095	97.65%
6	FS4	6	8	7,103	97.76%

The staffing-to-demand analysis below demonstrates that in order to meet a 6-minute travel time for 90% of the EMS incidents, 4 ambulances will be required 24 hours a day, 7 days a week. The UHU value is 20.7%.

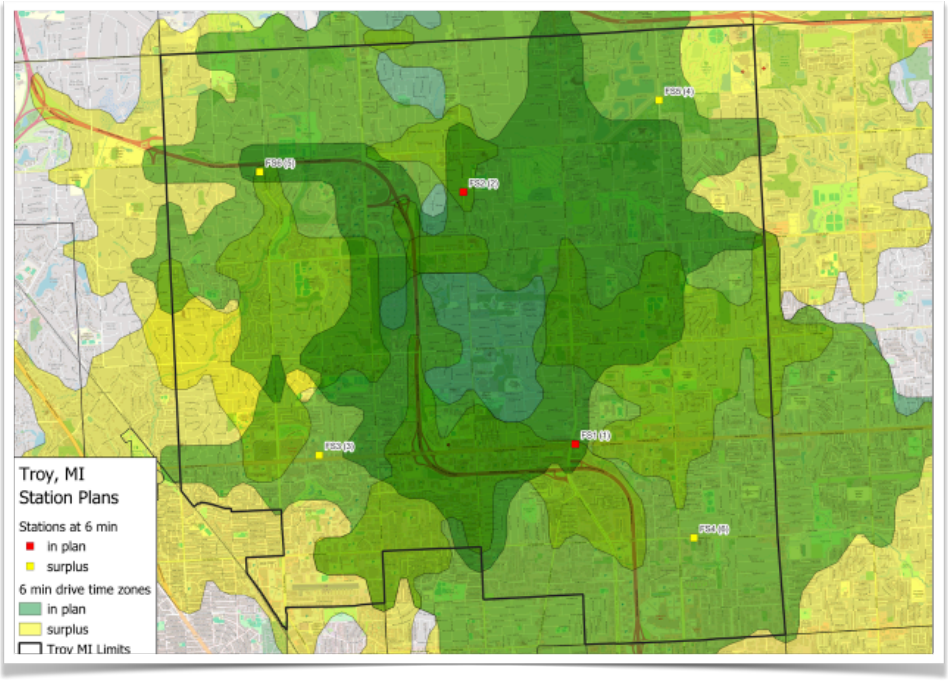


Adjusting for Incomplete Source Data

6-Minute Travel Time

Analyses suggest that the department could utilize a deployment strategy with a minimum of 2 stations staffed with 4 ambulances to meet a 6-minute travel time for nearly 92% of the incidents.

However, the source data for these analyses do not accurately account for calls handled by mutual/automatic aid requests. For example, for incidents in which AMH was unavailable to respond, the requests for other agencies are not captured in the AMH source data provided. Therefore, a peak-load unit is recommended to provide additional system capacity. This 5th unit would be deployed during the busiest period of the day, seven days a week.



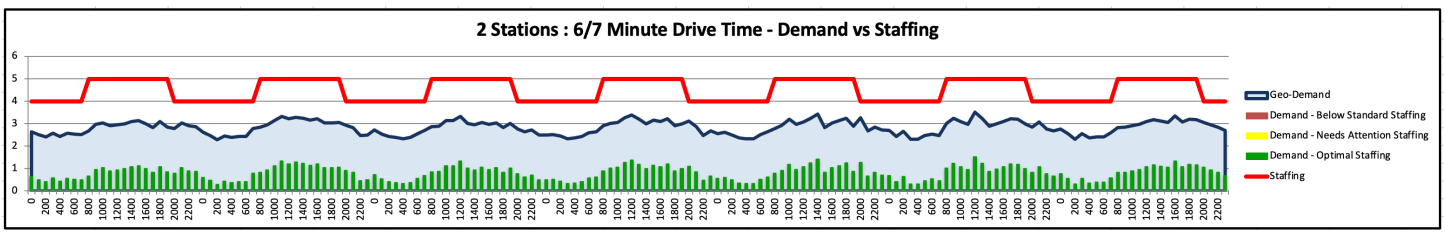
Observations

The source data for these analyses do not accurately account for calls handled by mutual/automatic aid requests.

Therefore, a peak-load unit is recommended to provide additional system capacity. This fifth unit would be deployed during the busiest period of the day, seven days a week.

The current travel time for any AMH unit arrival is 10.1 minutes at the 90th percentile. Therefore, there is an opportunity for an overall approval of ambulance arrivals by approximately 4 minutes.

The staffing-to-demand analysis below demonstrates that in order to meet a 6-minute travel time to 90% of the EMS incidents, 5 ambulances will be required during the busiest 12 hours each day and 4 ambulances overnight 7 days per week. The UHU value is 18.4%.



Estimated Personnel Costs and Assumptions

Personnel costs were estimated based on multiple assumptions and with coordination with the city. It is understood that the administrative capacity is subject to greater flexibility on policy desires. However, ambulance staffing has less flexibility if the adopted performance objectives are intended to be met with fidelity.

The scenarios utilized staffing strategies with a 42-hour workweek for ambulance personnel. All administrative positions were assumed to work a traditional 40-hour per week schedule except the Lt. Field Supervisors at 42 hours per week.

Observations

The 42-hour work week was the most fiscally responsible schedule for field personnel compared to 48-hour and 56-hour work weeks.

All schedules included the inherent overtime (OT) cost and a 30% fringe rate associated with the desired schedule. Finally, staffing multipliers were utilized to cover the average employee leave. In this manner, average leave or less would be accounted for with existing personnel, while above-average leave would utilize OT to fill vacancies.

Administrative Staffing

Position	Hourly Rate	Scheduled Hours	Scheduled OT Hours	Salary w/ Scheduled OT	Fringe	Total Compensation	Staffing Multiplier
Deputy Chief	$60	2,080	0	$124,800	30%	$162,240	1.00
Captain	$57	2,080	0	$118,560	30%	$154,128	1.00
Lt. EMS Field Supervisor	$34	2,184	104	$76,024	30%	$98,831	5.00
Administrative Assistant	$22	2,080	0	$45,760	30%	$59,488	1.00
Communications Supervisor	$36.00	2,080	0	$74,750	30%	$97,175	1.00
Dispatcher	$28	2,080	0	$57,907	30%	$75,279	3.00
Medical Direction				$0		$200,000	1.00
Total						**$1,393,025**	

EMS Personnel

Position	Hourly Rate	Scheduled Hours	Scheduled OT Hours	Salary w/ Scheduled OT	Fringe	Total Compensation	Staffing Multiplier
EMT	$24	2,184	104	$53,664	30%	$69,763	5.00
PM	$28	2,184	104	$62,608	30%	$81,390	5.00
Total Per Unit Personnel Costs						**$755,768**	

Estimated Capital and Equipment Costs

Category	Year 1 Cost	Lifespan	Year 2 Recurring Costs
Vehicle	**$340,300**		**$87,408**
Type III Ambulance Unit	$225,000	6	$37,500
Mobile Radio w/remote head	$9,600	6	$1600
Modem 2/ Antenna	$1,800	6	$300
MDT and Stand	$3,500	6	$583
Cellular	$1,440	1	$1,440
Fuel	$10,159	1	$10,159
Maintenance and Repair	$15,870	1	$15,870
Reserve Units at 30%	$77,163		$19,956
Capital Equipment - ALS	**$144,498**		**$21,702**
Portable Radio x2	$17,500	10	$1,750
Backboard x2	$168	6	$28
Monitor Defibrilator	$40,000	10	$4,000
Portable Suction Unit	$850	6	$142
Stretcher - Power Load	$30,000	6	$5,000
Stretcher - Power Lift	$28,000	6	$4,667
Stretcher - Scoop	$800	10	$80
Stair chair	$5,000	6	$833
ePCR Tablet	$1,300	3	$433
Reserve Equipment at 30%	$20,880		$4,769
Disposable Equipment - ALS	**$6,985**	**2**	**$3,493**
Consumable Supplies - ALS	**$5,552**	**1**	**$5,552**
Per Unit Cost - ALS Ambulance	**$497,335**		**$118,154**

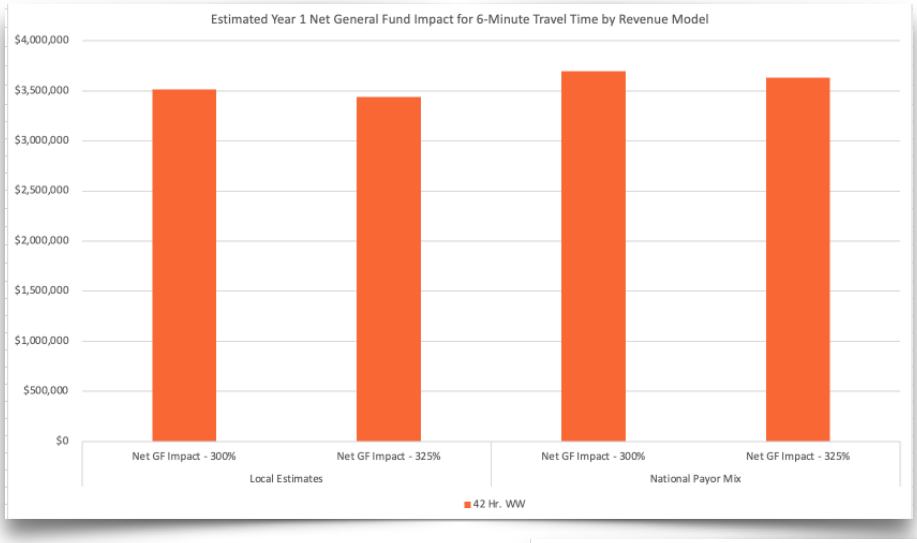
Fiscal Analysis - 6-Minute Travel Time (4 Unit)

To assist in the policy discourse, a fiscal analysis was completed to estimate the Year 1 (start-up) and Year 2 (ongoing) costs. Four revenue model strategies were utilized throughout this assessment. All scenarios include 24-hour-a-day and 7-day-a-week ambulance coverage.

The 6-minute travel time scenarios require the deployment of four ambulances.

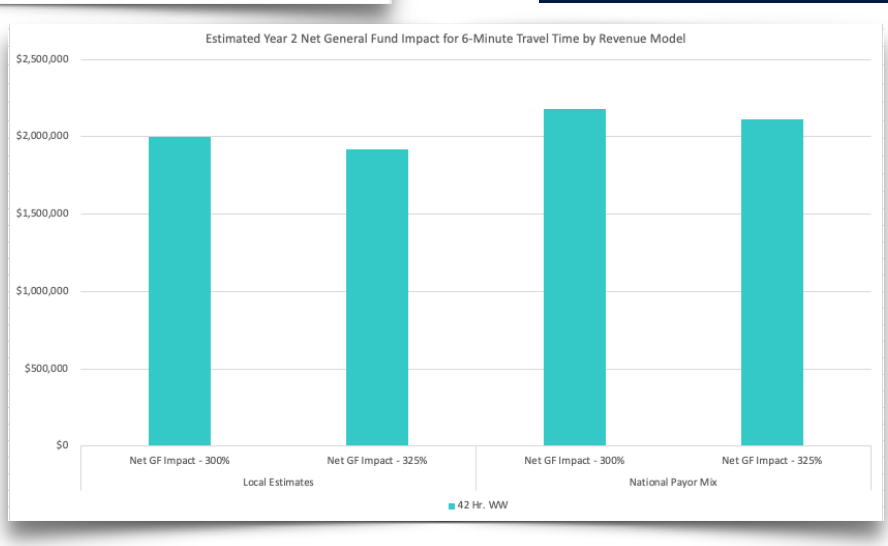
Year 1 Net General Fund Impact

The Year 1 estimates include purchases of new capital and equipment and personnel costs. The net impact on the general fund in Year 1 is estimated between $3.4m and $3.7m.



Year 2 Net General Fund Impact

The Year 2 estimates include depreciation of new capital and equipment and personnel costs. Year 2 (ongoing) costs held constant revenues and expenditures as no historical perspective existed. The net impact on the general fund in Year 2 is estimated between $1.9m and $2.2m.



Observations

A 6-minute travel time requires four ambulances deployed 24 hours daily and seven days weekly.

This deployment will improve overall arrival time by 4 minutes.

The Year 1 net impact on the general fund is estimated between $3.4m and $3.7m.

Depending on the revenue model chosen, the Year 2 net impact to the general fund is estimated between $1.9m and $2.2m.

All estimates included the current ambulance contract value of $814,680.

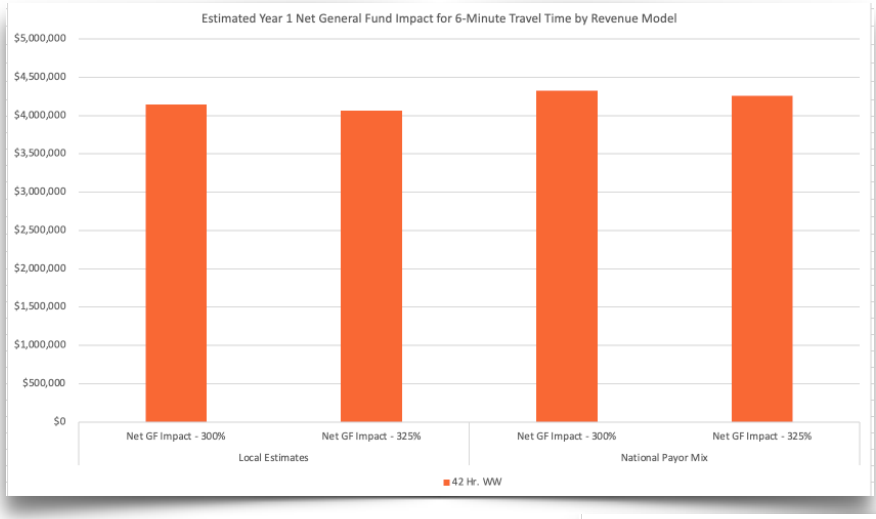
Fiscal Analysis - 6-Minute Travel Time (5 Unit)

To assist in the policy discourse, a fiscal analysis was completed to estimate the Year 1 (start-up) and Year 2 (ongoing) costs. Four revenue model strategies were utilized throughout this assessment. All scenarios include 24-hour-a-day and 7-day-a-week ambulance coverage.

The 6-minute travel time scenarios require the deployment of five ambulances during the peak of the day and four ambulances during non-peak hours.

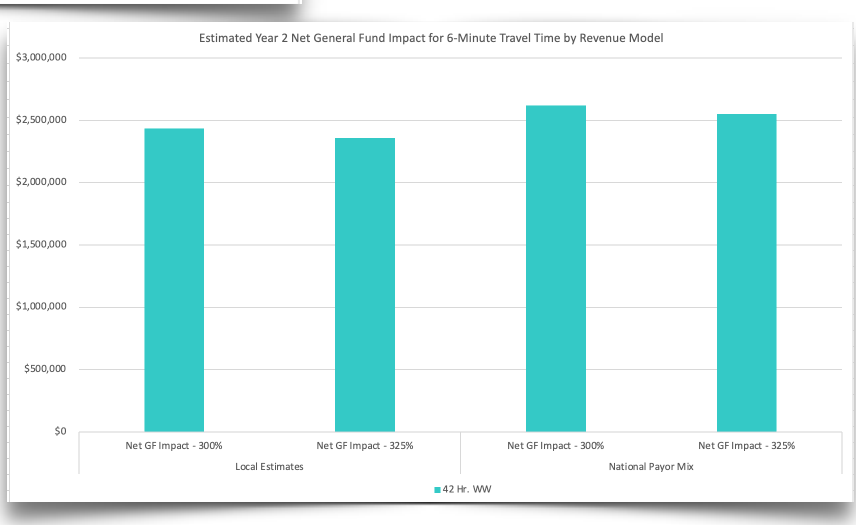
Year 1 Net General Fund Impact

The Year 1 estimates include purchases of new capital and equipment and personnel costs. The net impact on the general fund in Year 1 is estimated between $4.0m and $4.3m.



Year 2 Net General Fund Impact

The Year 2 estimates include depreciation of new capital and equipment and personnel costs. Year 2 (ongoing) costs held constant revenues and expenditures as no historical perspective existed. The net impact on the general fund in Year 2 is estimated between $2.3m and $2.6m.



Observations

A 6-minute travel time requires four ambulances deployed 24 hours daily and seven days weekly.

This deployment will improve overall arrival time by 4 minutes.

The Year 1 net impact on the general fund is estimated between $4.0m and $4.3m.

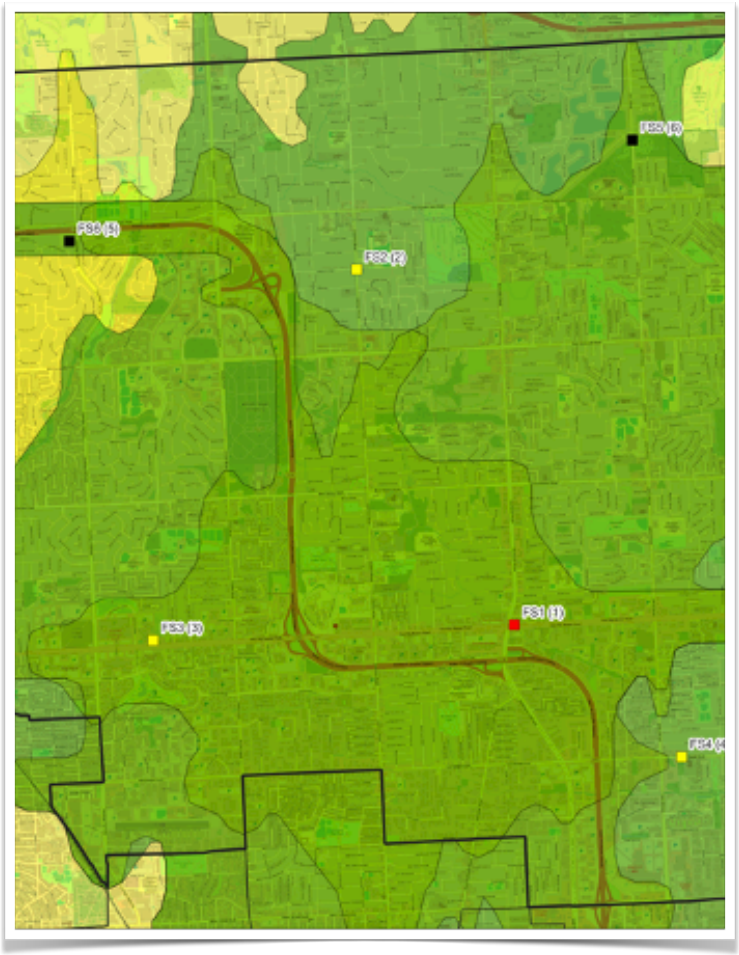
Depending on the model chosen, the Year 2 net impact on the general fund is estimated between $2.3m and $2.6m.

All estimates included the current ambulance contract value of $814,680.

Alternative Response Times to Reduce Costs

Community demand for emergency medical services for all 911 requests was evaluated. Analyses were completed to assess the proposed deployment of ambulance services within the City of Troy.

Elongating the response time in an effort to reduce costs is a common strategy in EMS systems that are fiscally constrained and/or challenged to meet performance expectations.



This analysis tested the upper limits of the response time in an attempt to find a fiscally neutral level of service. In other words, was there a sufficiently long response time that reduced the required resource allocation to a cost-neutral expenditure limit?

Observations

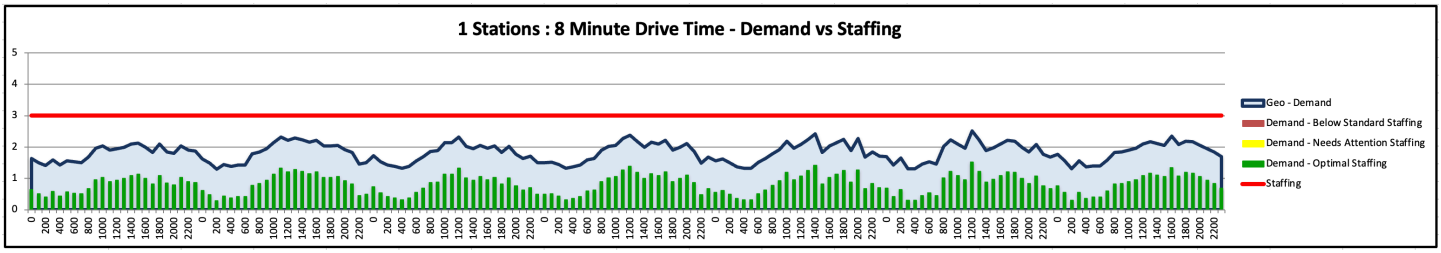
Analyses demonstrate that no response time option will provide fiscal neutrality for the system.

At 8 minutes, the system is no longer geographically constrained and becomes workload-controlled.

Therefore, no fiscal advantage exists to elongating response time to 8 minutes or beyond.

As previously presented, the shift from 6- or 7-minute travel times to 8 minutes reduced the required deployment needs from 4 to 3 units. However, at 8 minutes, the system is no longer geographically constrained and becomes workload-controlled. Therefore, there is no fiscal advantage to elongating response time beyond 8 minutes.

Finally, the relative efficiency provided by a longer response time of 8 minutes is not sustainable. Due to missing data from automatic and mutual aid responses, a three-unit configuration would be insufficient to meet community demands.



Appendices - Supporting Documents

The following supporting documents have been provided as foundational resources used to inform the Executive Summary Report. Reports include the following:

- Comprehensive EMS System Quantitative Data Report
- EMS System GIS Report

Appendices - Supporting Documents

Financial Assessments and Supporting Materials

Estimated Payor Mix

Estimated Payor Mix

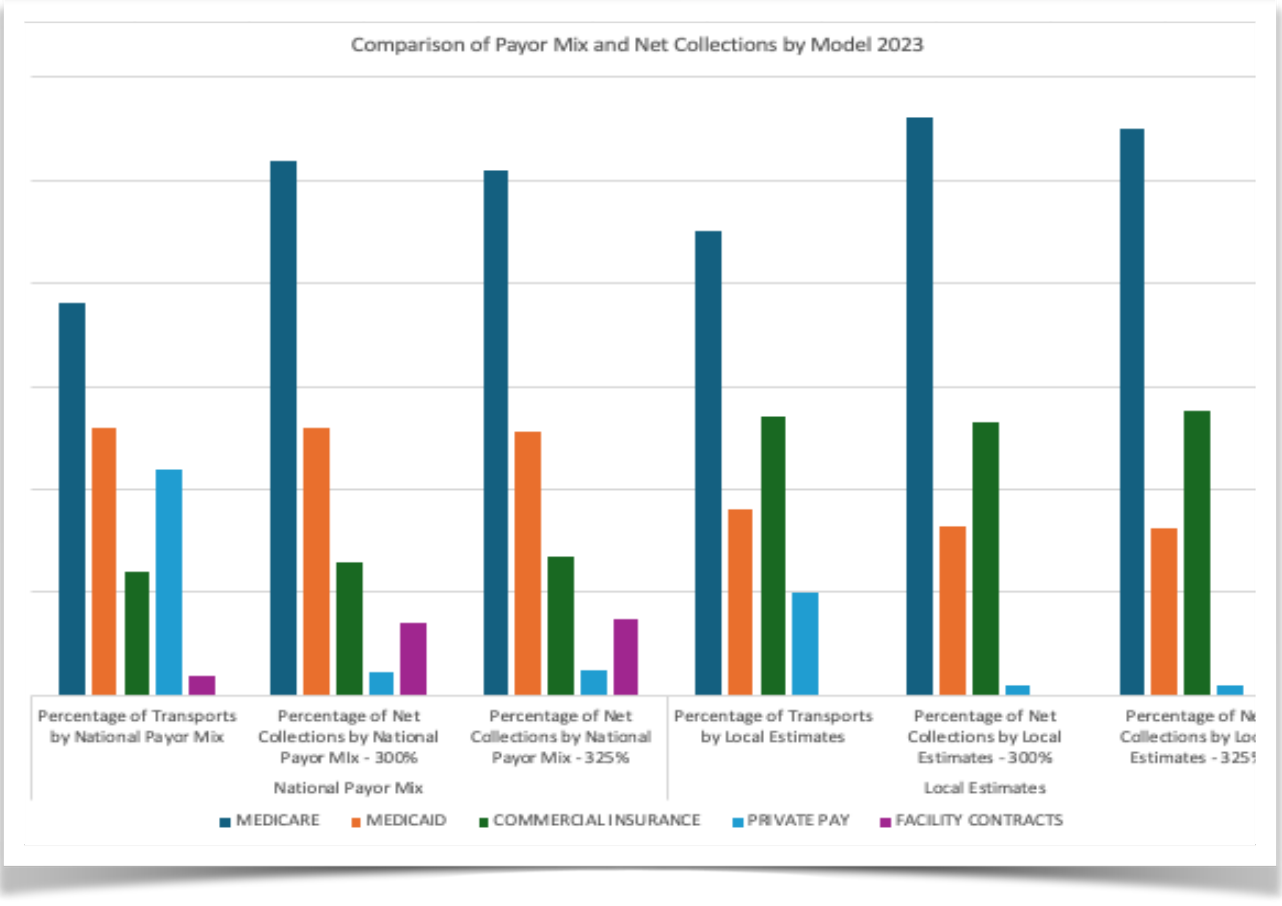
The number of transports for each payor class was compared to the actual net revenue from each payor class. Transport revenues are a product of the volume of transports within the service area, the rates charged for these transports, and the revenues received for these services.

Four scenarios were utilized, including using either 300% or 325% of the Medicare allowable costs and both national experience and local estimates. The largest payor class by transport volume is estimated at Medicare (38%-45%); the second largest is Medicaid (18%—26%), followed by Commercial Insurance (12%—27%) and Private Pay (10% to 22%).

These estimates are reasonable based on the national payor mix and historical collection by payors. The unique socioeconomic and demographic conditions in the City of Troy would suggest that there would be a greater proportion of Medicare and Commercial Insurance and less frequent reliance on Private Pay classes than the national average.

Observation

The unique socioeconomic and demographic conditions in the City of Troy would suggest that there would be a greater proportion of Medicare and Commercial Insurance and less frequent reliance on Private Pay classes than the national average.



Estimated Charges and Collections

Estimated System Gross & Net Charges vs Net Collections

An industry best practice is to examine and compare the rates of similar-sized EMS services throughout the state to current rates annually. This ensures rates are sufficiently above Medicare to collect the maximum amount commercial payors allow. *FITCH* estimated the gross and net charges, contractual adjustments, net collections, and net collection rate for 2023.

Four scenarios were utilized, including either 300% or 325% of the Medicare allowable costs and the national experience and local estimates. The average net cash per trip was $484. The average gross charge per trip was $1696, with a net charge of $999. This demonstrates a limited association between increasing rates charged for service and actual received net collections. In this data, for every 7.7% increase in gross charges, there was a 5.6% increase in net charges per transport and a 3.3% increase in net cash collected per transport. Generally, once an agency has the rates set at 325% of Medicare allowable values, the net collections per transport do not exhibit a meaningful linear relationship.

Average Days in Accounts Receivable or “Days in A/R” is the average time it takes for a service to receive payment from a responsible party.

Recommendation

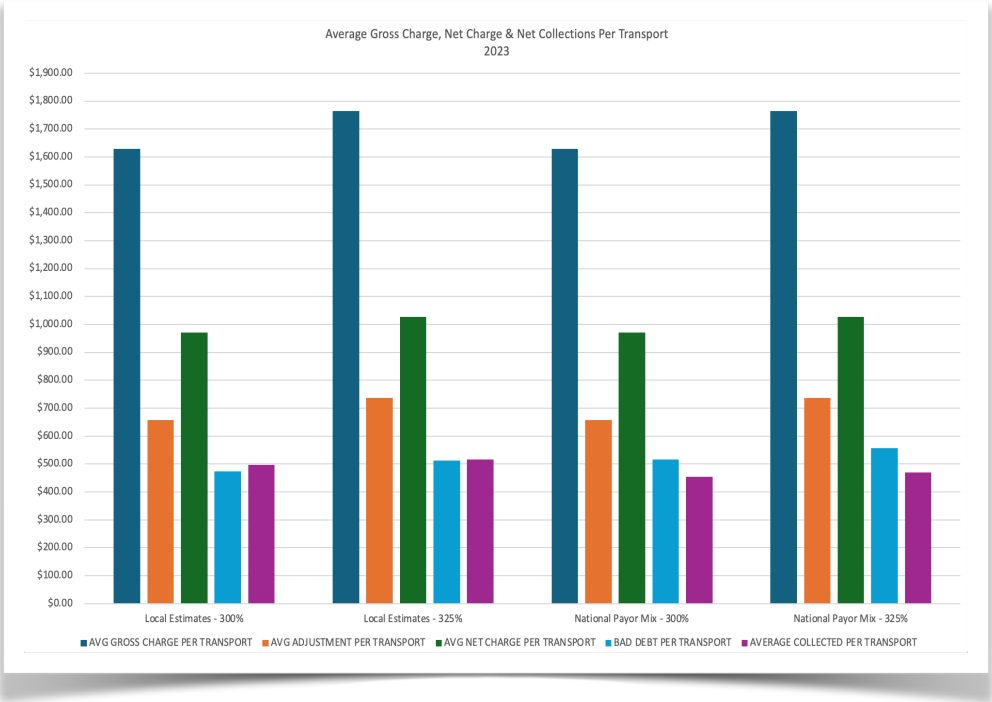
The average net cash per trip was estimated at $484.

The average gross charge per trip was $1,696, with a net charge of $999.

Demonstrates a limited association between increasing rates charged for service and actual received net collections.

Increases in net revenues are typically associated with increases in transports.

The goal for the average number of days in AR should be between 30 and 90 days.



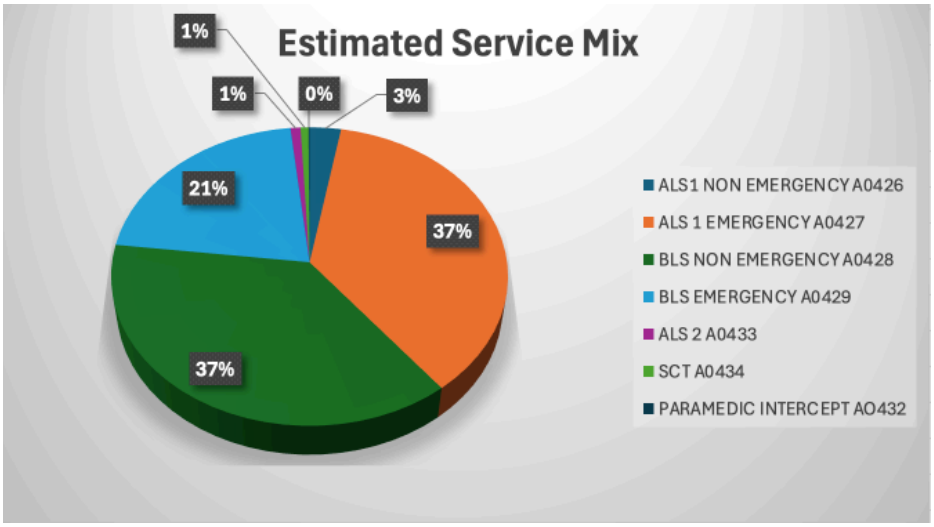
This metric describes insurance payments and patient payments. Agencies need to know how to calculate days in A/R to quantify the efficiency of their billing operations.

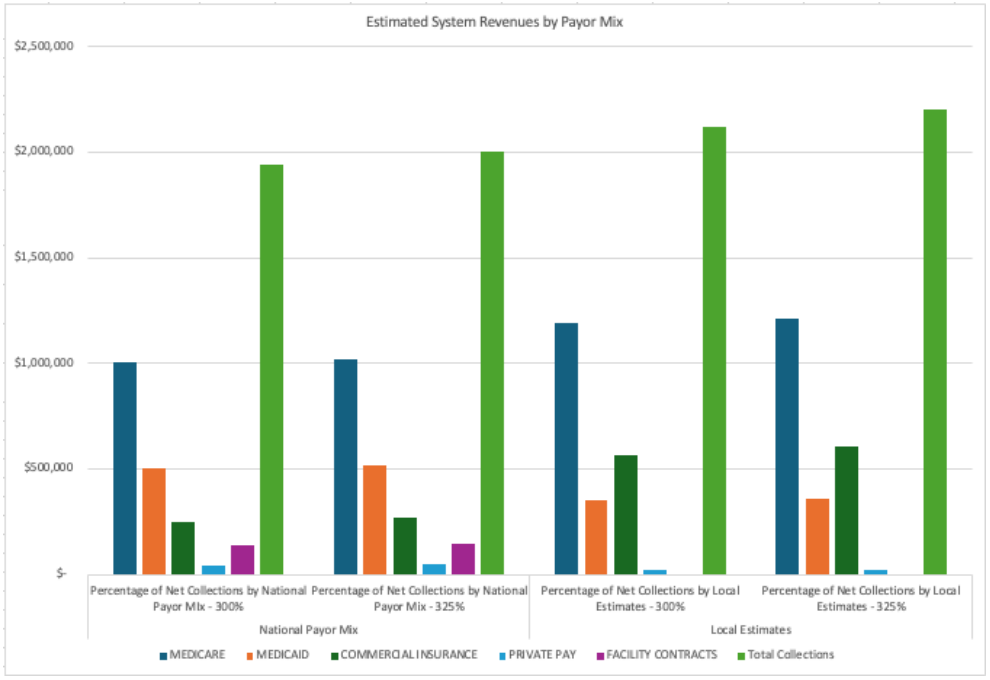
The standard calculation for days in A/R is computed by adding up the charges for a rolling period, dividing it by revenue collected, and multiplying by the analyzed period. The recommendation is to outperform the industry average of fewer than 90 days with a goal of 30 days.

Estimates of EMS System Revenues

Nationwide Service Level Mix

Service mix refers to the specific types (Emergent and Non-Emergent) and levels (Advanced Life Support, Basic Life Support, and Special Care Transport) of service billed to payors for ambulance services.
The system's estimated service mix is 36.6% ALS emergent and ~4% combined for ALS non-emergent and ALS 2. BLS emergent is estimated at 21.4% and BLS non-emergent was 37.5%.





Observations

- This service mix is provided as the nationwide average service mix data provided by CMS.
- ALS transports accounted for 41% of the charges.
- BLS services accounted for 58.9% of the services.
- 58.9% of the transports were classified as emergent.
- Across all model estimates, the total net collections (revenue) available to the system varied between $1.9m and $2.2m.

Estimated Total Net Collections by Payor Mix Source

Four scenarios were utilized, including using either 300% or 325% of the Medicare allowable costs and both the national experience and local estimates. Across all model estimates, the total net collections (revenue) available to the system varied between $1.9m and $2.2m.

Appendix - Year 1 Fiscal Summary Tables

Year 1 – Local Estimate at 300% Medicare Rate		
	6/7 Minutes (5/4 Units)	6/7 Minutes (4 Units)
Scheduled Workweek	42 Hr. WW	42 Hr. WW
Revenues	$2,121,802	$2,121,802
Expenses		
Equipment and Materials Costs	$2,285,308	$2,036,640
Personnel Costs	$4,793,980	$4,416,096
Total Expenditures	$7,079,288	$6,452,737
Public Funding Needed	**($4,957,486)**	**($4,330,935)**
Current Contract Costs	$814,680	$814,680
Net General Fund Impact	**($4,142,806)**	**($3,516,255)**

Year 1 – Local Estimate at 325% Medicare Rate		
	6/7 Minutes (5/4 Units)	6/7 Minutes (4 Units)
Scheduled Workweek	42 Hr. WW	42 Hr. WW
Revenues	$2,199,499	$2,199,499
Expenses		
Equipment and Materials Costs	$2,285,308	$2,036,640
Personnel Costs	$4,793,980	$4,416,096
Total Expenditures	$7,079,288	$6,452,737
Public Funding Needed	**($4,879,789)**	**($4,253,238)**
Current Contract Costs	$814,680	$814,680
Net General Fund Impact	**($4,065,109)**	**($3,438,558)**

Year 1 – National Experience at 300% Medicare Rate		
	6/7 Minutes (5/4 Units)	6/7 Minutes (4 Units)
Scheduled Workweek	42 Hr. WW	42 Hr. WW
Revenues	$1,940,263	$1,940,263
Expenses		
Equipment and Materials Costs	$2,285,308	$2,036,640
Personnel Costs	$4,793,980	$4,416,096
Total Expenditures	$7,079,288	$6,452,737
Public Funding Needed	**($5,139,025)**	**($4,512,474)**
Current Contract Costs	$814,680	$814,680
Net General Fund Impact	**($4,324,345)**	**($3,697,794)**

Year 1 – National Experience at 325% Medicare Rate		
	6/7 Minutes (5/4 Units)	6/7 Minutes (4 Units)
Scheduled Workweek	42 Hr. WW	42 Hr. WW
Revenues	$2,005,639	$2,005,639
Expenses		
Equipment and Materials Costs	$2,285,308	$2,036,640
Personnel Costs	$4,793,980	$4,416,096
Total Expenditures	$7,079,288	$6,452,737
Public Funding Needed	**($5,073,649)**	**($4,447,098)**
Current Contract Costs	$814,680	$814,680
Net General Fund Impact	**($4,258,969)**	**($3,632,418)**

Appendix - Year 2 Fiscal Summary Tables

Year 2 – Local Estimate at 300% Medicare Rate		
	6/7 Minutes (5/4 Units)	6/7 Minutes (4 Units)
Scheduled Workweek	42 Hr. WW	42 Hr. WW
Revenues	$2,121,802	$2,121,802
Expenses		
Equipment and Materials Costs	$578,918	$519,841
Personnel Costs	$4,793,980	$4,416,096
Total Expenditures	$5,372,898	$4,935,937
Public Funding Needed	**($3,251,096)**	**($2,814,135)**
Current Contract Costs	$814,680	$814,680
Net General Fund Impact	**($2,436,416)**	**($1,999,455)**

Year 2 – Local Estimate at 325% Medicare Rate		
	6/7 Minutes (5/4 Units)	6/7 Minutes (4 Units)
Scheduled Workweek	42 Hr. WW	42 Hr. WW
Revenues	$2,199,499	$2,199,499
Expenses		
Equipment and Materials Costs	$578,918	$519,841
Personnel Costs	$4,793,980	$4,416,096
Total Expenditures	$5,372,898	$4,935,937
Public Funding Needed	**($3,173,399)**	**($2,736,438)**
Current Contract Costs	$814,680	$814,680
Net General Fund Impact	**($2,358,719)**	**($1,921,758)**

Year 2 – National Experience at 300% Medicare Rate		
	6/7 Minutes (5/4 Units)	6/7 Minutes (4 Units)
Scheduled Workweek	42 Hr. WW	42 Hr. WW
Revenues	$1,940,263	$1,940,263
Expenses		
Equipment and Materials Costs	$578,918	$519,841
Personnel Costs	$4,793,980	$4,416,096
Total Expenditures	$5,372,898	$4,935,937
Public Funding Needed	**($3,432,635)**	**($2,995,674)**
Current Contract Costs	$814,680	$814,680
Net General Fund Impact	**($2,617,955)**	**($2,180,994)**

Year 2 – National Experience at 325% Medicare Rate		
	6/7 Minutes (5/4 Units)	6/7 Minutes (4 Units)
Scheduled Workweek	42 Hr. WW	42 Hr. WW
Revenues	$2,005,639	$2,005,639
Expenses		
Equipment and Materials Costs	$578,918	$519,841
Personnel Costs	$4,793,980	$4,416,096
Total Expenditures	$5,372,898	$4,935,937
Public Funding Needed	**($3,367,259)**	**($2,930,298)**
Current Contract Costs	$814,680	$814,680
Net General Fund Impact	**($2,552,579)**	**($2,115,618)**

NFPA Standard 1710

Organization and Deployment of Fire Suppression Operations, EMS and Special Operations in Career Fire Departments

History and Purpose

- The 1710 Standard for was originally released in 2001. Following, there have been three revisions (2004, 2010, 2016) with the most recent released in September 2016.
- The standard is applicable to substantially all CAREER fire departments and provides the MINIMUM requirements for resource deployment for fire suppression, EMS and Special Operations while also addressing fire fighter occupational health and safety.
- The 1710 Standard addresses structure fire in three hazard levels. These included low hazard (residential single-family dwellings), medium hazard (three story garden apartments or strip malls), and high hazard structures (high-rise buildings).
- The Standard addresses fire suppression, EMS, Aircraft Rescue and Firefighting, Marine Rescue and Firefighting, Wildland Firefighting, and Mutual and Auto Aid.

Fire Suppression and Special Operations Provisions

- "Company" is defined as:
  - Group of members under direct supervision
  - Trained and equipped to perform assigned tasks
  - Organized and identified as engine, ladder, rescue, squad or multi-functional companies
  - Group of members who arrive at scene and operate with one apparatus
- EXCEPTION to company arriving on one apparatus:
  - Multiple apparatuses are assigned, dispatched and arrive together
  - Continuously operate together
  - Managed by a single officer
- An Initial Alarm is personnel, equipment and resources originally dispatched upon notification of a structure fire.
- Performance Objectives
  - Alarm Answering Time
    - 15 sec 95%
    - 40 sec 99%
  - Alarm Processing Time
    - 64 sec 90%
    - 106 sec 95%
  - Turnout Time =
    - 60 sec EMS
    - 80 sec Fire
  - First Engine Arrive on Scene Time
    - 240 sec (4 min)
  - Initial Full Alarm (Low and Medium Hazard) Time
    - 480 sec (8 min)
  - Initial Full Alarm – High Hazard/ High-Rise Time
    - 610 sec (10 min 10 sec)

- Fire departments shall set forth criteria for various types of incidents to which they are required/expected to respond. These types of incidents should include but not be limited to the following:
  - Natural disaster
  - Acts of terrorism
  - WMD
  - Large-scale mass casualty

- Given expected firefighting conditions, the number of on-duty members shall be determined through task analysis considering the following criteria:
  - Life hazard protected population
  - Safe and effective performance
  - Potential property loss
  - Hazard levels of properties
  - Fireground tactics employed

- Company Staffing (Crew Size)
  - Engine = minimum 4 on duty
    - High volume/geographic restrictions = 5 minimum on duty
    - Tactical hazards dense urban area = 6 minimum on duty
  - Truck = minimum 4 on duty
    - High volume/geographic restrictions = 5 minimum on duty
    - Tactical hazards dense urban area = 6 minimum on duty
- Initial Alarm Deployment (*number of fire fighters including officers)
  - Low hazard = 15 Fire fighters
  - Medium hazard = 28 Fire fighters
  - High hazard = 43 Fire fighters

EMS Provisions

- The fire department shall clearly document its role, responsibilities, functions and objectives for the delivery of EMS. EMS operations shall be organized to ensure the fire department's capability and includes members, equipment and resources to deploy the initial arriving company and additional alarm assignments.
- EMS Treatment Levels include:
  - First Responder
  - Basic Life Support (BLS)
  - Advanced Life Support (ALS)
- MINIMUM EMS Provision = First responder/AED
- Authority-Having Jurisdiction (AHJ) should determine if Fire Department provides BLS, ALS services, and/or transport. Patient treatment associated with each level of EMS should be determined by the AHJ based on requirements and licensing within each state/province.
- On-duty EMS units shall be staffed with the minimum members necessary for emergency medical care relative to the level of EMS provided by the fire department.
- Personnel deployed to ALS emergency responses shall include:
  - A minimum of two members trained at the emergency medical technician–paramedic level
  - AND two members trained at the BLS level arriving on scene within the established travel time.
- All fire departments with ALS services shall have a named **medical director** with the responsibility to oversee and ensure quality medical care in accordance with state or provincial laws or regulations and must have a mechanism for immediate communication with EMS supervision and medical oversight.