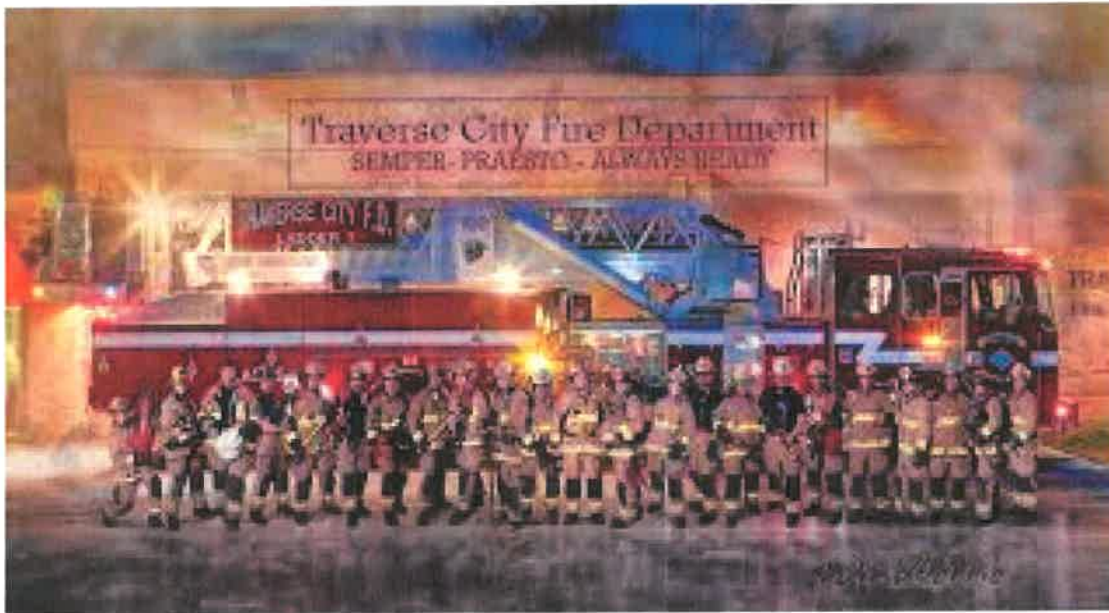


City of Traverse City, Michigan

Fire/EMS Transportation Feasibility Study For 2019



December 2020

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The Honorable Amy Shamroe	Mayor Pro Tem
The Honorable Brian McGillivray	City Commissioner
The Honorable Christie Minervini	City Commissioner
The Honorable Roger Putman	City Commissioner
The Honorable Ashlea Walter	City Commissioner
The Honorable Tim Werner	City Commissioner
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Executive Summary

At the request of city management, a study was undertaken by TriData LLC of Maryland to develop and evaluate options for adding patient emergency transport to the current fire department role in providing Emergency Medical Services. TriData is nationally known for consulting on public safety issues and has undertaken studies of similar scope for over 250 communities across the U.S. and Canada.

More specifically, the purpose of the Study was to determine if it is fiscally and operationally feasible for the City of Traverse City to provide primary first response Advanced Life Support (ALS) transport, in addition to its existing firefighting and other responsibilities, within the City limits through the Traverse City Fire Department. The analysis was to identify what resources are appropriate for the provision of Advanced Life Support primary transport in light of the current call load, response time, firefighting force, EMS force, workforce utilization hours, and fiscal feasibility.

The study was limited to 911 emergency transportation within Traverse City. It does not include non-emergency or interfacility EMS transportation currently provided by the private sector.

The study shows that providing first response ALS transport is feasible through additional staffing and purchase of additional vehicles and equipment, which would provide added benefits to emergency medical service. However, the expected revenues would probably not offset the additional annualized costs. The provision of this service is not financially sustainable without a subsidy.

Current EMS System

The Traverse City Fire Department (TCFD) provides advanced EMS first response while North Flight EMS, an agency affiliated with Munson Healthcare, provides primary advanced life support transport. All but two TCFD firefighters are Michigan- licensed paramedics. TCFD is providing good paramedic-level care but infrequently transports patients.

The Northeast Regional EMS Medical Control Authority provides daily oversight of EMS protocols and procedures for Traverse City and the surrounding areas. A board-certified emergency physician serves as the medical director. The medical control authority and the medical director said they would permit primary EMS transport to the TCFD if the city so desires. There are no legal barriers we know of to provide transport.

The Grand Traverse County 911 Center provides the primary 911 answering and dispatch point for emergency communications. Data retrieval was difficult due to the outdated Computer Assisted Dispatch (CAD) software it had been using. In 2019, the center upgraded its software and began to improve its data system. We relied more on the 2019 data than the earlier data.

EMS Demand: The City of Traverse City has a resident population of approximately 15,500 that is expected to grow by about 3.5 percent by 2023. Traverse City is known for its robust medical community, tourist and recreational facilities, and as a desirable place for seniors.

The current number of EMS calls per year averages about 2,367, including service to the Cherry Capital Airport, annual festivals drawing large crowds, and water recreation. The significant senior population increases the risk for falls, fire-related death and injury, and serious illness

Present Performance: Data on 911 connect- to dispatch times were missing in over 50 percent of the calls. The available data showed a mean dispatch time of 2:09 and a 90th percentile time of 3:35, both considerably above national standards. A compounding factor is how EMS medical priority dispatch is used; the current protocols contribute to the above-average time to dispatch, as dispatchers collect more information before sending a dispatch. We suggest this practice be changed. Automatic Vehicle Locator (AVL) capacity and the ability to monitor instances when “no unit is available” (NUA) also are needed.

The response time from dispatch to arrival—the travel time once a unit is dispatched-- averaged 4:34, with a 90th percentile of 8:05. They are in the acceptable range though not quite meeting national target goals. North Flight’s response time average was 7:24, with a 90th percentile of 12:26. EMS transport unit response is usually slower than first response because there are fewer ambulances and greater distances to cover. However, North Flight is well outside of its contracted nine-minute response time for 90 percent of the calls. **The difference in response times is one main factor in considering TCFD becoming primary in providing patient transport and paramedic-level care.**

EMS Alternatives: A forecast model showed that EMS calls should be expected to increase by 3.5 percent to 7.8 percent over the next several years. Except for a small call decrease from January to March, seasonality does not play much of a factor. The current system could handle the estimated increase without doing transport.

However, TCFD does not have enough personnel or ambulances to reliably provide emergency patient transport with its current resources. In 2019, there were at least 308 instances where the TCFD would not have been able to staff a second paramedic unit or have sufficient service depth to handle another fire or EMS incident. Adding primary EMS transportation without adding resources would sharply increase the system vulnerability.

If the TCFD adopts primary transport, the current dual role/cross-trained model is likely to be the most efficient. While some larger cities have adopted a single-role paramedic provider, this model would not be efficient for Traverse City. Smaller communities depend on providers that possess multiple talents that a single-role provider cannot provide.

There are three major alternatives (and several sub-alternatives) for Traverse City to consider for providing EMS going into the future.

1. The City could adopt the primary EMS transport role, which would require two staffed paramedic transport units 24/7. It would require up to 11 more firefighter/paramedics,

and the purchase of another ambulance. This option could be quickly phased in if the funds are available.

2. The City could continue its current role but assess a first responder fee to North Flight. Currently, the TCFD receives no remuneration for first responder services. Charging for first response could yield up to \$338,000 in fees and offset some of the present cost.
3. The City could maintain the status quo and take no action. This would leave the City vulnerable for less efficient response times, especially if North Flight decided to shift priorities or even abandon 911 service to Traverse City. At this time, North Flight has not indicated their intent to alter service.

Costs

If Traverse City elects to become the primary EMS transport provider, a considerable human resources investment would be needed. To provide assured EMS transport service, the city would have to increase minimum staffing from 7 to 9 on each shift. This provides for at least two firefighters left at each station for other calls when the two-person transport units are busy. A forty-hour EMS captain should also be added. The total staffing can be mitigated somewhat by reducing other areas. Even with mitigating factors, it will cost between **\$755,000 to \$1,548,000** (depending on options chosen) in additional personnel to become the primary EMS transport service.

Building and Equipment Costs: Taking on primary EMS transport will require each fire station to have some upgrades to accommodate additional staffing. The modifications for Station 1 and Station 2 would mostly involve expanding housing for the added staff. They also need some work to accommodate EEOC requirements if females are to be recruited.

New EMS units will likely each cost \$225-\$250K, including paramedic equipment. Full transport adoption could require two primary units and one reserve unit. Primary units should provide eight years of service, and then five additional years as a reserve unit.

Return on Investment: 911 EMS transport is rarely a profit-making venture. Adoption should be based primarily on the need for better service; the revenues will only partially offset the costs. Traverse City could obtain revenues from transport of approximately \$484,000 each year. This is well below the initial investment cost needed. After the initial investment, EMS transport costs should decrease but not likely yield a positive return on investment (ROI). Costs could be further mitigated by charging for EMS first responder services without transport—up to \$338,000, as noted above.

All in all, Traverse City is at a crossroads for the future of its EMS. It can continue the status quo, but there are good options to improve service and increase reliability for its growing population.

I. Introduction

The City of Traverse City, MI engaged TriData LLC, a professional EMS and fire service consulting firm, to analyze EMS provision and assist the City in determining whether it should begin providing EMS 911 transportation. EMS 911 transportation is currently provided by North Flight EMS, a part of the Munson Hospital System that serves Traverse City and nearby areas. This study was intended to identify possibilities concerning EMS 911 transportation and related EMS topics.

Scope of Study

More specifically, the purpose of the study was to assist in determining if it is fiscally and operationally feasible for the City of Traverse City Fire Department to provide primary first response Advanced Life Support (ALS) transport within the city limits, in addition to its existing firefighting and other responsibilities. The analysis would identify what resources are appropriate for the provision of Advanced Life Support primary emergency transport, considering call load, response time, firefighting force, EMS force, workforce utilization hours, and fiscal feasibility. The scope did not include addressing non-emergency or inter-facility EMS transportation now provided by a hospital-based service.

Community

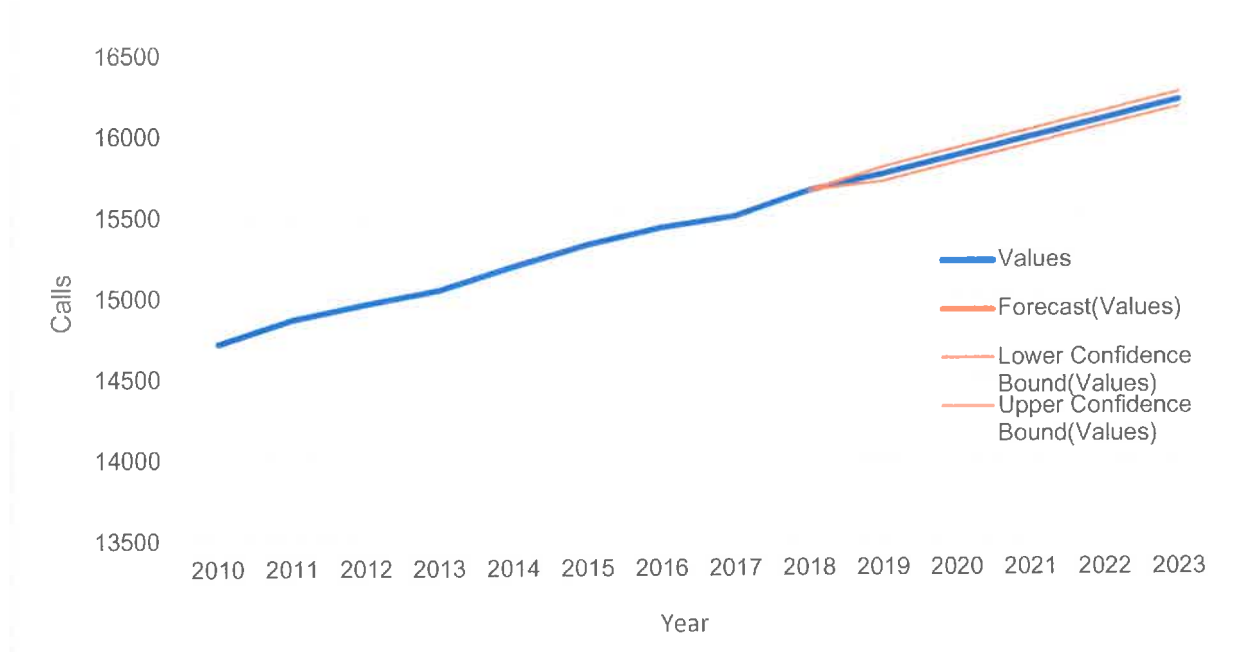
The City of Traverse City has a resident population of 15,600 that swells during weekdays to nearly 40,000. The population also swells about 15 percent during summer, from vacationers. The population has grown by about 1000 since 2010. It peaked in 1960, falling slightly until 2010 when the population stabilized except for a small increase. Table 1 shows the population projection thru 2023. It is expected to increase by another 3.5 percent over the next five years.

The population trend and the confidence interval for the future projection are shown in Figure 1.

Table 1. Population Estimates and Projections

Year	Population
2010	14717
2011	14868
2012	14963
2013	15048
2014	15192
2015	15323
2016	15428
2017	15495
2018	15651
2019	15751
2020	15865
2021	15979
2022	16093
2023	16207

Note: 2019 to 2023 are population estimates.

Figure 1. Analysis of Expected Population Growth for Traverse City

The narrow range between the high and low projections indicate confidence in the forecast by the planning department.¹ Growth has been slow but continuing.

Traverse City is 8.1 square miles in area and has an average household size of 2.1. The population per household is relatively low because of the high elderly population, equivalent to many cities in South Florida. Traverse City is known for being a desirable community to live in and retire due in part to its robust regional medical community, good EMS service, and its long-time tourist and recreational facilities. A private, non-profit, citywide workgroup known as 20 Fathoms is working to obtain additional city growth grants to attract new businesses. Another goal is to attract younger families to the City. Ultimately, the City would like to maintain a balance of elderly and younger population, and a friendly, growing, and healthy community.

Governance

Traverse City operates under a Commission-Manager form of government, with political oversight by a seven-member elected commission. The Mayor is the ceremonial CEO for the City and presides over commission meetings. The Mayor has voice and vote on the commission but does not have veto power. Commissioners are elected to a four-year term, and the Mayor a two-year term. Terms are staggered so no more than four commissioners are up for election at one time. All commissioners are elected at large, meaning there are no districts or wards within the city.

¹ World Population Review. (2019). Traverse City, MI 2019. URL: <http://worldpopulationreview.com/us-cities/traverse-city-population/>

The Commission has several administrative roles including passage of local legislation, city finances, policy oversight, appointments to boards and commissions, and exercising authority granted by the State of Michigan and Grand Traverse County. One of its most important tasks is the appointment of a City Manager and a City Attorney. The City Manager serves as the Chief Administrative Officer (CAO), and the City Attorney serves as the Chief Legal Officer (CLO).

City Manager: The City Manager's duties include oversight of city functions and departments, the appointment of department heads, enforcement of city laws and ordinances, formulation of a budget recommendation, and implementation of the Commission passed budget.

All department heads, including the police and fire chief, are appointed by and serve at the pleasure of the City Manager.² The City Clerk and City Assessor also are appointed by the City Manager but cannot be removed unless approved by five of seven City Commission members.

The City Manager believes that public services generally are running smoothly, and that issues are mostly anecdotal. He is interested in evidence-based decision making and is looking for more data analysis of fire and EMS activities. In 2008-2009, the COFAC program, a citizen-led program to reduce government spending, required the city to reduce the size of government. Although layoffs were avoided, several vacancies went unfilled. He is concerned that citizens are trying to restart the COFAC program and if successful, public safety programs will suffer. Recently, the fire department recovered two full-time positions.

Relationships between the City and the firefighter union are professional, and there are no major issues occurring.

City Treasurer: The City Treasurer oversees the city budget, including revenues and expenditures. The Treasurer is concerned about any costly additions to public safety service, especially those that require changes to minimum staffing requirements. Legacy costs are also challenging as pension costs significantly affect the City's economic status. Other financial concerns are the start-up costs and continued sustainability for hiring personnel, the purchasing and maintaining of vehicles, and covering the cost of medical supplies.

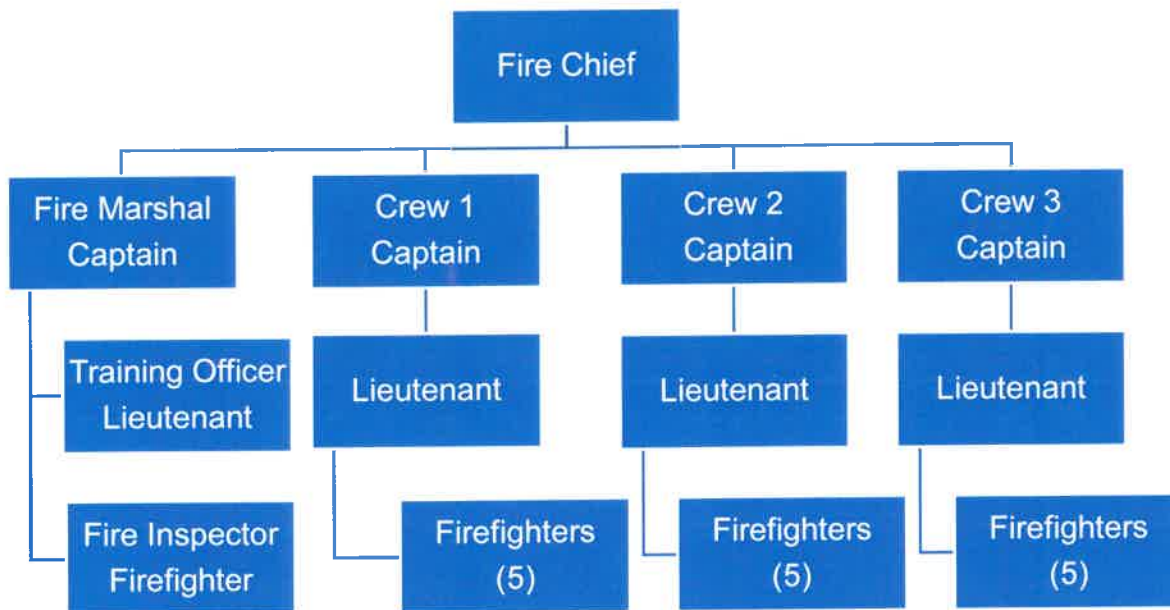
Prior to 1992, City retirees were provided health insurance until they became Medicare eligible. Between 1992 and 2009, retirees were required to pay 20 percent of their healthcare insurance premiums. The economic conditions during 2008-2009 caused the City to stop providing newly hired employees retiree health benefits, opting for a retiree health savings plan that retirees can use to pay for health insurance and reap additional tax benefits.

On the income side, the Treasurer oversees the revenues collected from ambulance transportation billing. Currently, the TCFD provides a minimal number of transports and collects only about \$10,000 annually. These monies are paid directly into the General Fund.

² The City Manager appoints all department heads as described on the City of Traverse City website, <http://www.traversecitymi.gov/departments.asp>

Fire Department: The City of Traverse City Fire Department became a city-wide career department in 1938. It is currently staffed with a Fire Chief, Fire Marshal, Training Lieutenant, Fire Inspector, and 21 firefighters (all but two of whom are paramedics). The organization chart is shown in Figure 2.

Figure 2. TCFD Organization Chart



II. Current Health Care System

Traverse City and its surrounding community enjoy a robust healthcare system that includes a regional healthcare facility, local medical practices, and ancillary care facilities.

EMS System Components and Responsibilities

Munson Healthcare: Munson Healthcare is a growing regional healthcare system with nine hospitals in Northern Michigan. The Munson Medical Center in Traverse City is a 442-bed facility designated by the American College of Surgeons as a Level II Trauma Center. Its Webber Heart Center has been designated as a regional cardiac and stroke center to provide the standard of care intervention for critical emergencies.

The Munson Medical Center Emergency Department is staffed 24 hours a day by board-certified emergency physicians, physician assistants, nurses, and other healthcare team members. Urgent care is available at the Foster Family Community Health Center for minor illnesses or injuries.

Munson's emergency medical services provider is North Flight EMS, the largest EMS provider in northern Michigan. North Flight responds to over 13,000 calls annually with basic and

advanced life support transport units.³ North Flight is the primary EMS transport (ambulance) provider for Traverse City. They also provide ALS transport for Cadillac and Manton. ALS intercept service, in which a paramedic meets the basic unit and either transfers the patient or accompanies the patient to a hospital on the BLS unit, is also provided for five additional primarily rural communities outside of Traverse City. When needed, North Flight EMS works with North Flight Aero Med to provide helicopter EMS service to specialty centers. Helicopter services are provided directly from the scene or from hospitals.

In addition to North Flight, Munson Healthcare provides EMS transport services from several of their hospitals. Much of the ambulance service provided by North Flight and other Munson EMS agencies is for inter-hospital emergency or non-emergency transportation, including transportation from hospitals to medical facilities or home.

The Munson Medical Center is also the home to Munson Regional EMS Education (MREMSE), the primary EMS education facility for Traverse City. Training includes paramedic and EMT primary and continuing education, special EMS topics, and outreach education to the community such as first aid and CPR.

During our project triage visit, we met with two high-ranking managers from Munson and North Flight EMS. The meeting was congenial and represented a spirit of cooperation. Without making any commitments, North Flight offered to cooperate as needed. If the system changes, it appears that cooperation would include an orderly transition plan and a willingness to enter into a mutual aid agreement.

State-level EMS Oversight: Emergency medical services in Michigan are part of the Michigan Department of Health and Human Services, Division of Community Health. The Department's primary purpose is to oversee all EMS agencies' licensing and relicensing, and all EMS life support vehicles, including transport and non-transport first response units.

Michigan EMS also approves and monitors the 66 Medical Control Authorities that provide medical direction for counties or groups of counties. This role includes assuring that EMS programs and providers are providing care based on state standards of care and scope of practice.

Other responsibilities of Michigan EMS are regulating the EMS communications system (MEDCOM) and assurance that EMS agencies are following state standards.

Finally, Michigan EMS provides some oversight for the state Trauma System, Michigan Emergency Medical Service Information System (MI-EMSIS), EMS Instructor-Coordinators, EMS for Children, and EMS Education Requirements.

Michigan has four-levels of EMS licensure:

³ Munson Health. (n.d.). Emergency Medical Services in Northern, MI.
<https://www.munsonhealthcare.org/services/emergency-medical-services/ems>

1. **Michigan First Responder (MFR):** Provides basic initial care in emergency situations, including basic assessment, CPR, oxygen administration, bleeding control, spinal restriction, and patient movement. In some programs, the MFR can assist with administering some medications.⁴
2. **Emergency Medical Technician (EMT):** Provides a comprehensive scope of basic EMS patient care including patient assessment, CPR (including mechanical CPR, bleeding control, splinting, spinal restriction, patient movement, administration of medications (as approved by local protocol), IV maintenance, and patient transportation.⁵ Considered the basic licensure level for providing patient care during transportation.
3. **EMT-Specialist (AEMT):** Provides all care within the EMT scope of practice plus, CPAP, additional assessment skills, additional medications, Intravenous (IV) administration, Intraosseous (IO) administration, and blood specimen collection. In some programs, cardiac monitoring and data transmission are included.⁶
4. **Paramedic:** Provides all care within the AEMT scope of practice plus advanced assessment, advanced airway management skills, a larger list of emergency medications, chest decompression, chest tube placement assistance, central IV line monitoring, accessing indwelling IV ports, and additional medications as directed by the local medical director.⁷

To obtain initial state licensure, candidates must pass the written and practical examinations offered by the National Registry of EMTs. After initial Michigan licensure, maintenance of National Registry certification is no longer required. Once licensed in Michigan, each provider must complete a specific number of continuing education hours in specified areas.

Medical Control Authorities: The heart of EMS regulation and oversight rests with the local EMS Medical Control Authorities (MCAs). Medical Control Authorities are not-for-profit, IRS 501(c) 3 organizations that are not state agencies. These boards oversee the provision of EMS for a county or counties and are the right hand of the Michigan EMS System. They assure that local EMS providers practice within the law and the medical scope of practice. In Michigan, there are 66 EMS Medical Control Authorities that provide varying degrees of oversight, but each provides the following standard services:

- An oversight board of system stakeholders

⁴ Michigan Bureau of EMS. (May, 2020). Scope of Practice Document: MFR/EMR. https://www.michigan.gov/documents/mdhhs/Scope_MFR_EMR_052020_691072_7.pdf

⁵ Michigan Bureau of EMS. (May, 2020). Scope of Practice Document: EMT. https://www.michigan.gov/documents/mdhhs/Scope_EMT_052020_691074_7.pdf

⁶ Michigan Bureau of EMS. (May, 2020). Scope of Practice Document: Specialist/AEMT. https://www.michigan.gov/documents/mdhhs/Scope_AEMT_052020_691076_7.pdf

⁷ Michigan Bureau of EMS. (May, 2020). Scope of Practice Document: Paramedic. https://www.michigan.gov/documents/mdhhs/Scope_Paramedic_052020_691077_7.pdf

- A medical director who grants functional privileges to providers
- EMS Quality Management
- Approval of applications for licensure
- The supervision and coordination of the EMS system
- Adopting an organizational structure of their choice, but it must have an advisory body
- Appointing a medical director who is board-certified in emergency medicine or who practices emergency medicine and is current in Advanced Cardiac Life Support (ACLS) and Advanced Trauma Life Support (ATLS)
- Establishing written protocols for the practice of life support agencies and EMS personnel
- Circulating draft protocols to all significantly affected persons for review, and submitting the protocols to the department for approval
- Ensuring physicians, hospital staff, and providers are educated on the protocols
- Monitoring EMS provider adherence to protocols.

Northeast Regional EMS Medical Control: The Northeast Regional EMS Medical Control Authority (MCA) is a 501(c) 3, not-for-profit organization that provides medical direction and regulatory oversight for all EMS activities within Traverse City and several nearby areas. Medical Control board members include physicians, nurses, EMS providers, administrators, and other medical professionals from the area

A major activity of the MCA is overseeing the medical privileging of all EMS providers. A physician serves as the primary medical director, assisted by other physicians within the community. The medical director privileges all providers, all services seeking licensure, and all training programs within the MCA. Dr. Robert L. Smith, MD serves as the primary medical director. He is a board-certified emergency physician who served as a paramedic prior to becoming a physician.

An MCA manager and staff perform day-to-day MCA activities. They oversee activities, including EMS Continuous Quality Improvement (CQI), administration of training, emergency medical dispatch compliance, and Multi-Casualty Incident (MCI) planning. They also coordinate the main sub-committees of the MCA.

Although the MCA and Munson Medical Center are independent organizations, there is a close relationship between them. The MCA manager also oversees the Munson Regional EMS Education (MREMSE) program.

Medical Discipline: Another major responsibility of the MCA is assuring the medical discipline of EMS organizations and providers, using a Professional Standards Review

Organization (PSRO) committee. Included are hospitals, fire and EMS agencies, and any other EMS providers. Medical discipline encompasses several areas, including:

- Maintaining a registry of incidents and their resolution
- Coordination of remedial education and training
- Assuring due process for agencies and providers
- Notification of the state licensing agency, as necessary.

Protocols: The MCA is responsible for the approval and monitoring of EMS Protocols. These protocols are MCA-wide and cover the daily practice of all EMS providers. They are based on a statewide protocol and include MCA-approved protocols to cover uncommon situations such as MCI's, hazardous materials incidents, communicable diseases, and other special situations. There are also administrative protocols involving MCA processes, rules for freestanding facilities, and similar situations.

Authorization of Transport Services: During our discussions we were advised by the medical control authority director that it would be relatively simple to gain MCA approval for adding EMS transportation to the TCFD.⁸ Since the TCFD is already an approved ALS agency there should be no complications. During our interview with Dr. Smith, he did not voice any objections to allowing TCFD to transport.

Grand Traverse County 911 Center: The Grand Traverse County 911 Center is a consolidated emergency communications center serving three police agencies, nine fire departments, and nine EMS services in the county. This includes the Traverse City Police Department and the Traverse City Fire Department. It also handles some aspects of North Flight EMS communications. On average, the center dispatches over 8,500 EMS calls annually.

While a review of the 911 services was technically outside the scope of this study, we felt it imperative to understand its role, and to obtain data on EMS responses from it. The 911 Center actions directly affect EMS quality in Traverse City.

The Grand Traverse Central Dispatch Policy board is responsible for the administrative and operational oversight of the 911 Center. Board members include representatives from EMS, fire and police agencies served by the center. Daily operations are managed by a full-time director, an assistant director, and a staff of telecommunications professionals who are trained and certified in 911 call-taking, police dispatch, fire dispatch, and medical priority dispatch.

The 911 Center is continuing to upgrade the CAD, dispatch software, and data management systems. The staff were very cooperative and provided what data they could. However, data between 2014 and 2018 were difficult to work with. From 2014 to 2018, the data were stored on old software and were difficult to analyze. Newer software made the 2019 data somewhat easier

⁸ Discussion with Laura Criddle, Manager, Northwest Regional Medical Control Authority.

to analyze. The 911 Center should work with Traverse City to assure that the data needed is accessible to the proper parties and usable.

Knowing the real-time status of available resources is a critical need for the 911 Center. Location and status of EMS units are particularly important to assure that large areas of the community are not left uncovered. The 911 Center currently cannot track the location of North Flight EMS units, nor whether they are available or out-of-service. 911 Center personnel believe that a county-wide automatic vehicle locator (AVL) system is essential, and we agree. Regardless of which agency provides EMS, tracking system status is essential. To provide efficient EMS service, you need to know where units are all the time, and whether they are in service. You can't rely on humans consistently reporting updates for a large county.

Consideration 1: Consider working with Grand Traverse County 911 to institute a county-wide Automatic Vehicle Locator program that includes all units providing EMS in Grand Traverse County.

No Unit Available: There are times when the EMS system status reaches the No Unit Available (NUA) level when all primary EMS units are unavailable, and the imminent return to service of at least one unit is not assured. Since the 911/Dispatch Center cannot access real-time data from North Flight EMS, it does not keep track of NUA status. Not knowing when the system reaches the critical point weakens the system's integrity by not allowing dynamic redeployment of units before large gaps of coverage occur.

Consideration 2: Consider asking the Grand Traverse County 911 Center to require North Flight EMS and any units working with the Greater Traverse County 911 Center to assure that their NUA status can be easily verified in real-time.

Analysis of 911 Center Communications

A key goal of this study was to provide data to assist City Management to determine whether Traverse City should adopt EMS transportation. To understand the full picture of EMS, communications components must be considered. If the 911 Center does not operate at peak efficiency, EMS response likewise cannot operate at peak efficiency. Simply adding more people, buildings, and vehicles to the EMS system without considering communications will not suffice.

911 Centers and Dispatch are often referred to as the forgotten sectors of the EMS community. Actions or inactions in the beginning phase of an emergency often have downstream effects. For example, a one- to two-minute processing delay at the 911 dispatch center could increase mortality from sudden cardiac arrest between 11 percent and 22 percent. Not rapidly providing a caller with bleeding control instructions could result in the difference between life and death.

Also, increasing the 911 Center's efficiency often is the least costly and quickest way to improve EMS efficiency. Saving one minute of time at dispatch is much less costly than reducing response times by a minute, such as by building another firehouse or adding another ambulance to a community. It is still the same minute!

Much of the response time data provided to us was difficult to analyze because it came from the old Computer-Aided Dispatch (CAD) program. In 2019, the 911 Center initiated a new program, and area EMS systems initiated new reporting systems. These changes allowed us to measure dispatch and response times using data from an authentic source for 2019. For total EMS calls, data were used from the TCFD NFIRS reports.

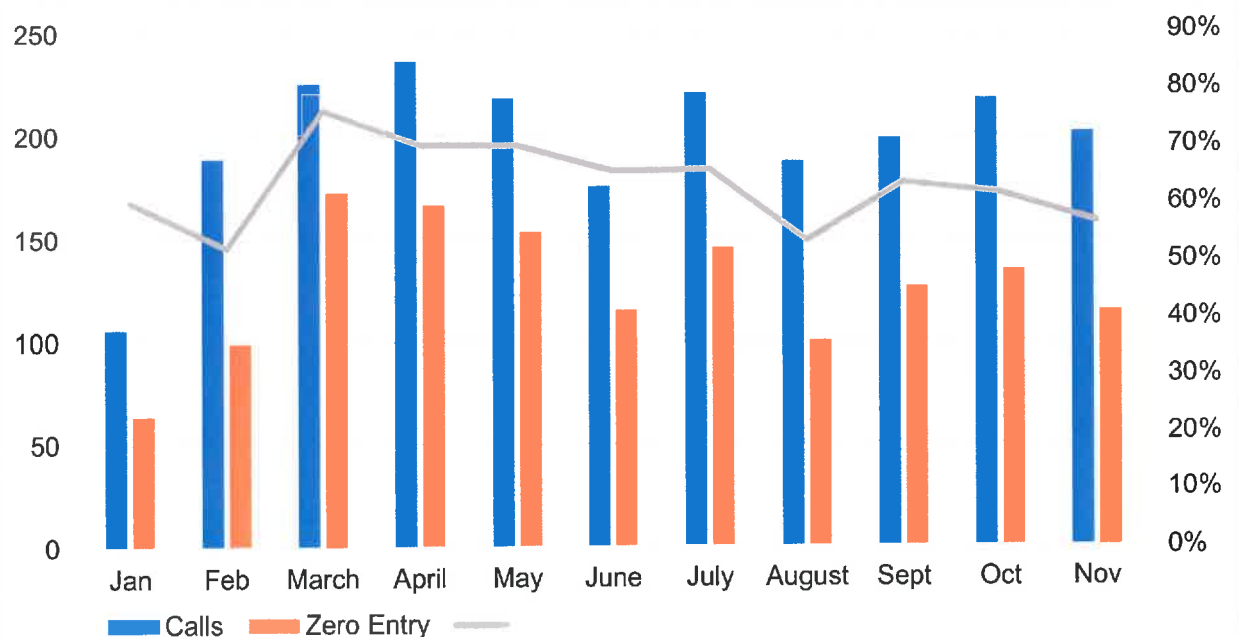
911 Center Times for 2019: An important measurement for this study is the time from 911 connection until the call is dispatched. The National Fire Protection Association (NFPA) 1221 standard set two benchmarks for dispatch performance:

1. Ninety percent of calls must be dispatched within 64 seconds from receipt, and
2. Ninety-five percent must be dispatched within 106 seconds (1:46) of receipt.⁹

The American Ambulance Association uses a combined 911 access to on-scene time standard of 8:59 for ninety percent of responses (in urban/suburban areas). Like many states, Michigan has standards for EMS dispatcher certification but does not have a specific time measurement requirement.

The raw data provided to us had many missing data points that skewed the time statistics. Figure 3 shows that for each month of 2019, 911 Activation to Dispatch time was missing for 52 to 76 percent of calls. Some EMS calls do not involve direct 911 activation such as police requests for EMS, but these are uncommon occurrences. Prior to analysis we deleted all zero times. A call theoretically can come for a unit right where it is, but this is rare.

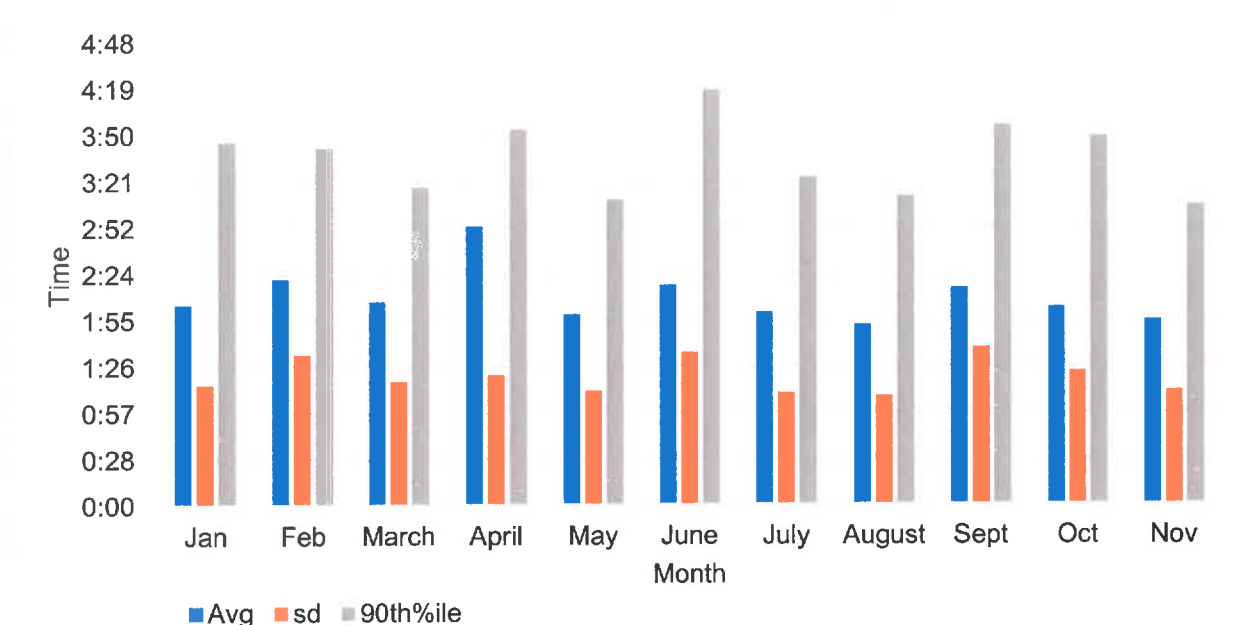
Figure 3. 2019 911 EMS Calls with No Connect Time Entered



During 2019, the 911 Center made significant improvement as to the documentation of 911 connect time. If this continues, the above data concern may become moot.

During 2019, the average 911 Connect to Dispatch time was 2:09, with a standard deviation of 1:20 and a 90th percentile of 3:35. These are above the NFPA and other standards but should not be looked at as a system failure. Only a minority of EMS dispatch centers nationally meet the NFPA standards. Figure 4 shows the 2019 911 Center Connect to Dispatch times.

Figure 4. 911 Connect to Dispatch Times, 2019



One reason for the extended dispatch times is the time spent by call handlers on medical priority dispatch questions. When first adopted 40 years ago, EMS dispatch centers needed to operate strictly by the published protocols. Some of these protocols now may require modification to allow units to be dispatched while basic information is still being gathered. After the four basic questions, a unit could be dispatched, followed by assignment upgrading or downgrading as needed.

There is a belief that not following the computer-based protocols to the letter will void liability protection from the software manufacturers. This was a risk management selling point when the Medical Priority Dispatch System (MPDS) was first introduced over 40 years ago. With the addition of sophisticated communications systems, validated training, and EMS medical direction, there is much less risk today of adopting modifications to MPDS. It often is more important to get units moving when someone is unconscious or bleeding profusely than waiting to get all the questions in the protocol answered before dispatching. Any MPDS modifications should be a team-based process involving the 911/Dispatch Center leadership, the EMS

leadership, and the EMS Medical Director. But using common sense in handling a call can cut a critical minute or so off the response time.

Analysis of EMS in Traverse City

Currently, the TCFD provides advanced EMS first response to the City. EMS transportation is primarily provided by North Flight EMS, with the TCFD Rescue providing back-up transportation services.

Risk and Demand: One can look at risk in Traverse City from an environmental and operational aspect. The Traverse City Planning Department and the TCFD Fire Marshal have identified several current and future risks. One is slips, trips, and falls to senior citizens. The airport and festivals also are special risks. Newer risks include new housing facilities and expansion of Cherry Capital Airport (TVC) area facilities.

Cherry Capital Airport

A significant risk is the Cherry Capital Airport (TVC), a full-service municipal airport that is a critical economic and transportation link for northern Michigan. Cherry Capital Airport is ranked as a Tier 1 – or “critical” airport in the state and ranks only behind the Detroit Metro and the Grand Rapids Gerald R. Ford, and the Bishop International airports in terms of flights.¹⁰ Five major airlines and general aviation provide service to and from TVC. Thirty-four commercial flights arrive or depart between 6:00 AM and 12:00 Midnight daily. Three additional flights will be added in 2020.

Currently, the airport contracts with Traverse City to provide a full-time staffed first responder/fire suppression unit with at least one ARFF trained firefighter. Rescue 4 or Rescue 3 responds to all fire, and EMS calls within the terminal and on airport grounds.

Figure 5. Cherry Capital Airport (TCFD Rescue 3)



¹⁰ Steven Baldwin Associates. (2019). Leelanau County: Northwestern Regional Airport Commission Airport Governance Advisory Committee Report & Recommendation. Presentation on December 10, 2019, Slide 9. <https://tvcairport.com/pdf2020/TVC%20LC%20Presentation%20on%20AGAC%20Report%20&%20Recommendation%20120519%201125%20SG.pdf>

When emergencies occur, the TCFD unit is assisted by North Flight EMS, Traverse City, and Grand Traverse County units. Michigan EMS licenses the TVC unit as a basic life support unit. In 2019, the TVFD airport units responded to 104 EMS calls on airport property. Table 2 shows the demand breakdown by month.

Festivals

There are eight major festivals in Traverse City that draw large crowds, requiring significant city resources to provide protection. Table 3 lists these major festivals. The TCFD and North Flight EMS provide emergency and non-emergency services for these events

Water Recreation

There are many resort and summer activities in Traverse City, including boating on the waterways. The TCFD has two water rescue boats that are staffed on an as-needed basis by on-duty personnel. All TCFD personnel are water rescue qualified.

Table 2. TVC EMS Calls, 2019

Month	Number of Calls
January	1
February	3
March	5
April	6
May	7
June	9
July	18
August	15
September	12
October	10
November	9
December	9
Total	104

Figure 6. Traverse City Film Festival



Table 3. Traverse City Major Festivals

Cherry Festival /Airshow
August Friday Night Live
Iron Man
Fireworks along the Beach
Bayshore Marathon
Up North Pride
Traverse City Film Festival
New Year's Eve

Community Risk Reduction: Community risk reduction is a relatively new trend in the fire service that take a broader, more integrated view of how to reduce risks in the city, including emergency medical risks. The TCFD assigns a Fire Marshal (Captain) and a Fire Inspector to manage community risk reduction, plan review, inspections and public education. Munson Regional EMS Education provides risk reduction activities geared toward EMS. Fire companies also assist the Fire Marshal with conducting low-risk inspections.

During peak demand, the fire marshal and fire inspector may be called upon to staff primary response units. Having risk reduction personnel that are operationally qualified benefits the department with their expertise and may lead to reduced risk reduction efforts from sheer busyness.

Explaining the Statistics

This report contains several statistics that some readers may already understand, but we will describe them below for those unfamiliar with them.

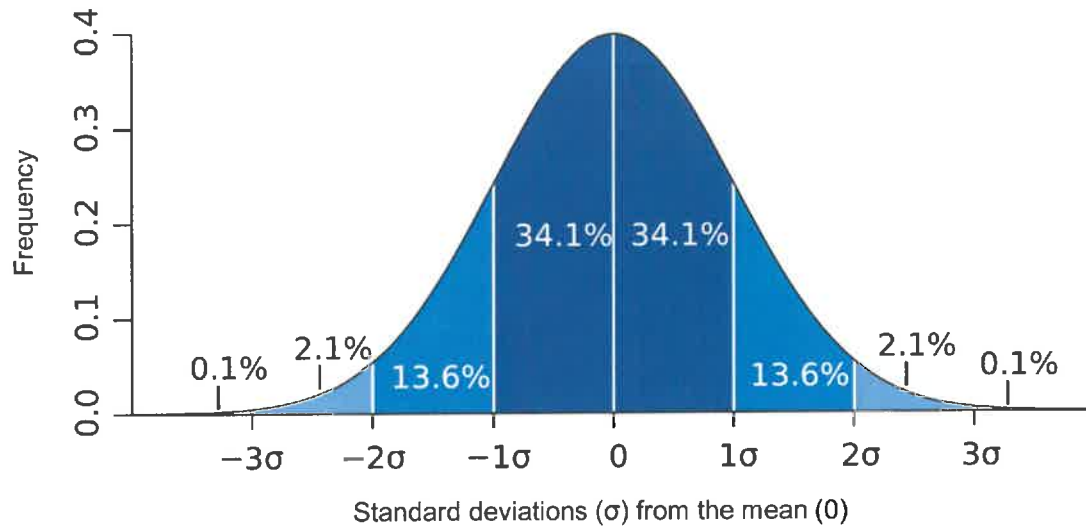
Average: For a data set, the arithmetic mean, also called the mathematical expectation or average, is the, the sum of the values divided by the number of values. For example, adding the response times for each call and dividing by the number of calls is the average response time.

While the average is often considered essential, its value alone is limited. For example, if you had two responses in two minutes and two responses in 10 minutes, the average response time would be 6 minutes, totally misleading.

Standard Deviation (SD): In statistics, the standard deviation is a measure of the amount of variation or dispersion of a set of values. A low standard deviation indicates that the values tend to be close to the set's mean, while a high standard deviation indicates that the values are spread out over a wider range.

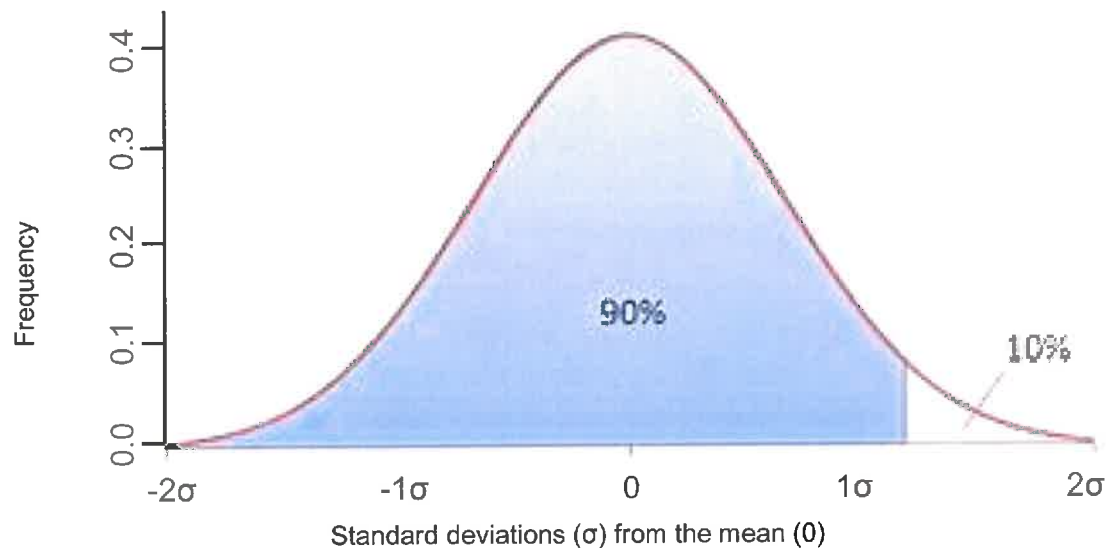
For a “normal statistical distribution, also called a Bell Curve, 68 percent of scores will be within the first standard deviation. Approximately 95 percent will be within the second standard deviation and approximately 99 percent of scores will be within the third standard deviation.

Figure 7. Bell Curve



90th Percentile: The 90th Percentile is the time under which 90 percent of the calls fall. It provides municipal and department leadership with a better indication of system performance. Figure 8 illustrates the 90th percentile for a Bell Curve distribution.

Figure 8. 90th Percentile

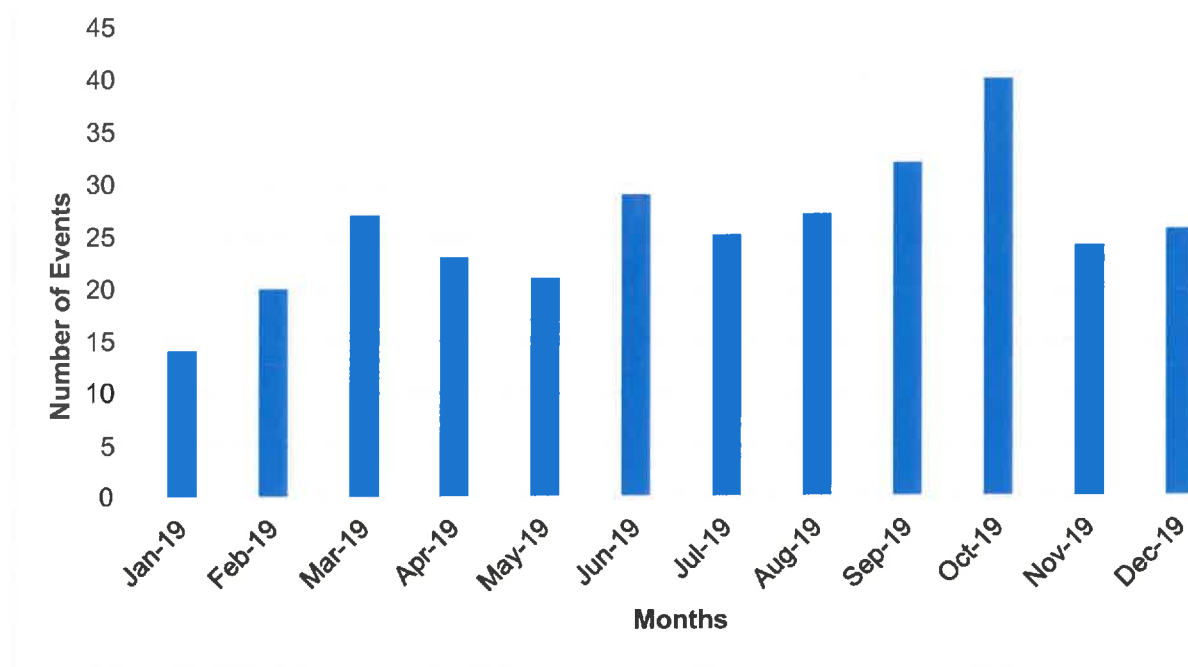


Availability of Units: Another EMS concern is unit availability. The City is concerned that adding additional services like transport may lead to more uncovered times, especially for fire response, when no unit is available to respond to the next call. The 2019 data allowed us to estimate such system vulnerability. We considered the system vulnerable when Rescue 1 was unavailable and a second incident was received, or when an incident required response from both

stations. The assumption is that Station 2 would not have enough personnel to staff a second rescue in those events.

In 2019 there were 308 vulnerable time events lasting from a few minutes to 30 minutes. Data were not precise enough to determine the exact times. Figure 8 shows the monthly vulnerability average was 26 calls, with a range of 14 in January to 40 in October. Again, this is the number of times the system could not handle another EMS call in a reasonable amount of time.

Figure 9. Vulnerable Time Events, 2019



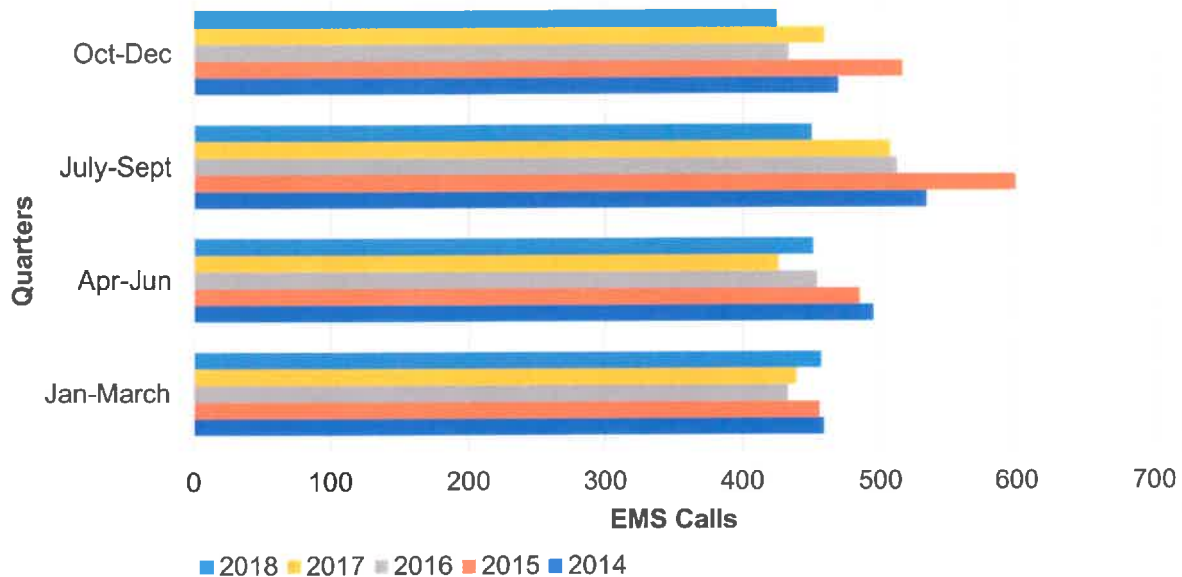
We are unable to conclude whether the vulnerable time variable identified any untoward outcomes at present. If Traverse City adds EMS transport, the number and time of vulnerable events will increase, because the length of time on a call will increase as the unit transports to a hospital and completes patient transfer and paperwork there.

Demand: Demand is the need for services within the city or other contracted areas.

The TCFD responds to all 911 EMS requests that occur within the city unless its units are totally busy. Responses are usually made from the closest of the two stations within the city. In Station 1's area, the first unit to respond is usually Rescue 1, a paramedic transport ambulance capable of transporting patients when North Flight has an extended ETA. Station 2 can provide back-up ALS with Engine 2 that does not have transport capability.

Figure shows the EMS seasonal demand for Traverse City between 2014 and 2018. As mentioned earlier, the data for 2014-2018 is problematic due to the software package used to retrieve data.

Figure 10. Traverse City EMS Demand, 2014-2018



We also performed a double line smoothing forecast for the years 2019-2023. Table 4 and Figure 11 show the forecast.

Table 4. EMS Demand and Projection based on 2014-2018 Data¹¹

Timeline	Number of Calls for Service	Forecast	Lower Confidence Bound	Upper Confidence Bound
2014	2328			
2015	2330			
2016	2260			
2017	2401			
2018	2374			
2019	2367	2367	2367	2367
2020		2409	2321	2496
2021		2424	2337	2512
2022		2439	2350	2528
2023		2454	2365	2543

We were required to use the TCFD NFIRS reports for total call volume, because of incomplete CAD data. In the future, 911 Center data should be accurate to where it can be relied upon as the authentic data for Traverse City. We were also asked about the seasonality of responses.

¹¹ The TCFD NFIRS Reporting data were used for the forecast.

Seasonality is an important variable because many communities considered resort communities question the need for a full-time fire department throughout the year. Figure compares the seasonality between 2019 and 2014-2018. We used 911 Center data for this calculation.

Figure 11. EMS Forecast, 2014-2023¹²

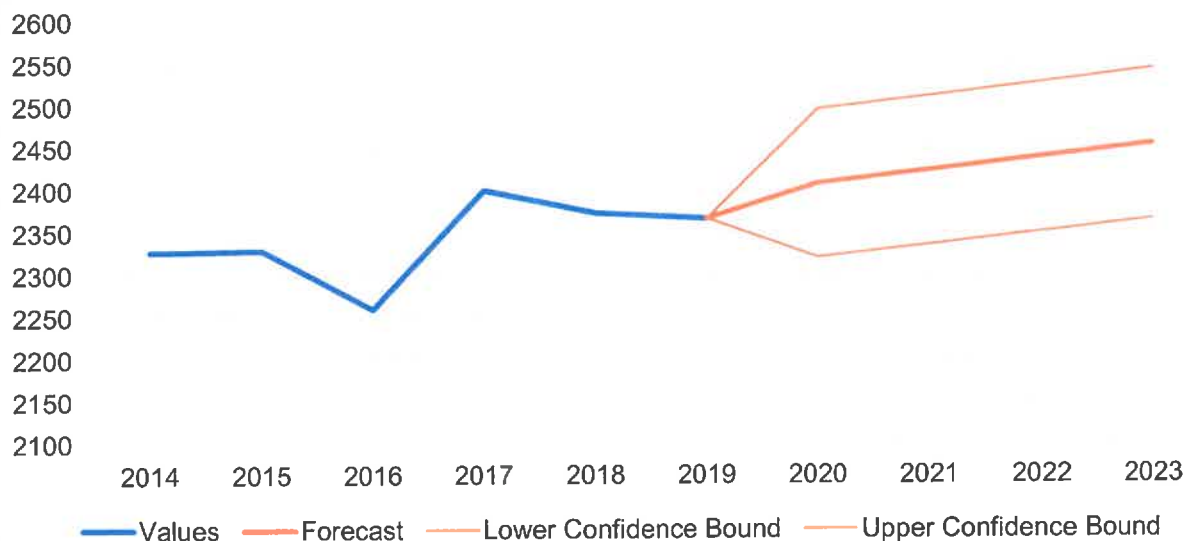
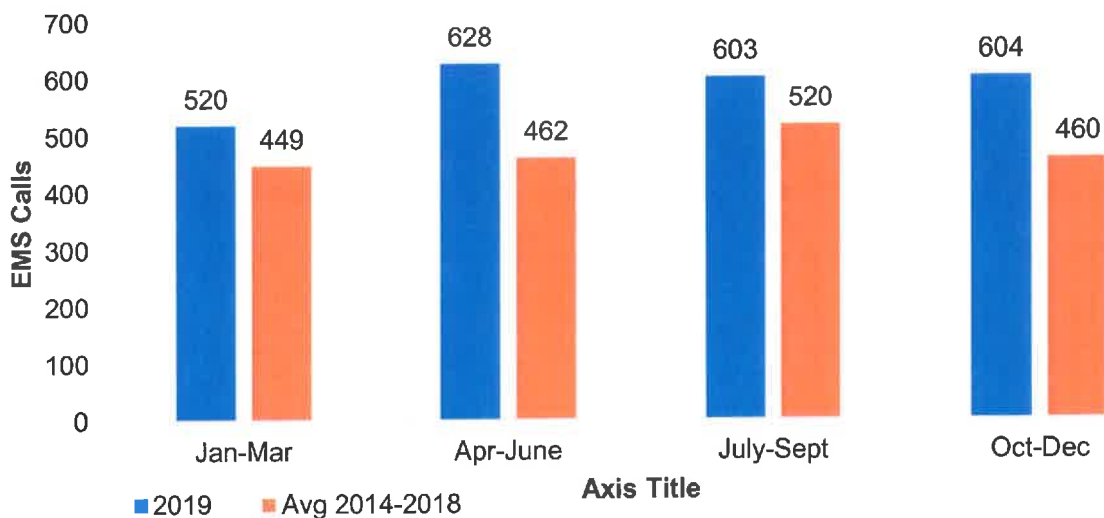


Figure 12. Comparison of Seasonality Between 2019 and 2014-2018¹³



¹² Ibid.

¹³ The 911 Center figures were used for this data to show seasonality patterns.

Based on the above data, we can draw a few conclusions:

1. Traverse City EMS demand is not highly seasonal, contrary to what might have been expected. The first quarter tends to have fewer calls, but the remaining quarters are not much different.
2. In 2019, the second quarter, between April and June, was the busiest. This is different from 2014-2018, where the third quarter, July to September, was busiest.
3. City leaders are correct to say that Traverse City is a year-round community and not just a seasonal community.

At this point we believe that the EMS demand within Traverse City will grow through 2023. The data issues caused us to lack some confidence in the details of the findings, but the big picture is likely correct. The new software implemented by the Grand Traverse County 911Center will allow for more dynamic data analysis in the future.

Consideration 3: The TCFD should consider working closely with the Grand Traverse County 911 Center to develop a data management program that will assure access to authentic EMS data. Data should include incident type, 911 and dispatch times, locations, response time intervals (as per NFPA), and other data as designated by the Fire Chief.

EMS Response Times

First Response EMS: As discussed earlier, the TCFD is the primary (but not exclusive) EMS first responder for Traverse City. It provides paramedic first response from Station 1 (Rescue 1) and Station 2 (Engine 2) and EMT response from Station 3 (Airport). Station 1 has one paramedic transport-capable unit (Rescue 1) and a fire engine with EMT equipment. Station 2 has a fire engine equipped with paramedic equipment. It is uncommon for any unit, even the airport unit, not to have a licensed paramedic on board.

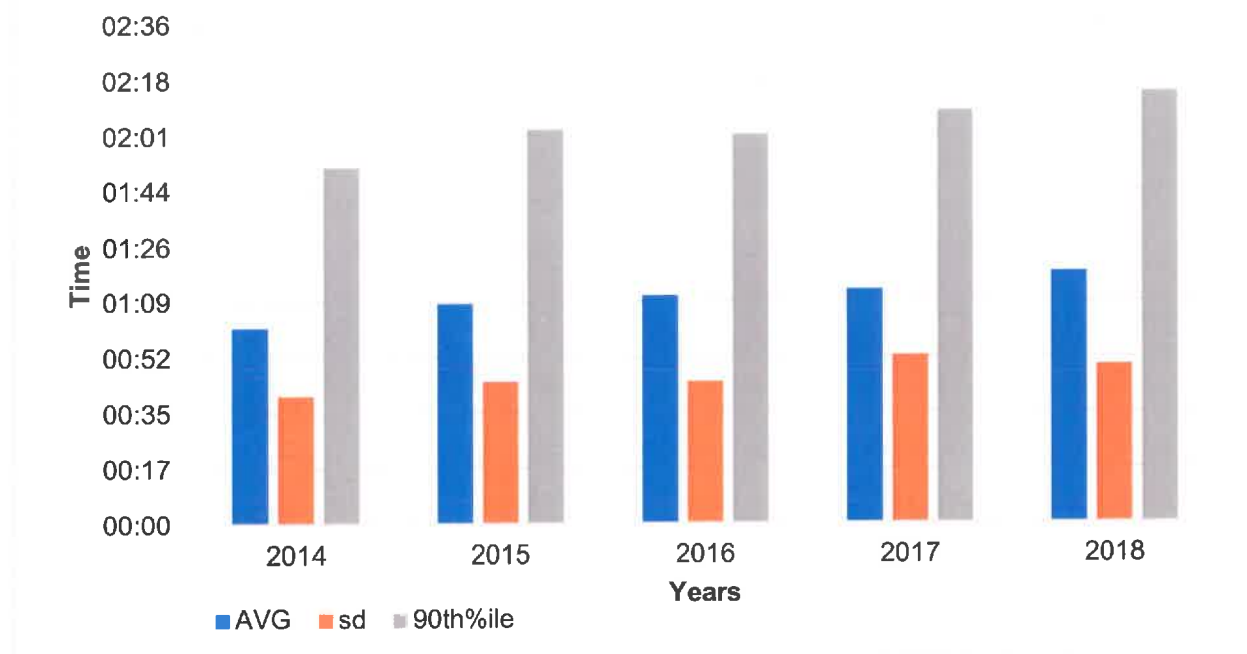
Response times are critical for life-threatening emergencies, such as cardiac arrest, heart attack, stroke, choking, severe difficulty breathing, severe trauma especially with profuse bleeding and similar events. We examined the response data from 2014-2018 to determine response times for TCFD first responder units. This included times for dispatch to en route, and en route to arrival.

Although response times are important, they are not the only consideration used to determine the level of department EMS efficiency and effectiveness. We address other aspects of service later on.

Dispatch to En Route: NFPA 1710 calls for units to be responding within 60 seconds on 90 percent of emergency calls. This is a challenging standard that few departments meet. Many departments measure this time interval differently. Some measure from dispatch time until someone *calls out (en route)* on the radio, while others call out en route only when all personnel

are seated with the appropriate gear and restraints in place. Some signal en route using a no-voice system where a button is pushed inside the vehicle. Between 2014 to 2018, the TCFD maintained an average dispatch to en route time of 1:10, SD = 0:45, and 90th percentile of 2:03. Figure shows the data within the time range.

Figure 12. TCFD Dispatch to Response, 2014-2018



To determine the current status, we analyzed the 2019 data. During 2019 the times for dispatch to response averaged 1:21, an SD = 0:53, and 90th percentile of 2:27. These times are acceptable if the data is accurate but have risen over the last five years. They should continue to be monitored and should not be allowed to continue to rise. However, station safety issues such as running, unsafe stair descent, and similar issues should not be sacrificed to reduce these times.

Consideration 4: Continue to monitor the dispatch to response times and try to determine why they are slowly increasing.

En Route To Arrival (Drive Time): This interval measures when a unit calls en route until the unit calls arrived at location. A growing number of EMS systems measure time at patient instead of or in addition to arrival at location. For example, arrival at scene for calls at a high-rise building can be somewhat misleading because it can take several minutes to get to the patient after arriving outside the building. NFPA 1710 recommends that in urban communities the first arriving unit be on scene within a four-minute drive time, with a transport unit being on scene within eight minutes, 90 percent of the time. Traverse City would be considered urban/suburban with a first response goal four-minute travel time.

Table 5 shows the 2014-2018 en route to arrival time for TCFD units.

Between 2014 and 2018, en route to arrival times have remained constant. We further analyzed data for 2019 and found an average response time of 3:14, an SD = 2:40 and a 90th percentile of 6:06. So, the average drive times are very good, but the 90th percentile times are slightly above NFPA 1710.¹⁴

Table 5. TCFD En Route To Arrival Time, 2014-2018

Year	Average	SD	90th Percentile
2014	0:03:37	0:02:20	0:06:03
2015	0:03:40	0:02:10	0:06:11
2016	0:03:32	0:02:09	0:05:51
2017	0:03:31	0:02:12	0:05:57
2018	0:03:34	0:02:21	0:06:02

Combined (Overall) Response Time: Dispatch to En route and En route to At Location times were combined to determine TCFD's actual performance. The average combined time was 4:34, with an SD = 2:58, and a 90th percentile of 8:05. Figure 13 shows these variables for 2014-2018.

¹⁴ NFPA. (2020). NFPA 1710: Standard for the organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by career fire departments. Quincy, MA: National Fire Protection Association. Retrieved from URL <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1710>

Figure 13 TCFD Combined Response Times, 2014-2018¹⁵



This time variable is stable and should be acceptable to the community. Tracking arrival at patient and arrival at scene should be considered.¹⁶

Consideration 5: Consider measuring the time of arrival at patient.

The TCFD provides timely and efficient EMS paramedic first responder service. The quality of care is acceptable to the medical control organization and the medical director. Additional data concerning patient care, provider skills proficiency and patient outcomes should be assessed. The addition of the 911 Center new software package and the new EMS reporting software package should provide the future needed data.

EMS Transportation: As noted earlier, EMS transportation is provided primarily by North Flight EMS that is part of the Munson Medical System. North Flight provides emergency and non-emergency 911 EMS response, inter-facility emergency and non-emergency transfer services, specialty and critical care ground transportation, and aeromedical EMS service to areas served by Munson hospitals. There have been anecdotal reports that North Flight service to Traverse City has suffered because of fewer units serving the area and the dynamic deployment model not allowing guaranteed service to the city. See the data below for specifics.

¹⁵ The 911 Center figures were used for this data to measure time.

¹⁶ Milne, K. (2016). Surviving an out-of-hospital cardiac arrest associated with patients' floor in high-rise buildings. *ACEP Now*. Retrieved from Url: <https://www.acepnow.com/article/surviving-hospital-cardiac-arrest-associated-patients-floor-high-rise-buildings/>

North Flight EMS is contracted with Traverse City to provide EMS transportation under specific measures.¹⁷ The agreement was first signed in 2011 and was for three years. It renews annually unless either party provides a 120-day notice.^{18 19} The specific performance measure calls for North Flight to have an ambulance on scene within nine minutes from time of dispatch.

North Flight Performance:

Table 6. Dispatch to En Route Time for North Flight, 2014-2018

We analyzed North Flight EMS performance between 2014 and 2018, including turnout time and response times. Dispatch to en route times averaged 1:12 with an SD = 0:59 and 90th percentile of 2:15. Services like North Flight often have efficient turnout times since the crews are often in the ambulances when the calls are dispatched. Table 6 shows the data for 2014-2018.

The data reveal that this time interval has improved since 2014 and appears stable.

We also measured the En route to Arrival time for 2014-2018. We found that the average travel time was 6:54 with a SD = 3:51 and a 90th percentile of 11:07. Figure shows the annual measurements for this variable.

Figure 14. North Flight En Route to Arrival Time, 2014-2018²⁰

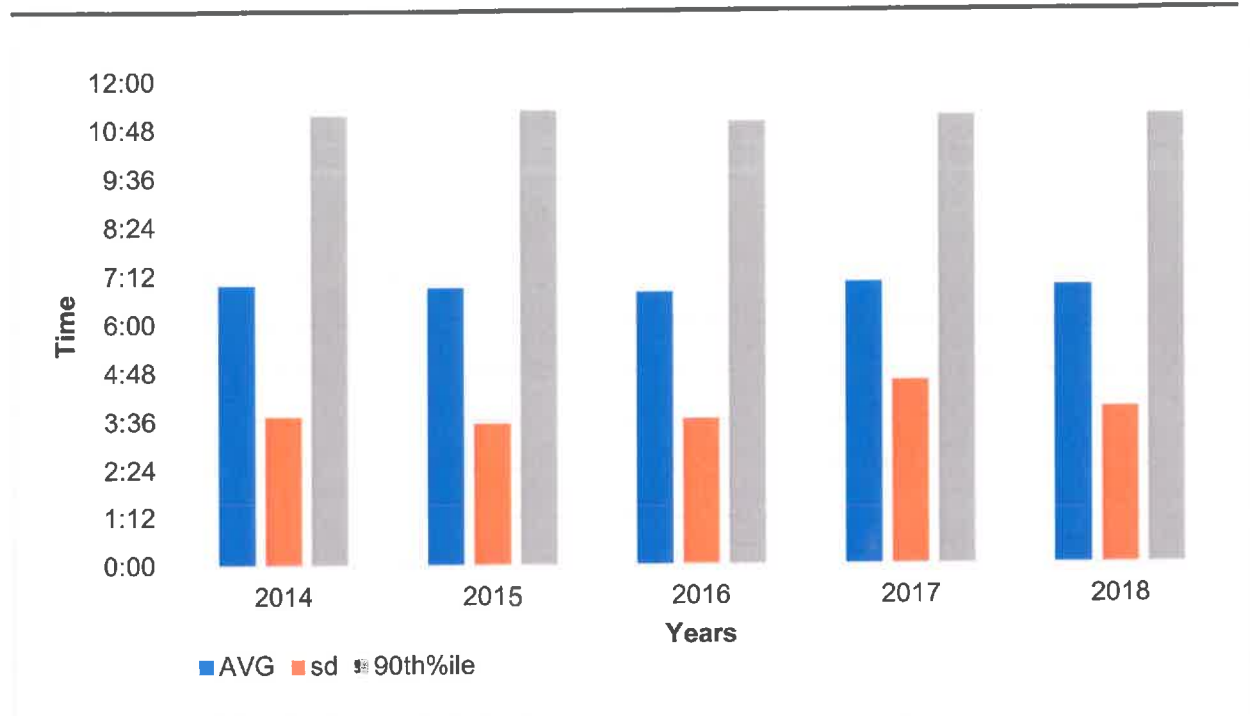
Year	Average	SD	90th percentile
2014	2:27	1:02	3:41
2015	1:03	0:57	2:08
2016	0:50	0:52	1:47
2017	0:46	0:50	1:39
2018	0:58	1:15	2:02

¹⁷ City of Traverse City. (2011). Ambulance Service Agreement. Url: <file:///C:/Users/Owner/Downloads/07.18.2011%20-%20NF%20-%20Ambulance%20Service%20Agreement.pdf>

¹⁸ Marks, M. (2019, January 3). *Billing and Accounts Receivable Management Agreement with North Flight Inc.*

¹⁹ Zeits, K. (2019, January 4). North Flight Agrmt [sic].

²⁰ The 911 Center figures were used for this data to measure time.



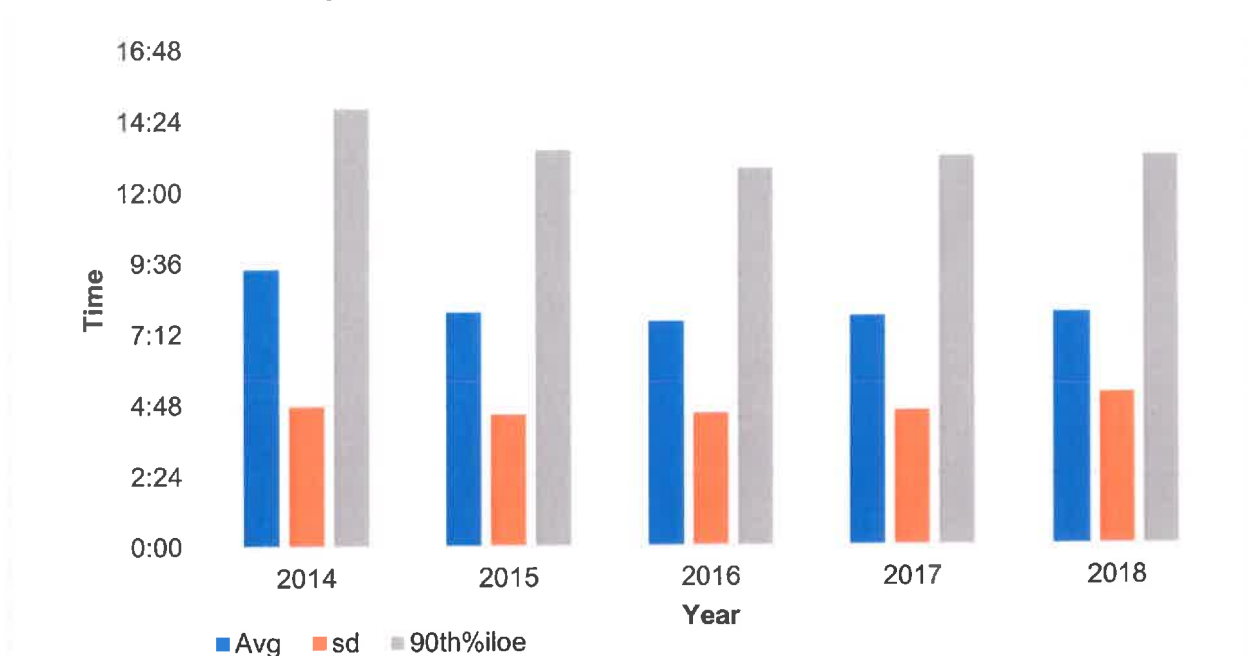
Between 2014 and 2018, North Flight did not meet the contracted performance standard. They were out of compliance at the 90th percentile by between 3:09 and 5:50.

Table 7 shows that in 2019 North Flight's response times into Traverse City improved slightly but are generally within the pattern shown above. The results are questionable because it was difficult to process the 2019 data.

Table 7. North Flight Response Times, 2019

Time	911 to Disp	Disp to Resp	Resp to Loc	Combined Disp to Loc
Average	02:08	01:28	06:07	07:24
SD	01:33	01:53	04:45	04:54
90th percentile	03:24	02:57	10:37	12:26

Figure 15. North Flight Combined Times, 2014-2018²¹



As with the TCFD, data should also be available to help measure system efficiencies in patient care and risk reduction efforts.

North Flight Contract Compliance: Questionable data made a definitive measurement of contract compliance difficult. It appears that North Flight may be out of response time compliance on up to 25 percent of its responses.

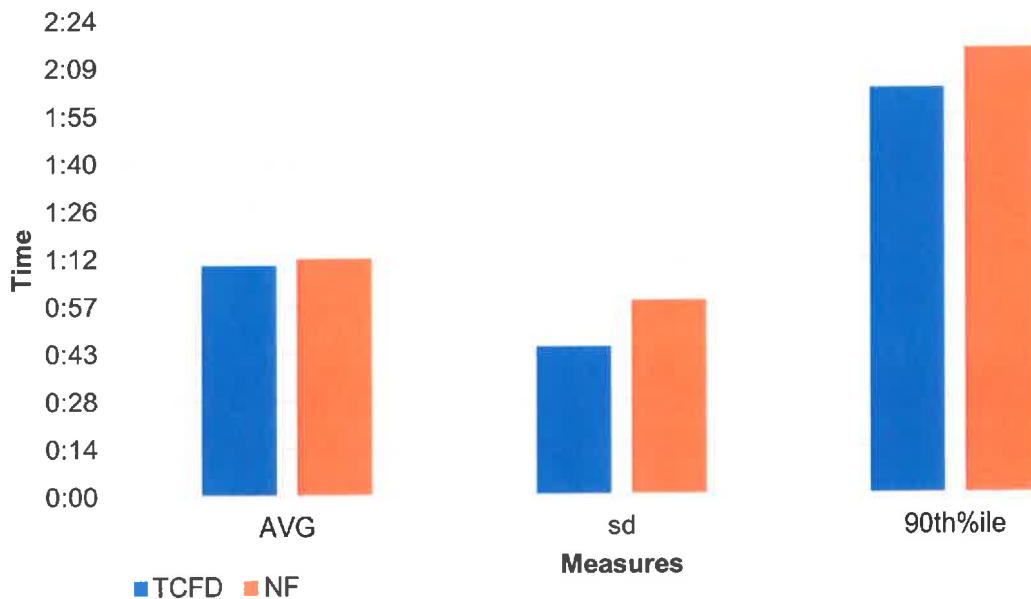
A Comparison of TCFD and North Flight EMS Response Times: We compared the primary agencies' response times providing EMS to Traverse City. It is normal for fire first responder units to have quicker response time than for transport units. The real challenge involves analyzing the effects of these times on EMS efficiency and effectiveness.

Dispatch to Response Times: Figure 16 shows the comparison of Dispatch to response time for TCFD and NF.

These times are comparable and are acceptable. Each organization should continue to monitor these times, but not compromise safety to reduce times.

²¹ Ibid.

Figure 16. 2014-2018 Comparison of TCFD and NF Dispatch to Response Times²²



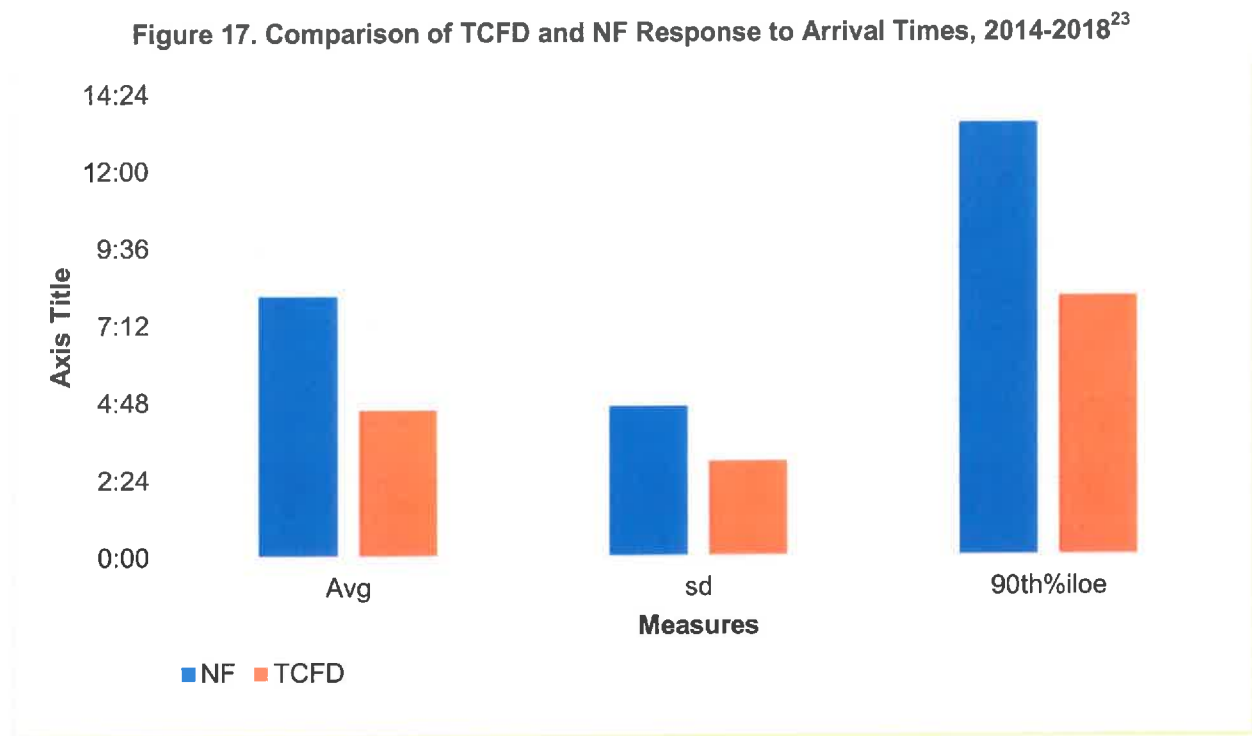
Response to Arrival: A significant difference was found when we compared Response to arrival at scene times. Figure 17 shows the difference between TCFD and North Flight's times.

From 2014-2018 North Flight's Response to Arrival times averaged 6:54 with an SD = 3:51 and a 90th percentile of 11:07. In contrast, TCFD's response to arrival times averaged 3:35 with as SD = 2:14 and a 90th percentile of 6:01.

The 90th percentile time difference of 5:22 shows that North Flight EMS has not met its contractual obligations since 2014. It also supports the practice that TCFD first responder units be paramedic capable. The time difference places TCFD EMS providers in a position to provide several critical interventions prior to arrival of North Flight.

After reviewing the time interval data of North Flight EMS, we were able to triangulate on why there may be an adjustment in service levels. Figure 18 shows the triangulation piece.

²² Ibid.

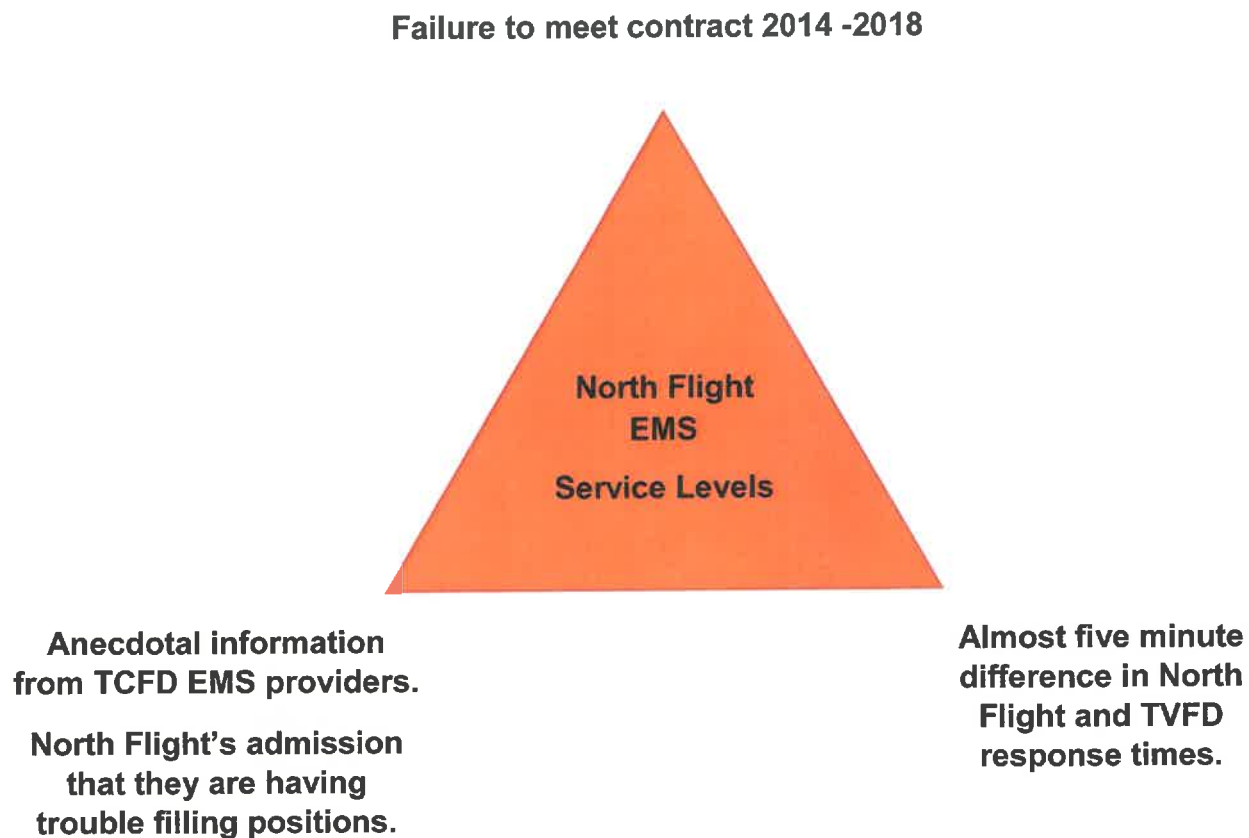


Triangulation: At several points in the study we suggest that North Flight may be reevaluating its commitment to providing 911 emergency ambulance service for Traverse City. Figure 18 provides a visual triangulation of what led us to this conclusion. The factors identified include.

1. North Flight's continued failure to meet contractually agreed upon response times.
2. A five-minute slower response time for North Flight EMS units
3. Anecdotal reports from TCFD and North Flight personnel that North Flight is having difficulty filling paramedic and EMT positions.

²³ The 911 Center figures were used for this data to measure time.

Figure 18. Triangulation of Issues Leading to Questioning North Flight Future Commitment



III. Fire Department Assumption of EMS Transportation

This study's overarching question was should the TCFD assume primary EMS transportation responsibility for Traverse City. There are three main options, with each having sub-options. Before examining them, we present alternative delivery models that can be considered regardless of whether primary EMS transportation is assumed.

Our description of the possibilities includes human resource requirements, finances, logistics and political considerations.

Alternative Delivery Models There are several EMS delivery models that Traverse City can consider, with advantages and disadvantages to each. There also are some slight variations for each model. EMS delivery

models are a current topic of conversation throughout the country. During this project, there was a national podcast presented on the topic.

The challenge is to find the most appropriate one for the city's unique situation. The EMS system has evolved into the current model of fire department first response with hospital-based EMS transportation. City leaders want to look forward and determine if another model will allow EMS to continue to provide the best level of EMS service for the future. Because fire and EMS are provided by different agencies, changes in responsibility must balance efficiency and effectiveness. There also is the concomitant issue of who gets the money for transport.

We discuss next the several major models and some variations.

1: Existing Model. The existing EMS delivery system uses fire department units and hospital-based ambulances that are staffed with EMS-qualified personnel. Upon assignment from dispatch, the closest TCFD paramedic first responder unit and a North Flight paramedic transport unit (or mutual aid unit) responds to the scene.

Advantages of the present system include:

- Personnel are familiar with this model
- Using multi-unit response can decrease on-scene time by getting multiple step care done faster.
- Multi-unit teams may assist in reducing firefighter and EMS provider injuries by reducing safety hazards, such as: two rescuers lifting heavy patients or moving equipment or having enough personnel to maintain situational awareness.
- Decreases reliance on precise medical priority dispatch coding.

Disadvantages include:

- Over- dispatch of fire suppression units (more than needed) often occurs.²⁴²⁵
- TCFD units are unavailable for another EMS call when multiple units are committed to a response
- Engine companies responding to medical calls reduce suppression force availability.
- The City is vulnerable when multiple emergencies occur.

²⁴ Clawson, J., Oloba, C., Heward, A., Scott, G., & Patterson, G. (2007). Accuracy of emergency medical dispatchers' subjective ability to identify when higher dispatch levels are warranted over a Medical Priority Dispatch System automated protocol's recommended coding based on paramedic outcome data. *Emergency Medicine Journal*, 24(8), 560-563, retrieved from doi: [10.1136/emj.2007.047928](https://doi.org/10.1136/emj.2007.047928)

²⁵ Pennino, J.A. III. (2020). The expanded implementation of the medical Priority Dispatch System (MPDS) in Pinellas County: A Public Value Perspective. ProQuest Dissertations Publishing, 2020. 28024483.

- Citizens are dependent on North Flight being adequately staffed to provide transport. Currently, TCFD Rescue 1 responds as a first response paramedic unit that is transport capable. It automatically fills the gap if North Flight is low on units and unavailable to respond.

2: Saint Paul Model (First Call First). This model requires that only four personnel be assigned to cover both an engine and medic company. All respond on either the medic unit or engine, whichever call comes in first. At least one paramedic must be assigned to the engine/medic company.

Advantages include:

- Fewer paramedics may be needed.
- Engine or medic unit can be kept in service during repair trips, some training, and some assignments.
- Station officers would have a better chance to observe EMS skill performance and development of personnel.
- Less reliance on medical priority dispatch.
- Having four personnel on each unit could reduce injuries

Disadvantages include:

- First-due territories may be uncovered for extended periods of time for fires and other non-EMS emergencies. Due to transportation time, TCFD units will remain unavailable for longer times.
- Four personnel is overkill for many EMS calls.
- Additional time spent on EMS calls may affect engine and medic ability to accomplish other necessary tasks such as risk reduction, inspections, and on-duty training.
- End of shift EMS calls may lead to additional overtime.
- Heavy reliance is needed on Mutual Aid Agreements

3: Independent Municipal Service. In this model, EMS is provided by a municipal service not associated with fire or police departments. Its leadership is responsible for just EMS. Often referred to as *third service EMS*, these organizations can be managed by a county, city, hospital, or a community-based non-governmental agency (e.g., religious or service organization).

Advantages include:

- This type of organization can concentrate on providing the medical component of EMS.
- Salaries tend to be lower than for fire-based providers.

- EMS can be an equal partner in public safety (though this is mainly theoretical because most of these EMS-only organizations are subservient to police and fire agencies).
- These types of systems thrive where local fire departments are not capable of or not interested in providing EMS.

Disadvantages include:

- Another government agency leads to additional high-level employees
- Much additional time is spent on interagency issues such as coordinating fire and EMS units in responses
- Higher level of conflict between agencies
- Higher level of conflict between employees
- Less economy of scale because additional higher priced management staff must be hired.
- The TCFD has integrated EMS into its mission, and employees have accepted this role. There would be little advantage to an independent municipal service.

4: Privatization of EMS. EMS may be provided by a private sector, non-governmental organization that may be contracted by a governmental organization. This includes commercial EMS organizations, hospital-based EMS organizations, or a stand-alone agency providing EMS for profit (or patient capture). Historically, commercial, or hospital-based services were established where public safety agencies did not have statutory authority or a desire to provide these services. Funeral homes were often the provider of EMS because they had the vehicles for transportation.

As the 911 service became more sophisticated, some local governments relied on commercial services to provide emergency service in exchange for guaranteeing the private service exclusive or shared rights to non-emergency transportation. While less exciting, non-emergency transportation is how commercial services make most of their money because these transports are usually pre-authorized; require less trained (and hence less expensive) personnel; and require less expensive vehicles, hardware and supplies. Also, fewer red light and siren responses reduce risks, and it is easier to predict and plan for needed services. Covering emergency or 911 responses became the price for accessing the lucrative non-emergency patient.

Hospital-based EMS, like commercial EMS, was developed because some hospitals saw the need to provide services that governments could not or would not perform. It seemed logical for the hospitals to provide this medical service. Ambulance service also served as a catchment tool to bring patients (and their fees) to a specific hospital. There are many hospital-based emergency, non-emergency, and specialty systems still being used. But many hospitals have found that providing EMS can be expensive and high-risk. Also, sophisticated EMS protocols now are guiding EMS transportation decisions, eliminating the need for hospitals to use ambulance service as a catchment tool.

Advantages include:

- The medical part of EMS can be managed by medical organizations
- Salary and legacy costs are usually lower than for public agencies.
- Coordination of EMS response and patient transportation is easier.
- Charges are user-based, with government having little financial or risk exposure.
- Profit-based organizations may be better able to demonstrate efficiencies, with fewer civil service regulations.

Disadvantages include:

- Local governments may still have to augment service by providing EMS first responder (usually fire department) services, often without reimbursement. There usually are more geographically dispersed units in a fire department than a private service within a given jurisdiction, so the fire department often can arrive sooner to start EMS.
- Local governments must often provide system oversight to assure contract compliance
- Commercial ambulance services can suddenly become insolvent, leading to government having to take emergency action to restore ambulance services
- Employees are often not held to the same personal standards as fire department personnel (i.e. background investigations, drug-testing)
- There is frequent employee turnover
- Local governments are often cajoled into accepting long-term contracts, only to be approached by the commercial carrier asking for a supplemental fee to assure profitability.

Traverse City is served by this model through North Flight. For commercial or hospital-based EMS to thrive, there must be high demand to induce profitability. It would be impossible for a 911-only (responding to just 911 calls) based private service to financially survive.^{26,27}

5: Public Utility Model. A public utility model combines government-based services and private services. Usually, the local government owns buildings, vehicles, and equipment, while a commercial service is contracted to manage daily operations, including hiring and paying personnel. This model gained popularity in the 1980s, eventually being adopted by about 8 percent of EMS agencies. At present, this model is used by less than 2 percent of EMS agencies

²⁶ Rudavsky, S. (2020, February). Ambulance services could face emergency of their own. *Indy Star*. Retrieved from <https://www.indystar.com/story/news/health/2020/02/24/ems-companies-indy-struggle-survive-limited-payments/4820488002/>

²⁷ DelBet, A. (2019, April). Avon ambulance shuts down; turns services over to county. WHAM News. Retrieved from <https://13wham.com/news/local/avon-ambulance-shuts-down-turns-services-over-to-county>

nationwide. There are no advantages for Traverse City to consider adopting a public utility model. This model is difficult to manage and is more expensive to operate.

Use of Non-Sworn EMS Personnel. Using non-sworn personnel is not an EMS model per se, but rather a variation that can be employed within most models. In many fire-based EMS systems, all responding personnel are dual-role/cross trained firefighters, meaning that they are qualified to perform fire suppression and EMS. Some fire-based systems argue that recruiting licensed EMS providers who just do EMS would add to the pool of applicants, especially women and minorities. Fire departments including Washington, DC, FDNY, Los Angeles, CA, Baltimore, MD and Alexandria, VA have employed multiple track recruiting for over 30 years. In some of these systems, EMS employees are considered “civilian,” meaning that they are not badged public safety employees, and therefore are not in the fire-police retirement systems. In other communities, EMS-only employees enjoy the same full pension benefits as other public safety employees.

Advantages of hiring non-sworn EMS employees include:

- If EMS employees are not in the fire-police pension system, employee legacy costs are lower.
- Less training time is needed when they do not require firefighting skills.
- A wider recruitment pool may be available, especially women and minorities, increasing diversity.
- Quicker hiring to street time. Most of these services do not run extensive academies for EMS employees.

Disadvantages of hiring non-sworn EMS employees include:

- Promotional opportunities are often limited, causing human resources issues that often incite conflict. The organizations listed above experienced major employee conflict because the non-sworn employees perceive they are treated as second-class citizens.
- Limited- role personnel may provide less depth of resources to handle significant natural and manmade disasters.
- Single-role personnel programs are often associated with larger organizations. Smaller organizations cannot afford to sacrifice the depth of abilities offered by dual role providers.

Consideration 6: Regardless of whether Traverse City adopts EMS transportation, the TCFD should consider maintaining the dual- role/cross-trained status for all personnel. Smaller departments usually benefit from multi-skilled employees who can fulfill multiple roles.

Volunteer EMS: The use of volunteers to provide EMS can fit into any model. Some volunteers are provided no compensation, while others are provided minimal compensation or benefits. Some are paid on call, where they only receive compensation for responding. According to the current interpretation of the Fair Labor Standards Act (FLSA), to be considered a volunteer, the provider must receive less than 20 percent of the compensation of a paid provider.

The reliance on volunteers as primary EMS providers is problematic. The National Volunteer Fire Council (NVFC) noted that the number of volunteers nationally is receding by up to eight percent each decade. In 2017, volunteer firefighter numbers reached an all-time low of 682,600.²⁸ A 2015 report noted that less than 70 percent of adults were interested in volunteering for fire and EMS services.²⁹

Volunteer providers in Michigan are experiencing the same situation. Most of the volunteer companies are struggling to provide service, especially during daytime hours.

At this time, we think that the TCFD should not consider a volunteer EMS model. Volunteers could, however, be used to augment risk reduction and emergency management activities.

Alternatives to Providing EMS Transportation

Given all the alternative models for providing EMS transportation, we suggest that, all things considered, there are three reasonable strategies for Traverse City to consider concerning its EMS transportation going into the future. These include 1) providing primary emergency transportation responsibility, 2) being compensated for first responder service, or 3) keeping the status quo.

It is unlikely that Traverse City will monetarily profit from taking over EMS transportation, as previously mentioned, and discussed in detail below. Becoming responsible for full EMS must be approached as an investment in the care and safety of the citizens, rather than for saving money.

In about one-third of EMS calls, there is no patient present upon arrival, or the patient does not need, or rejects being transported, thereby generating no ability to collect fees. Table 8 shows data for 10 months of 2019 that indicated 42% of North Flight's responses did not result in a patient transport.

Also, the collection rate for emergency patient transport is significantly lower than for scheduled, non-emergency transportation. Emergency transport brings additional risk to the TCFD, greater chances of provider injury, and greater liability. EMS providers must be licensed at a higher level to handle some emergencies.

²⁸ National Volunteer Fire Council (n.d.). *The Fire Service in the United States of America*.

²⁹ Salter/Mitchell Inc. (2015). *Volunteer Firefighter Recruitment and Retention Formative Research Results: Prepared for National Volunteer Fire Council*. https://www.nvfc.org/wp-content/uploads/2016/09/NVFC_Formative-Research_2015_Report_v1f.pdf

³⁰ The data for January and April 2019 were not useable.

The above statement is not meant to totally dissuade the City from considering service expansion, but rather to be candid about the investment needed. Timeliness, quality patient care, and fiscal responsibility must all be considered in the transport decision.

Option 1: TCFD Assuming EMS Transportation. When considering advantages or disadvantages of adding EMS transport, some features may present superficially as advantages but need to be fully understood.

Conversely, some of the features may be presented as disadvantages but only because there may be an inability to expect Traverse City to undertake the move. To fully provide EMS transport, between six and 11 firefighters will need to be added at a possible cost of **\$755,004 to \$1,547,791**. These figures are explained below.

The advantages to assuming EMS transportation include:

- Capability already exists to take on a greater role. Rescue 1 is already equipped and staffed to handle these services.
- Stations are already well placed to provide transport service in a timely manner.
- TCFD providers are qualified to provide EMS services during transport.
- IAFF local union seems to be supportive of an expanded role.
- Individual employees in the fire department are supportive of an expanded role.
- Citizens will be less dependent on an outside agency for an essential emergency service.
- Traverse City will have greater control over system efficiencies.
- Easier for Traverse City public safety agencies to implement special programs for multi-casualty, active shooter, and other emergency incidents.

The disadvantages/challenges of assuming EMS transportation include:

- EMS transportation will not likely be profit-making or breakeven.
- The City will have to make a substantial fiscal and capital investment to upgrade and maintain services.
- Station 2 may have to move equipment to accommodate a transport vehicle.

Table 8: 2019 North Flight No Transports³⁰

Month	Transported	No Transport	Total	%No
Feb	304	258	562	46%
March	358	279	637	44%
May	378	255	633	40%
June	328	226	554	41%
July	354	284	638	45%
August	351	276	627	44%
Sept	330	217	547	40%
Oct	352	256	608	42%
Nov	300	220	520	42%
Dec	360	264	624	42%
Total	3415	2535	5950	42%

- A requirement for additional fire department administrative and operational personnel.
- A need to purchase and maintain transport vehicles with sophisticated medical equipment.
- A need for an expanded automatic and mutual aid plan.
- A need to more aggressively recruit qualified personnel from a limited pool of candidates.

The sections below will further explain the costs and the pros and cons.

Response Time Efficiency: As shown earlier, between 2014 and 2018, the TCFD 90th percentile response time was 5.5 minutes faster than North Flight. While this cannot be directly equated to lives saved, faster is better. Although not every EMS call requires rapid transportation, people who call 911 generally want and expect a quick response, if for nothing more than the comfort of knowing help has arrived.^{31,32,33}

Personnel Needs: A great concern to some stakeholders is the number of additional employees would be needed to upgrade TCFD to provide transport services. Obvious concerns include the need to hire additional city employees that are higher paid, have better benefits, increase legacy costs due to pensions, and higher rates of accidental and ordinary disability than non-public safety and private employees.

Currently, a shift captain on one shift is responsible for overseeing EMS activities. This level of supervision is probably insufficient for a full-service EMS system because the added transportation element brings additional challenges. These include:

- Additional liaison between the TCFD, the regional hospital, and city medical facilities.
- Greater interaction between the TCFD and the Northwest Region EMS Medical Control.
- Greater interaction with the EMS Medical Director.
- Development of a comprehensive EMS Quality Management program that includes clinical, operational, and administrative oversight.
- Direct liaison with the EMS medical billing entity.

³¹ Van Milligan M, Mitchell III JP, Tucker J, Arkedis J, Carvalho D. (2014). *An Analysis of Prehospital Emergency Medical Services as an Essential Service and as a Public Good in Economic Theory*. (Report No. DOT HS 811 999a). Washington, DC: National Highway Traffic Safety Administration.

³² Institute of Medicine. (2007). *Future of emergency care: Emergency medical services at the crossroads*. Washington, DC: The Academies Press.

³³ EMS Agenda 2050 Technical Expert Panel. (2019, January). *EMS Agenda 2050: A People-Centered Vision for the Future of Emergency Medical Services* (Report No. DOT HS 812 664). Washington, DC: National Highway Traffic Safety Administration.

- Additional oversight of EMS operations, including clinical procedures, incident command and special operations.
- Greater assurance of readiness for vehicles, supplies, complex medical equipment, and controlled substance compliance.
- Provision of additional training regarding transportation issues.
- Negotiation and oversight of a robust automatic aid and mutual aid program.

While a shift officer can handle these issues at the current first responder level, adding the complexity of transportation makes full time oversight essential. Oversight would be better provided by a captain assigned to a 40-hour a week position who also is available on-call for critical situations. This person would also have a vehicle, possibly licensed as an advanced life support unit, to initiate advanced care when needed—more likely when units are out of service while doing transports. The estimated cost for this employee is \$169,269 (salary and benefits) and \$50,000 for an ALS equipped vehicle.³⁴

Another consideration is adding an assistant chief who would be second in command of the department and in charge of EMS. Traverse City has held the line against making the department top heavy, with too many chiefs. But consideration should be given to creating a 40-hour non-bargaining unit member who could assume additional health and safety responsibilities and would likely be FLSA-exempt. This employee would likely be classified as a Mid-5 Grade 7 to Mid-5 Grade 8 at a cost of \$103,825 to \$116,823.³⁵

Although we advise adding an additional uniformed position (EMS captain), a non-uniformed, non-union EMS manager is also a possibility. The candidate would need significant EMS qualifications but not be required to have fire suppression qualifications. A non-uniformed/non-union EMS manager could be hired at a lower salary, not have the same legacy costs and not be part of the operational chain of command. However, a civilian manager may not have the versatility needed for a small department, would have less opportunity for advancement and may present labor/management issues that detract from relationships.

Consideration 7: If the TCFD provides primary first response EMS transportation, it should consider adding a 40-hour fire captain to oversee the EMS program. Alternatively, a non-uniformed EMS manager could be considered.

Operational Services: To provide primary first response EMS transport, the TCFD would need two full-time EMS transport units, one at each station. The past trend in demand is unclear due to

³⁴ Information per the Traverse City Office of Human Resources, updated in 2020.

³⁵ Ibid.

poor data, but the 2019 data suggests that TCFD is likely to respond to at least 2,600 emergency calls annually utilizing the two transport units.

The need for two transport units is based on three main demand factors used by professional fire and EMS organizations, including: the Center for Public Safety Excellence (CPSE), the National Fire Protection Association (NFPA), the American Ambulance Association (AAA) and our historical analytical methods:

1. Workload classification criteria that describes the demand in terms of total call volume.
2. Unit-hour utilization that describes the busyness of units, and availability for emergencies.
3. The workload including both 911 (emergency) response and inter-facility emergency and non-emergency transports.

Workload Classification Criteria: The Center for Public Safety Excellence uses the following guidelines to determine workload levels for operations companies.

- **Very Low Workload (<500 responses/yr.):** Simultaneous calls are infrequent and unit availability usually is assured. Stations/units can be spaced at the maximum distance possible to achieve travel time objectives established by the community.
- **Low Workload (500–999 responses/yr.):** Few calls will overlap and unit availability usually is assured. Stations/units can be spaced at the maximum distance possible to achieve travel time objectives established by the community.
- **Moderate Workload (1,000–1,999 responses/yr.):** Considerable overlap of calls will occur, usually at peak demand periods; however, stations/units are usually available. Stations/units must be located with marginal overlap to achieve travel time objectives established by the community.
- **High Workload (2,000–2,999 responses/yr.):** More frequent overlap of calls will likely occur; however, stations/units will probably be available for an emergency response. Stations/units must be located with significant overlap to achieve stated travel time objectives established by the community. This footprint usually achieves the best results in terms of cost efficiency and effectiveness of service delivery.
- **Very High Workload (3,000–3,999 responses/yr.):** Overlapping calls occur daily, usually during peak demand periods, and working incidents are frequent. The closest station/unit often may not be available, thus requiring the response of adjacent stations/units. Stations/units must be located with the significant overlap to achieve stated travel time objectives established by the community.
- **Extremely High Workload (>4,000 responses/yr.):** Overlapping calls may occur hourly, regardless of the time of day. The closest station/unit is likely to be unavailable often, requiring the response of adjacent stations/units, with longer response times.

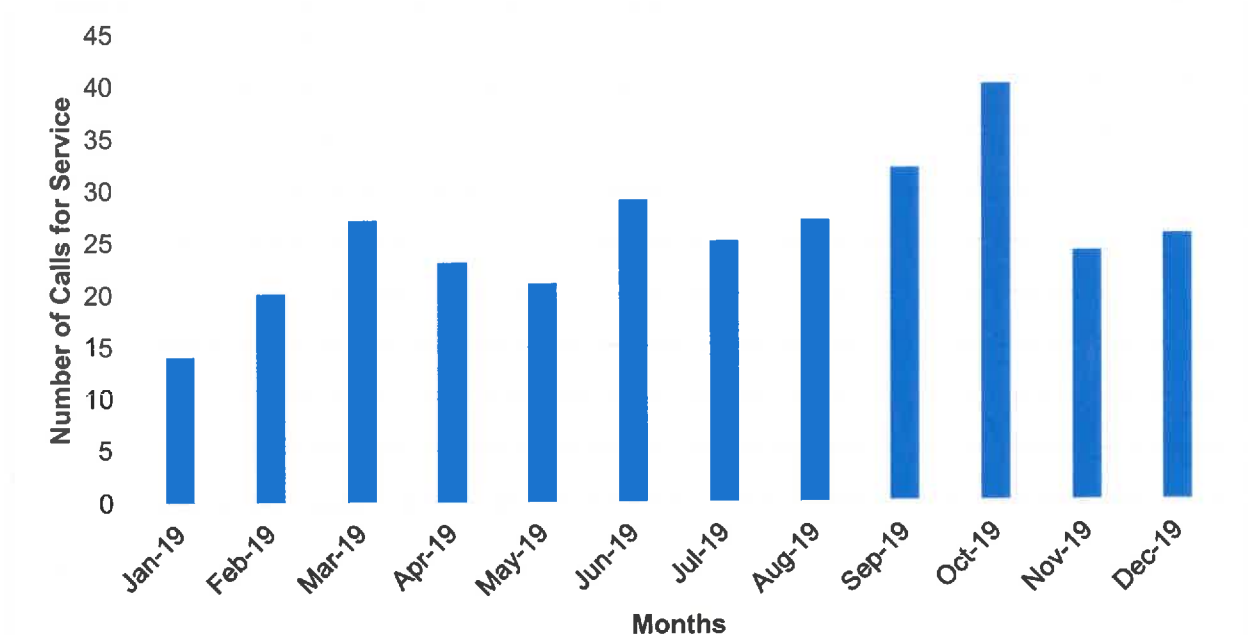
Frequent transfers or move-ups are required for the delivery system to meet demand. Stations/units must be located with redundancy (back-up units) to achieve travel time objectives. This situation is usually found in very densely populated urban areas and is especially evident in EMS services located in urban areas with very high demand.

Overlapping of calls may be related to simultaneous calls in the same area, or simultaneously systemwide.

Based on these criteria, one transport unit would have a “heavy” workload. With two, each would have a moderate EMS workload, and better response times. They would also likely respond to some fire emergencies and some service calls, to enhance fire and EMS personnel safety and care, and be ready for civilian injuries, which would add to their workload.

We considered the likelihood of simultaneous calls in detail. In 2019, there were 308 instances of “vulnerable demand time” where if a second ambulance would be needed, outside assistance would be necessary. Figure 19 quantifies the vulnerable time events.

Figure 19. Vulnerable Time Events, 2019



The above data is actually an understatement of vulnerability because it does not account for the additional time that Rescue 1 or 2 would be unavailable because they are transporting a patient.

Unit Hour Utilization: If the TCFD added EMS transportation, many calls would take longer to handle because of transport time, hospital waiting, and readying the unit to return to service. Therefore, the number of calls alone do not adequately represent the workload. When we add in time for each call, the true workload is clearer. The performance measure that reflects the length of time per call and the number of calls for a given unit is called the unit-hour utilization.

Unit-hour utilization (UH:U) is an estimate of the time a unit is occupied on emergency calls, as a percentage of the total number of hours the unit is staffed and available for response. A unit staffed full-time is available 8,760 hours per year—24 hours x 365 days. UH:U measures the percentage of this on-duty time that is consumed by emergency service field activities. A high UH:U means lower availability for calls because the more time spent on calls, the more likely the next call must be handled by something other than the first due unit. Poor availability negatively impacts response times.

The formula used to calculate the UH:U for each full-time unit is:

$$UH:U = \frac{(\text{number of calls}) \times (\text{average call duration in hours})}{8,760 \text{ total hours in a year}}$$

While UH:U measures the percent of a unit's time in service that is spent running calls, there is other productive time *not* accounted for in this measure, such as time spent on training, maintenance, public education, and other preparedness-related functions. That is, when units are not engaged in emergency response, it does not mean their personnel are not working.

UH:U was originally designed to measure unit-hour use for private ambulance transportation. Recently, this measurement has been modified for use in municipal EMS and fire suppression.³⁶

While there is consensus within the EMS industry on the importance of utilization rates and how to measure them, the interpretation of how indicative they are of overall system efficiency is debatable. Private ambulance services strive for a UH:U between .35 and .45 (35 to 45 percent) to achieve good economic efficiency (profit), including inter-facility non-emergency transports. Municipal units, too, must account for non-transport calls that they respond to. Even if calls are unfounded, result in a patient refusing transport, or a patient being treated on scene and released, they still impact unit utilization. A UH:U of greater than .45 indicates that there is clearly a need for additional units to retain response time levels. If a UH:U is below .35, units may not be most efficiently used, but better response times can be expected. Many communities choose to aim for a UH:U in the .15 to .25 range for municipal EMS units, to balance productivity with good response times. If a unit has a UH:U of .40, it will not be available for the next call 40 percent of the time. This is, of course, an average over the course of the day.

The UH:U guidelines are based on EMS responses. Fire suppression UH:Us are usually lower, with no consensus on efficiency ratios.

To develop an effective resource deployment plan, units must be available to respond to incidents most of the time. No amount of resource placement planning will improve system-wide response times if the responding units are not available.

³⁶ Evans, B. and Dyar, J. (2010). *Management of EMS*. Upper Saddle River, NJ: Pearson.

To calculate the EMS UH:U for Traverse City, we took the 2019 response rate of 2,367 calls divided by two full-time units = 1184 average calls per year, x one hour per call (estimated) /8760 hours per year = a UH:U of 0.14. TCFD's predicted UH:U should be just under the desired level, bordering on the moderate range. By 2023 the average call volume for each ambulance is estimated at 1,217 = a UH:U of 0.15 clearly falling into the moderate level.

Considering the above elements justifies TCFD providing two full-time EMS transport units. Two units would keep expected responses in the moderate range, allowing personnel to continue their dual role/cross-trained status.

Consideration 8: If it elects to proceed with emergency EMS transportation, the TCFD should consider providing the service with two units, one assigned to each station.

Depth of Response: There could be times when even with two full-time units, additional simultaneous calls or multiple patient incidents will occur, but with two units the expected workload and response times would likely be reasonable and meet current standards.

Traverse City is fortunate that there is great depth of response within and external to the TCFD. Internally, all but two personnel are licensed paramedics and one unit at each station, except for the airport vehicle, are paramedic equipped. When the primary EMS transport unit is out of service, the primary fire units would be able to provide EMT care at a minimum and often paramedic care while on scene.

The external depth is provided from automatic and mutual aid agreements between the TCFD and neighboring departments. Table 9 shows the current automatic and mutual aid EMS agreements.

Table 9. EMS Automatic and Mutual Aid

Jurisdiction	Level Available	Additional
Blair Township	ALS-Transport	Contract with North Flight North Flight would provide paramedic
Paradise Emergency Services	EMT-Transport	
Peninsula Township Fire & EMS	ALS-Transport	
Elmwood Township	EMT-Transport	
Grand Traverse Metro Fire Authority	EMT non-transport	
East Bay Township EMS	ALS-Transport	
Greenlake Township Fire and EMS	ALS-Transport	

It would be unreasonable to expect that North Flight EMS could be entirely dropped from the picture. To assure continuity of EMS care, a mutual aid agreement with North Flight EMS would be necessary. With North Flight or any other mutual aid agreements, call assignments should

continue to be based on closest unit response as determined by the Grand Traverse County 911 Center.

Consideration 9: If Traverse City decides to provide primary EMS transport, it should consider revising the automatic/mutual aid agreement with North Flight EMS.

Personnel Needs: There is no definitive answer to the number of additional EMS providers it would take for the TCFD to provide two paramedic transport units. We analyzed the type of responses, weight of response and EMS provider collateral duties. Currently, TCFD staffs three career (full-time) personnel at Station 1 and two at Station 2. One additional firefighter with ARFF qualifications is assigned to the Traverse Regional Airport on a rotating basis. Two personnel at Station 1 are assigned to Rescue 1 while others are assigned to Engine 1. As needed, these personnel may rotate to the Ladder Company. Station 2 personnel are assigned to Engine 2. The airport firefighter is contractually provided by Traverse City. The airport unit is provided by the Airport. This contract is subject to renewal. Figure 20 displays Engines 1 and 2.

**Figure 20. Engine 1
(below)**



(above) and Engine 2



TCFD field personnel work on one of three shifts, using what is called a modified 24-hour shift with specific rotations. To provide current service levels, the TCFD must have a minimum of six personnel on duty. This includes a captain at Station 1 and three firefighters, at least two being paramedics. Station 2 must have a lieutenant and one firefighter, at least one being a paramedic. An additional firefighter for the airport is required to be ARFF qualified and EMT licensure

(paramedic not required). Overtime may be needed occasionally to fill gaps in schedules from unforeseen absences.

Staffing Factor: Table 10 shows the current staffing factor (number of personnel needed per on duty position) based on personnel data. Staffing factor is based on:³⁷

- Vacation Hours

Table 10. Current Staffing Factor Computation per Shift

- Comp Hours
- STL Hours
- Add STL Hours
- Bereavement Hours

The department must have 21 operations personnel, with seven assigned to each crew and six on duty to meet the current staffing minimums. Two people on each shift are allowed off duty on vacation, or compensation time. If two are off for any reason, the shift is covered by overtime. This staffing does not provide for anyone off on long-term illness or injury. This all means that on most shifts, overtime (sometimes mandatory) is required, or the fire marshal, training officer, or fire inspector must cover an open position.

Basis	Numbers
Hours	24
Crews	3
Days Needed	365
AVG Work Week	56
Hours per Emp	2912
Hours Away	388
Total Actual	2528
S/F (Staffing Factor)	1.15
Min Staff	6
Needs	6.9
7 24-hr Fire/Para	\$859,635

Table 11. Staffing Factor Computation for Eight Firefighters Per Crew

It will take at least two additional firefighter/paramedics on each shift to staff two EMS transport units. This includes two on each transport unit, leaving two back to staff the suppression piece. Table 11 shows the necessary change to the staffing factor.

This would mean that eight operations personnel would be needed to be assigned to each crew. The .20 fraction means that premium pay would be used on 20% of the crew days. Since the fraction is below .25, premium pay becomes less expensive than adding personnel. To begin providing two full-time EMS transport units, the

Basis	Numbers
Hours	24
Crews	3
Days Needed	365
AVG Work Week	56
Hours per Emp	2912
Hours Away	388
Total Actual	2528
S/F (Staffing Factor)	1.15
Min Staff	8
Needs	9.2
9 24-hr Fire/Para	\$1,132,497

³⁷ Provided by the Traverse City Office of Human Resources

TCFD would have to hire six additional firefighter/paramedics.

Additional Staffing Considerations: During the time that either Rescue 1 or Rescue 2 is not available, there are not enough on-duty personnel to guarantee the necessary *two-in, two out* fire crew needed to meet the standard for firefighter safety on an interior attack. Currently, if Rescue 1 is unavailable, it is usually back in service within a few minutes. When a Rescue unit provides transport, it will likely raise the unavailability time by at least 40 minutes. If either Rescue is unavailable, there would barely be enough on duty personnel to provide entry into a live fire. If both Rescues or 1 Rescue and 1 Engine are unavailable, there would not be enough on-duty staff to provide for the minimum two-in, two out fire crew to provide fire attack.

There is another option to consider that would

alleviate the above challenge. Station 2 could be staffed with two firefighter/paramedics for Rescue 2 and two for Engine 2. That would allow Engine 1 to be staffed with two personnel on Rescue 1 and two on Rescue 2. Currently, when Rescue 1 is providing service, only one firefighter is left to cover the Engine. This means that another call in Station 1's district would require the response of Engine 2. Table 12 provides the staffing factor needed. This option would increase the daily minimum staffing to nine. Table 12 shows the staffing factor for nine personnel. The number is based on a staffing factor of 10.35. Once the staffing factor fraction is above .25, we consider moving up to the next employee. Using the exact factor would create premium pay overtime on at least 35% of each crew day.

Table 12. Staffing Factor for Nine Per Crew

Basis	Numbers
Hours	24
Crews	3
Days Needed	365
AVG Work Week	56
Hours per Emp	2912
Hours Away	388
Total Actual	2528
S/F (Staffing Factor)	1.15
Min Staff	9
Needs	10.35
11 24-hr Fire/Para	\$1,384,174

Table 13 shows the annual cost for each firefighter position and the cost for one additional captain as recommended earlier.

Table 13. Cost for Additional Firefighter/Paramedic Positions³⁸

Position	# Positions	Base Wage	Act 345 Pension	Other Fringes	Total Per Position
Firefighter	1	\$68,808	\$38,694	\$18,332	\$125,834
EMS Captain	1	\$96,808	\$47,457	\$19,352	\$163,617

³⁸ Bosley, K. M. (2019, December 23).

Table 14 provides the total cost for TCFD upgrade to two full-time EMS transport units.

Table 14. Annual Additional Personnel Cost for Upgrading to Two Transport Units (7 or 9 minimum staffing)

Position	Base Wage	Act 345 Pension	Other Fringes	Total
6 new FF/PM (9 min min staffing	\$412.28	\$230.19	\$175.00	\$817.47

)				
1	\$	\$	\$	\$
1	7	4	2	1
	5	2	0	,
n	6	5	1	3
e	,	,	,	8
w	8	6	6	4
	8	3	5	,
F	8	4	2	1
F				7
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The estimated total human resources cost for the proposed upgrade is **\$755,004 to \$1,547,791**. Table 15 explains the choices for upgrade.

Table 15: Choices for Human Resources Costs

Choice	Costs	Total
9 Minimum Staff	\$755,004	\$755,004
9 Minimum Staff plus EMS Captain	\$755,004 + \$163,617	\$918,621

11 Minimum Staff	\$1,384,174	\$1,384,174
11 Minimum Staff plus EMS Captain	\$1,384,174 + \$163,617	\$1,547,791

Human Resources Issue-Who to Hire, EMTs or Paramedics? An important human resources issue is whether to require new firefighters to obtain EMT or paramedic licensure prior to employment. This variable does not have an obvious answer. Some considerations:

- Does the local and regional labor pool produce enough EMS providers to sustain this level of hiring?
- Are the costs for paramedic hires worth the additional investment of \$10,000 each?
- Are there advantages to staffing a transport vehicle with one paramedic and one EMT versus two paramedics?
- Is having too many paramedics overkill and negatively affecting care/skill levels? If there are too many, there may not be enough cases to ensure proficiency. For example, one study found that only “1.4% of all EMS activations (6.2% of paramedic responses) involved at least one advanced airway procedure attempt.”³⁹ In King County, Washington, paramedics are required to place 12 endotracheal tubes annually to maintain proficiency. This requirement has been correlated to a higher success rate.⁴⁰ It is uncommon for paramedics from smaller communities to have this much field experience with intubation, and thus there may be some disadvantage to staffing with two paramedics.⁴¹

Paramedic Resources in Northern Michigan: The Northwest Michigan College in partnership with the Munson Regional EMS offers an Associate in Applied Science Degree with a concentration in Paramedic (AAS-Paramedic). This is a standard 60 credit program that takes two years to complete. Some applicants with previous college credits may finish the program within a year. Those who obtained EMT training within Michigan may be eligible for a fast track program that significantly reduces academic time requirements.⁴²

³⁹ Preeker, M.E., Kwok, H., Shin, J., Carlom, D., Grabinsky, A., & Rae, T. D. (2014). The process of prehospital airway management: Challenges and solutions during paramedic endotracheal intubation. *Critical Care Medicine*, 42(6), 1372-1378. Retrieved from doi: [10.1097/CCM.0000000000000213](https://doi.org/10.1097/CCM.0000000000000213)

⁴⁰ Rea, T. D. (2020). Seattle and King County setting standard in prehospital ETI. *Journal of Emergency Medical Services*, 2(36), <https://www.jems.com/2011/01/31/seattle-and-king-county-settin/>

⁴¹ Shotwell, D., Merlin, M. A. and Robbins, V. D. (2018). Ambulance Crew Configurations: Are Two Paramedics Better Than One? JEMS. URL: <https://www.jems.com/2018/10/08/ambulance-crew-configuration-are-two-paramedics-better-than-one/>

⁴² Northwestern Michigan College. (2019). *Paramedic Program Requirements*. URL: <https://www.nmc.edu/programs/academic-programs/paramedic/catalog.html>

There are 11 additional paramedic training programs at colleges and universities throughout Michigan. It is unknown how many personnel complete training, certification, and licensure each year. Paramedic training costs range from \$1,100 to \$10,000 depending on where the program is taken, and if room and board are needed.⁴³

Two Paramedics vs One Paramedic/One EMT: The literature and professional opinions are mixed concerning which crew configuration is best. From a medical standpoint, there does not appear to be a significant difference in patient outcome with one versus two paramedics on a call. The two-paramedic model does result in more successful IV and advanced airway successes.⁴⁴ Whether this affects patient outcome is still unknown.

Financially, it is less expensive to deploy one EMT/one paramedic versus two paramedics, but the savings is only about two percent.⁴⁵

As a smaller department that is dependent on an all-career staff, versatile employees are a priority. Allowing some members to avoid paramedic training or to drop their licenses throws the burden onto others. In larger organizations, there is more leeway, but not here.

Consideration 10: Consider requiring all TCFD staff assigned to operations to maintain their paramedic license.

Recruiting: Recruiting of new employees deserves special attention. The days of the 1980's when there were plenty of candidates applying for fire department jobs are over. Like private industry, public safety recruitment must become more aggressive.

Paramedic Recruitment

The ability to recruit paramedics or paramedic candidates is a nationwide challenge that has no simple answers. Some fire-based EMS systems, especially small and medium sized ones, believe that all firefighters hired should already be licensed and credentialed paramedics, because it takes less time to train a paramedic to be a firefighter than a firefighter to be a paramedic.

- Paramedics have already demonstrated significant academic abilities that may better predict success in other emergency services subjects.
- There is quicker hiring to street time for those already certified or licensed as paramedics.

⁴³ Paramedic Training *Sport*. (2019). *Paramedic Training in Michigan*. URL: <https://www.paramedictrainingspot.com/paramedic-training-in-michigan/>

⁴⁴ Shotwell, D., Merlin, M. A. and Robbins, V. D. (2018). Ambulance Crew Configurations: Are Two Paramedics Better Than One? JEMS. URL: <https://www.jems.com/2018/10/08/ambulance-crew-configuration-are-two-paramedics-better-than-one/>

⁴⁵ Ibid.

In the past, word-of-mouth, simple recruiting posters, media announcements and similar local recruiting methods were the only recruitment methods needed. Fire-based EMS is now competing for talent, and TCFD must use more proactive strategies and tactics to recruit certified and licensed candidates that meet expectations. Recruiting at paramedic training programs, recruitment of those who complete clinical training in Traverse City, and recruiting booths at EMS professional events outside Traverse City should be considered.⁴⁶

Successful recruiting will require additional human resources and financial investment. In other professions, human resources managers spend up to 33 percent of a prospective employee's first year salary on recruitment and the on-boarding process. Investment to this extent may not be possible, but recent experience nationwide points to the need for aggressive recruiting. In the current market, there is no place that is off limits or no market that should be considered untouchable. The City Office of Human Resources should be a front-line player in this effort. One suggestion is to keep the application period open and simply select a date for new hire processing. This small step allows the department to get potential new hires started in the process year-round. Another suggestion is allowing paramedic clinical ride-a-longs for the TCFD.

Other non-traditional recruiting methods include:

- Use of job boards including Zip Recruiter, Google, Indeed, National Labor Exchange, and similar. Assure that HR can remotely turn on and turn off the sites;
- Use virtual interviews to decrease time to hire;
- Completing in-person activities within one day.⁴⁷

Getting potential fire/EMS employees to relocate is difficult but not impossible. An advantage for the fire service includes salary, benefits, and work schedule. This is a nationwide issue that affects all areas of the country.

Consideration 11: Consider investing the resources needed to continue recruiting certified and licensed paramedics into the department.

⁴⁶ Evans, B.E., & Dyar, J.T. (2010). *Management of EMS*. Upper Saddle River, NJ: Pearson.

⁴⁷ On-Shift. (2020, August 25). *The state of the workforce in EMS*. On line seminar.

Union Cooperation: The IAFF Local 646 representing rank and file employees can play an important role in the successful transition to EMS transport if that path is chosen. Our interaction with union officials was positive, and it seemed that the employees have a great interest in becoming the primary EMS provider including transport. While labor does not have veto power over management rights, cooperation helps smooth the transition. As with every new venture, there are obvious elements for the union to consider, such as the ability to keep jobs, expected significant increases in salary, and pension protection. In this case, we believe that the Union's support is genuine and while some benefits are expected, their support is not conditional. Labor groups in some municipalities have little interest in EMS or make support conditional to high demands. Fortunately, this does not appear to be an issue in Traverse City.

EMS Education and Training: Department education and training (including EMS training) is directed by a lieutenant who works a 40-hour week. EMS responsibilities include teaching, overseeing continuing education contract with North Flight, EMS instructors, assuring the annual completion of blood borne and HIPPA training, and overseeing the Target Solutions on-line continuing education programs. The training officer is assisted by the Training Committee consisting of four lieutenants, three fire instructors, three Michigan-certified EMS-ICs, and other instructor-trainers.

Paramedics are required to obtain 45 hours of approved continuing education every three years. Table 16 shows the required continuing education.

Table 16. Required Paramedic Continuing Education (every three years)

Subject	Hours
Seven 2-hour CE medical director-approved Paramedic topics	14
Five CEs in Pediatrics	5 ⁴⁸
One Operations CE in Emergency Preparedness	1
Twenty-Five elective hours	25
CPR, ACLS, ITLS, and PALS must be completed within the 45-hours.	Total-45 hours

EMS Vehicle and Equipment Costs: Costs for EMS equipment include start-up and maintenance costs. The Traverse City Garage Superintendent estimated that purchasing two new EMS transport vehicles, stocked with basic and advanced hardware will cost between \$225,000 and \$250,000 each. Major equipment includes:

⁴⁸ One Pediatric must be a Training Officer led in-person Pediatric skills class.

- Cardiac Monitor/Defibrillator/Pacemaker: \$38,000⁴⁹
- Ambulance Stretcher with Lifting Device: \$32,000
- Lucas Mechanical CPR Device: \$17,400
- Startup medical supplies: \$3,000 to \$5,000⁵⁰

Each vehicle is expected to provide 13,000 engine hours within an 8- to 10-year period. Annual maintenance costs, including tires is \$5,000. Warranty work is usually done in-house, and the City is reimbursed by the factory (Personal Communications, Garage Superintendent David Courtad, November 2019). The current rescue unit is a Ford F450 and is providing good service. We are concerned about the time it takes to specify, order and receive a new unit. The Garage Superintendent is convinced that units could be purchased and readied within two months of ordering. Although this is possible if a rush order is needed, in a non-urgent setting, four to six months is a reasonable target.

Fire Station Readiness: During our visits, we made a cursory inspection of both fire stations. While not a complete architectural assessment, we looked closely for the ability to house units, quarter personnel, and provide appropriate washing and restroom facilities. Both TCFD stations need upgrade and repair.

Station 1: Station 1 (Figure 21) already houses an EMS transport unit so there will be no problem continuing to house a unit there. The station does need an upgrade of sleeping quarters and lavatory facilities. Modern firehouses have installed separate sleeping quarters for men and women. Many have individual sleeping rooms. Lavatory and shower facilities should be segregated by gender. These upgrades are necessary even if there are

no changes in
response profile.

Figure 21: Traverse City Fire Station 1



⁴⁹ At this time Traverse City

⁵⁰ Parker, P. J. (2016). *Grand Traverse Metro Emergency Services Authority: EMS Transport Study*. p. 7. This additional cost is also included to cover unexpected changes in treatment protocols.

Station 2: Station 2 (Figure 22) is in greater need of upgrade than Station 1. Recently, a new shed was placed on Station 2's property. Equipment could be moved and a new Rescue could be housed in Station 2.

Figure 22: Traverse City Fire Station 2



There are no women currently employed by the department. The only recent one retired. When departments take on an increased EMS role, there tends to be greater interest by women in the job. Expanding into transport would benefit recruiting of personnel and better community representation. Having upgraded sleeping and lavatory facilities is likely to make women employees or those potential employees more comfortable in making Traverse City their choice.

Consideration 12: The TCFD should consider upgrading both stations to modernize facilities for staffing, including facilities for women.

Financial Benefits: Although the city is unlikely to financially profit from becoming the primary EMS transport provider, there is a reasonable expectation that much of the expense would be covered by transport revenues.

There are several reasons that it is difficult to cover all expense or even profit from EMS transport service.

- In communities with large senior populations, much EMS reimbursement comes from Medicare, with supplementation from Medi-Gap or out of pocket payment. Medicare pays for 80 percent of EMS transportation based on what they consider the reasonable and customary rate. Traverse City can bill patients for the outstanding 20 percent balance.

They cannot bill for the uncovered part. For example, if Traverse City sets its rate at \$750 for a transport, and Medicare has judged the reasonable and customary rate to be \$400, the city would get 80% or \$320 from Medicare, and could only bill for the 20% of the Medicare-approved amount, or \$80. The additional \$350 must be written off.

- Most private insurance providers, including full payors or Medi-Gap, have aligned their reimbursement policies with Medicare. They require the provider to accept their assignment or collect from the patient and require the patient to bill the insurer for reimbursement.
- Reimbursement for non-transport is very limited for a 911 EMS transport service.
- On many occasions, EMS crews will assess and treat a patient, sometimes with advanced skills, only to have the patient refuse transportation. EMS agencies are usually not reimbursed by Medicare in this case.
- This federal reimbursement policy is anachronistic, coming from the 1960's and 1970's. Requiring patient transportation to get any Medicare reimbursement stimulates unnecessary transports which are not good for the patient and creates a burden on the emergency department and the healthcare system. Federal and state agencies are working to change this, but change comes slowly. Programs are being initiated to provide reimbursement for *treat and release* or *alternate transportation* (urgent care centers, specialty health centers, and doctor's offices) programs. These changes are slow in materializing and the city should not count on them to occur anytime soon.
- Although Traverse City has a limited Medicaid population, those qualifying for Medicaid often need emergency care and become high frequency users of transportation. Medicaid reimbursement is very low and will not cover expenses.
- Collection rates tend to be about 70 percent of billings. Collecting your own EMS bills is a risky enterprise, and often not efficient. The rules and regulations for Medicare generally follow the same guidelines as for other healthcare providers. In the first week of 2020, the Center for Medicare Services levied its first EMS agency fine of \$60,000 for HIPPA violations. Mistakes in EMS billing are considered fraud unless the agency can show how the mistake was not purposeful. As of 2018, EMS services must detect and return any Medicare overpayments or be considered in violation. There have been medical providers who have been fined, debarred, or even criminally charged for violations.

Traverse City currently collects for its limited transport role. In 2019, the City contracted with North Flight to collect the EMS bills for 64 transports. If the TCFD becomes the primary EMS provider, this will increase to approximately 2,367 bills, with collection on approximately 1,600. This will likely require renegotiation with North Flight.

Consideration 13: If TCFD becomes the primary EMS provider, it should consider — getting a competitive bid for providing ambulance billing and collection services. —

Expected Return on Investment (ROI): It is difficult to provide precise ROI forecasts because we were not provided access to the exact payor mix. In communities with a large senior population, government reimbursement expectation (Medicare/Medicaid) should be about 50-60 percent. Other government reimbursement programs will be a very small portion of reimbursement. Military Insurance (TriCare) may account for up to 10 percent of services. Approximately 20 percent of revenue (excluding the Medicare copay revenue) should be expected from insurance providers. About five percent of customers might be cash customers.

To estimate ROI for providing full transport, we used the 2019 TCFD EMS call level of 2,367. We estimated that one-third of calls will not produce a patient transport. Of the 1,578 patient transports expected, we used the 2019 Medicare rate plus loaded mileage allowance to determine reimbursement levels. Table 17 shows the estimated 2019 based ROI.

Table 17. Expected Return on Investment Based on 2019 Data (N = 1,578 Transports)

	Transports	Medicare Allowance	Mileage rate	Total Per Call	Sub Total
BLS	710	\$368	\$46	\$414	\$293,655
ALS-1	710	\$437	\$46	\$483	\$342,626
ALS-2	158	\$635	\$46	\$681	\$107,447

The billing total would be about \$744,000. Of that, it is reasonable based on past experience elsewhere to predict a 70 percent collection rate. Some communities have a slightly higher collection rate while some, most urban communities, experience a lower collection rate. It will also cost approximately seven percent of collected funds for billing services. Table 18 shows the actual collection forecast.

Table 18. Estimated Funds Collected Based on 2019

Billing	Gross Expected Collections	Collection Costs	Net Collections
\$743,728	\$520,610	\$36,443	\$484,167

A conservative estimate shows that Traverse City would receive about **\$484,000** to offset its expenses for adding transport.

If Traverse City becomes the primary EMS transport agency, it will require an initial investment of **\$1,204,904 to \$2,047,712**. The initial investment would cover personnel, vehicles, equipment, and other incidentals. Table 19 shows the initial investment forecast.

Table 19. First Year Investment Cost

Investment	Explanation	Cost
Additional Personnel	Six to 11 new personnel	\$755,004 to \$1,547,791
Vehicles-Stocked	One or two new Rescue vehicles	\$450,000 to \$500,000
Total		\$1,204,904 to \$2,047,712

Reimbursement expectations would only reach 25-50 percent of first year costs. The return on investment should increase after the first year because technological and vehicle expenses will be reduced.

There are options to consider for phasing in transport.

Option 1. An Alternative for Adopting Primary EMS: Instead of jumping straight into becoming the primary EMS transport agency, the city can phase it in. This alternative would include assuming some of the primary transport responsibility now but deferring a full takeover until a time designated by city leaders. Implementing a phase-in plan will spread out the expense of an immediate takeover, while giving Traverse City time to further evaluate the process. The improvement in response times should be quickly noticed. The phasing in might be as follows:

Phase 1: The Traverse City Fire Department would become responsible for primary EMS transport utilizing Rescue 1, and North Flight would be considered the secondary provider. Phase 1 could be accomplished by raising the minimum staffing to seven, providing two firefighter/paramedics for Rescue 1, two firefighters for Engine 1 (one captain, one firefighter), two personnel for Engine 2 (one lieutenant and one firefighter) and one firefighter (ARFF qualified) for the airport. At a very minimum, this would require a staff of seven, the same as at present.

In most cases Rescue 1 would handle transport in both Station 1 and Station 2's territory, with North Flight being the back-up. In cases where North Flight or other mutual aid units are closer, they would be assigned the call. Station 2 would continue providing paramedic first response and Station 1 and Rescue 3 (Airport) would continue providing EMT first response.

Before starting Phase 1, an EMS billing contractor should be selected, and a contract signed. Implementation of Phase 1 could occur within three to six months of inception.

The advantages of Phase 1 include:

- Since Rescue 1 is already in-service, the plan can be quickly implemented.
- There are no upgrade costs to the current unit or equipment.

- There are enough licensed paramedics to carry out this option.
- Only minor changes in dispatch protocol are needed.
- North Flight could shift resources to provide better coverage to other areas.
- The expenses of total upgrade could be spread over time.

The disadvantages of Phase 1 include:

- This could be interpreted by the community and departments as a lack of commitment to adopting full primary EMS transport responsibility.
- Once this occurs, retreat would be possible but politically unpopular.
- North Flight EMS must be willing to support this plan.
- The availability of Rescue 1 could be reduced due to its increased transport activity.

Phase 2: During Phase 2, Traverse City would increase staffing, upgrading stations and 2 EMS vehicles to be ready for full implementation of primary EMS transportation. Actions would include the readying of Station 2, upgrade of Station 1 and Station 2 sleeping quarters and lavatory/shower facilities, specification and purchase of two new EMS transport vehicles. This phase can begin simultaneously with Phase 1 or during Phase 1 after a decision is made to continue with a full implementation. Phase 2 should be completed within 12 to 18 months of implementation.

Phase 2 would also include the increase of staffing. Decisions concerning minimum staffing could be evaluated with the best choices being made that effect the entire TCFD functions.

The advantages of Phase 2 include:

- Implementation can be deliberate, assuring that all aspects throughout the implementation are considered.
- Implementation costs can be controlled by having more time to purchase necessary equipment.
- This allows any unexpected problems found in Phase 1 to be corrected.
- Allows for human resources costs to be spread out over time.

The disadvantages of Phase 2 include:

- May not reflect a commitment to the outcome.
- May provoke further delays in the planning process.
- North Flight may not support the long phase-in time.

Phase 3: During Phase 3 all plans will have been completed and the complete program will be implemented going forward. This includes finalizing human resource needs, fire station upgrades, new EMS units ready for service, and new automatic/mutual aid agreements finalized. The TCFD will be the primary EMS provider for Traverse City.

The advantages to Phase 3 include:

- Everything needed will be in place before the phase-in will be declared complete.
- Possible negative consequences can be identified and mitigated before an unwise investment involving service or finance is made.

The disadvantages to Phase 3 include:

- Taking long to complete the project.
- Several opportunities for prolonged delay.

From the viewpoint of providing the best EMS, Traverse City would commit to immediately becoming the primary provider for the city. But the alternative of using a phase-in process seems an acceptable option.

Option 2. Reimbursement for Non-Transport First Response EMS: Traverse City receives little reimbursement for EMS first responder services. The TCFD provides Paramedic response (Medic 1 or Engine 2) or EMT response from Engine 1 or Rescue 4 (airport). While Rescue 1 can do EMS transport, it rarely does (< 3 percent of its total calls).

Providing EMS first response with paramedics provides many advantages.

- Traverse City residents and visitors are provided timely care by highly qualified professionals.
- The TCFD is staffed by multi-discipline professionals that provide a variety of services with relatively few people, which enhances their job satisfaction.
- North Flight EMS enjoys an economy of scale because it can staff fewer EMS transport units. Rapid EMS first response reduces stress on the system because rapid care is available.
- Provided that the agency holds the appropriate MI license, there are no restrictions to charging for first responder EMS. The only mention of fee was found in MI Section 333.20941, Public Health Code (Excerpt), Act 368 of 1978, Section (7)
- A medical first response service shall provide life support consistent with its license and approved local medical control authority protocols to all patients without prior inquiry into ability to pay or source of payment.

The points above were confirmed by the Michigan DHHS Bureau of EMS.⁵¹

Some disadvantages of the current EMS first response profile include:

- The city receives little EMS remuneration for the services it provides.
- Insurance payors rarely provide remuneration for EMS first response.
- Some believe that the city is providing an outside vendor with unreimbursed city services.
- North Flight could choose to limit remuneration for EMS response to specific circumstances.

Besides charging for First Responder EMS services, there are other alternatives that can enhance the city's ability to cover costs for provided services. One is to charge an annual franchise fee to North Flight that would be paid regardless of the number of EMS first response calls made by the fire department. A second alternative is a charge per call based on the services provided. There would be a base charge for responding to a call. Additional fees would be added if a TCFD paramedic accompanies the transport unit to the hospital or if a TCFD employee drives the unit to the hospital. Table 20 describes a potential reimbursement model.

Table 20. Potential First Response Reimbursement Model

First Responder Activity	Fee	Expected Instances ⁵²	Potential Reimbursement
Emergency Response	\$150 per response \$100 if no patient or cancelled	1578 * \$150 777* \$100	\$236,700 \$77,700
Accompany Patient	\$150 per case	Up to 158* \$150 ⁵³	\$23,700
Driver Provided	\$75 per case	Up to 158*\$75	\$11,850
Non-emergency lift assist	\$150	100*\$150	\$15,000

The potential reimbursement for TCFD EMS first response is \$341,250 to \$353,100. This is based on the current response profile. The EMS provider will likely negotiate payment only for mandatory calls identified based on medical priority dispatch.

Many cities believe that providing EMS first response (initial non-transport EMS response) is a moral obligation, part of assuring public safety. Some municipalities provide EMS first response to offset any franchise supplement claimed by a private EMS Transport provider. In 2020, these arguments both fail for several reasons. Private or private intended for public use agencies

⁵¹ Personal Communications, MI DHHS Bureau of EMS, Derek Flory, Life Support Agency and Vehicle Licensing Coordinator, August 21, 2020.

⁵² Based on 2019 call level of 2355.

⁵³ Based on projected Medicare ALS-2 level. TCFD would provide either paramedic or driver.

(private agency contracted to provide EMS for a public entity) often claim that private EMS is cost efficient. Non-public agencies have better control of costs and efficiencies. When a municipality requires a franchise fee or fees to make up for uncollectable services, it admits that their efficiency model is faulty. When municipalities provide EMS first response, the financial beneficiary is the EMS provider, not the patient or the city. The municipality is providing services to a vendor. Unless legally obligated to provide such service, it may be a questionable practice.

Even if Traverse City decides not to assume primary EMS transport, it is reasonable to pursue reimbursement for EMS first response costs. In-kind services such as training could be substituted for all or part of the reimbursement.

Consideration 14: If Traverse City decides not to pursue primary EMS transport responsibility, it still might consider seeking reimbursement for EMS first responder services. Otherwise it stabilizes and “packages” the patients, then turns them to the transport agency which collects all the money for the call.

Option 3. Keeping the Status Quo: Whenever a change of this magnitude is considered, municipalities must ask the question “What if we make no changes?” Some of the reasons for keeping the status quo include:

- At this time, we cannot conclude that there is an imminent threat to public safety if the status quo is maintained.
- Traverse City and the TCFD have plans to continue current services.

However, we do see some warning signs that, without intervention, could lead to a future threat (See Figure 18).

Between 2014 and 2019 the North Flight 90th percentile response times were considerably above the contracted time of 9:00 from Dispatch to Arrival at Location. There appears to be no enforcement of the contracted requirements.

- North Flight may be shifting priorities. It operates a robust EMS program that includes 911 response, inter-hospital emergency and nonemergency transports, and nonhospital nonemergency transports. Collection of fees for 911 emergencies is universally poorer than for other transports. Combined with difficulty in finding qualified employees, North Flight could shift their resources to inter-facility services and non-emergency services.
- Instead of North Flight shifting its services, they could attempt to ask the city for a franchise fee to mitigate losses. We explained the franchise fee situation above.

- North Flight EMS is required to give Traverse City a 120-day notice before suspending services. This is inadequate for taking over citywide EMS and could result in an imminent threat to public safety.
- There is no Annex in the Grand Traverse County or Traverse City Emergency Plans addressing loss of an essential service as a community emergency.

The above cautions are not meant to imply that North Flight EMS is planning to take any action detrimental to the citizens of Traverse City. These cautions are possibilities that any EMS system of similar design must be prepared for. If Traverse City decides to operate its EMS system under the status quo, we suggest considering the following.

Strict Contract Enforcement: The negotiated agreement between Traverse City and North Flight should be more strictly enforced. Contract violations should be met with penalties up to and including contract nullification. Late responses should include significant monetary penalties. These penalties are intended not for financial gain but rather as an incentive for North Flight to provide Traverse City residents and visitors the level of care promised.

Cities like Rochester, NY and Arlington, TX have placed the fire chief in charge of enforcing the EMS transportation contract. The Fire Chief can meet with North Flight to review North Flights Plan for improving compliance.

Consideration 15: Consider strictly enforcing the EMS contract with North Flight. Contract enforcement should be the responsibility of the TCFD fire chief or EMS officer.

North Flight Reprioritization of Services: System efficiency and economic stability are important factors for EMS agencies. Since North Flight represents part of a larger EMS system, they are not immune to reprioritization. North Flight should be encouraged to

Consideration 16: North Flight should share, in a timely manner, any reprioritization plans that could affect Traverse City

share any EMS reprioritization plans on a timely basis.

Emergency Plan Annex: There are many municipalities that use an outside vendor of some type to provide EMS transportation. Most municipalities work well with their vendors. Occasionally, whether due to finances, labor issues, Medicare debarment, or other legal issues, these vendors are subject to full or partial failure. This type of occurrence could place Traverse City citizens in jeopardy.

There are two methods to reduce these risks. First, make sure that county and city emergency plans include an annex describing a plan for failure of the current ambulance service. Second, ensure that any contract with outside vendors includes a provision for a

Consideration 17: Assure that the county and city emergency plans include an annex for ambulance service failure.

bond or irrevocable line of credit of up to \$1,000,000 to offset implementation costs.

A Plan for Implementation

This section contains a plan for implementing primary EMS transportation if full implementation is adopted, and a phase-in plan if full commitment is deferred.

Initial Actions: Upon approval of the Traverse City Commission, the City Manager may direct the fire chief to take the following actions:

- Notify Grand Traverse County, The Grand Traverse County 911 Center, Grand Traverse County Fire and Rescue companies of Traverse City's intent.
- Provide notice to Northwest Michigan EMS Medical Control Board and the EMS Medical Director that TCFD will be providing primary EMS transport status within the City of Traverse City. This should be a formality since TCFD is already approved as an Advanced Life Support agency.
- Conduct a planning meeting with North Flight EMS to notify it of TCFD's intention and determine steps needed by both organizations.
- Utilize existing department workgroup to be chaired by a captain. The fire chief shall designate the workgroup assignments including a start and set dates. These work group assignments should include:
 - **Operational Integration** includes recruiting, retention, updated Standard Operating Guidelines (SOG). and the operational steps needed to complete the upgrade. The TCFD training lieutenant should be part of this workgroup. The Traverse City Office of Human Resources should also have representation on this workgroup.
 - **Dispatch and Medical Priority Dispatch** will prepare requests for dispatch modification procedures and help increase the MPDS efficiency. This workgroup is also responsible for determining what information technology upgrades are needed to adopt primary EMS transportation. The Grand Traverse County 911 Center should have representation on this workgroup.

- **Vehicle and Equipment Committee** will determine vehicle and specifications for new EMS units and hardware. This should include a timeline for having these specifications approved by the fire chief and submission to city leadership. The Traverse City Office of Garage Maintenance should have representation on this workgroup
- **Station and Building Upgrade** will determine a plan for any needed upgrades to TCFD fire stations. After identification, the workgroup should submit a plan to the fire chief. The Traverse City Office of Engineering should have representation on this workgroup.
- Assign individuals to research possible grant opportunities to assist with funding of implementation

In addition, the City Manager should appoint an Executive Oversight Workgroup with the primary purpose of assisting the other workgroups in accomplishing their mission. This includes any human resources, equipment, or other resources needed for completion. The Executive Oversight workgroup could include the fire chief, a representative from the Office of Human Resources, a representative of the City Planner, the Assistant City Manager, and a representative from IAFF Local 646.

The Executive Oversight Group should act as facilitators to assist the other workgroups in meeting their needs. It should also assure that actions needed are aligned with goals and objectives of the City Commission. This group should not act as an obstruction to the process. Anyone not committed to the accepted plan to implement this change should not participate in any of these workgroups.

Each of the workgroups should have their objectives met within six months of assignment. Single steps should be accomplished as finished.

Charting the Course Toward Implementation: The course toward implementation should be started soon after initial actions commence. Traverse City is fortunate that it can choose to begin primary service quickly or wait until everything is in place. While waiting to dot the i's and cross the t's has advantages, there is always a fear that overdependence on process can stall progress. The course toward implementation might include the following elements:

- Rescue 1 can become the primary provider and North Flight could move into a secondary role. Traverse City will get a better idea of how providing primary EMS transportation will affect the department. Data collection should emphasize the effect of longer out of service times on vulnerability.
- The EMS Captain position should be filled and many of the implementation responsibilities should be shifted to this officer.
- Decisions should be made about staffing and hiring should begin.

- A final transition plan should be submitted to North Flight EMS.
- The 911 Center should finalize upgraded dispatch and priority dispatch procedures.
- Station upgrade plans should be completed. The budget should be submitted to the Executive Workgroup for approval.
- Vehicle and equipment specifications should be finalized, and a budget should be submitted to the Executive Workgroup for approval.
- The Operations Workgroup should have an EMS Quality Management plan ready to implement.
- Each workgroup should submit an evaluation to the Executive Workgroup.
- The Executive Workgroup should submit an evaluation to the City Manager.
- The Executive Workgroup will determine if additional actions are necessary or if there will be a change in goals and objectives.

All activities should be completed within one year. This is a maximum time as actions can be implemented as they are completed. Instead of waiting for every step to be completed, individual steps can be implemented as they are completed.

Towards Full Implementation:

- All programs and policies should be in place or ready to be implemented.
- Any projected delays should be documented, and an implementation time determined.
- The EMS captain will prepare and submit an EMS Operations Plan to the fire chief.
- Each station will have an EMS transport unit in the station.

Suggested Rate Schedule for EMS: Traverse City asked that we suggest a rate schedule for EMS transportation and other EMS services. Use caution in interpreting this information because very few pay the full charge. Medicare and most insurance companies have a rate schedule used to determine the reasonable and customary amount reimbursed. Most private insurers follow the Medicare schedule. Medicaid rates are determined by the state. Michigan reimbursement rates (like all other states) are very low. Traverse City has a limited number of Medicaid patients, making this a minimal issue.

Table 21. Combined Traverse City and Payor Insurance Reimbursement Rates

Service	City Suggested Rate	Medicare Rate ^{ab}	Medicaid Rate ^a
A0429-BLS Emergency	\$475.00 + \$13.25 per loaded mile	\$371.17 + \$7.96 per loaded mile	\$128.36 + \$3.92 per loaded mile
A0427- ALS 1 Emergency	\$600.00 + \$13.25 per loaded mile	\$440.76 + \$7.96 per loaded mile	\$230.26 + \$3.92 per loaded mile
A0433- ALS 2 Emergency	\$750.00 + \$13.25 per loaded mile	\$637.95 + \$7.96 per loaded mile	\$230.26 + \$3.92 per loaded mile

Paramedic Intercept	\$600.00 plus \$13.25 per loaded mile	\$405.97 + \$7.96 per loaded mile	\$230.26 +\$3.92 per loaded mile
First Response- Emergency	\$150.00	Not covered	\$128.36 ^c
Upgrade PM or EMT	\$150.00	Not covered	\$128.36 ^c
Lift Assist	\$150.00	Not covered	Not covered
^a Cannot balance bill the patient for full cost. ^b CMS pays 80 percent and provider collects 20 percent. ^c Although Michigan Medicaid has a rate listed, the MI Medicaid Handbook does not outline a procedure to allow for collection.			

IV. Consolidated List of Considerations

This is just a listing in one place of all the previous suggested considerations. It can be used as a checklist for future planning of EMS.

Consideration	Page
1 Consider working with Grand Traverse County 911 to institute a county-wide Automatic Vehicle Locator program that includes all units providing EMS in Grand Traverse County.	14
2 Consider asking the Grand Traverse County 911 Center to require North Flight EMS and any units working with the Greater Traverse County 911 Center to assure that their NUA status can be easily verified in real-time.	14
3 The TCFD should consider working closely with the Grand Traverse County 911 Center to develop a data management program that will assure access to authentic EMS data. Data should include incident type, 911 and dispatch times, locations, response time intervals (as per NFPA), and other data as designated by the Fire Chief.	24
4 Continue to monitor the dispatch to response times and try to determine why they are slowly increasing.	25
5 Consider measuring the time of arrival at patient.	27
6 Regardless of whether Traverse City adopts EMS transportation, the TCFD should consider maintaining the dual- role/cross-trained status for all personnel. Smaller departments usually benefit from multi-skilled employees who can fulfill multiple roles.	37
7 If the TCFD provides primary first response EMS transportation, it should consider adding a 40-hour fire captain to oversee the EMS program. Alternatively, a non-uniformed EMS manager could be considered.	41
8 If it elects to proceed with emergency EMS transportation, the TCFD should consider providing the service with two units, one assigned to each station.	45
9 If Traverse City decides to provide primary EMS transport, it should consider revising the automatic/mutual aid agreement with North Flight EMS.	45
10 Consider requiring all TCFD staff assigned to operations to maintain their paramedic license.	50
11 Consider investing the resources needed to continue recruiting certified and licensed paramedics into the department.	52
12 The TCFD should consider upgrading both stations to modernize facilities for staffing.	54
13 If TCFD becomes the primary EMS provider, it should consider getting a competitive bid for providing ambulance billing and collection services	55
14 If Traverse City decides not to pursue primary EMS transport responsibility, it still might consider seeking reimbursement for EMS first responder services. Otherwise it stabilizes and “packages” the patients, then turns them to the transport agency which collects all the money for the call.	61
15 Consider strictly enforcing the EMS contract with North Flight. Contract enforcement should be the responsibility of the TCFD fire chief or EMS officer.	62
16 North Flight should share, in a timely manner, any reprioritization plans that could affect Traverse City	62
17 Assure that the county and city emergency plans include an annex for ambulance service failure.	63
18 Consider amending the EMS contract with North Flight to provide the city with access to a \$1,000,000 bond or irrevocable line of credit that can be accessed if the ambulance defaults	63