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UNITY POINT HEALTH CITY OF FORT DODGE, IOWA EMERGENCY MEDICAL SERVICES STUDY

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# **CONSULTANT REPORT**

# Unity Point Health / City of Fort Dodge Iowa Emergency Medical Services Study

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# **EXECUTIVE SUMMARY**

Unity Point Health and the City of Fort Dodge, Iowa engaged Fitch & Associates earlier this year to analyze its Emergency Medical Services (EMS) System, identify improvement opportunities and potential models for optimizing the efficiency and effectiveness.

The overarching goal of this analysis was to analyze the EMS services provided by both Unity Point Health (TRMC EMS) and Fort Dodge Fire Rescue (FDFR). This includes reviewing operational and administrative capabilities and identifying future System options to enhance sustainability. The goals are; to preserve a high level of EMS response in the City and County, ensure capabilities to address patient transfers to tertiary care facilities, and minimize the fiscal impact to both entities. Furthermore, the System's performance was to be compared to industry best practices.

This report outlines key observations and corresponding enhancement opportunities that will position the EMS System to evolve with future changes in healthcare, address financial obstacles and ensure optimal pre-hospital delivery of care.

Key findings and recommendations of the analysis include:

- Both TRMC and FDFR have a dedicated staff providing Advanced Life Support/ALS (paramedic) level care for virtually all 911 responses, while rural county providers are largely volunteers providing a mix of First Responder and Basic Life Support/BLS transport services.
- Response times could not be validated or benchmarked to similar systems due to inadequate/incomplete data records. More than half the records provided contained missing data fields. Therefore, a valid geospatial analysis could not be competed.
- The 911 center is not adequately staffed, does not categorize calls based upon severity or provide pre-arrival instructions in accordance with standard 911 practices. Response times are not adequately tracked and do not use industry standard methods of measuring the 90<sup>th</sup> percentile of reliability.
- Although there is a single Medical Director for both entities, each ambulance agency functions at different levels with different treatment protocols and Quality Improvement processes.
- Over 36 specific improvement recommendations were made for this system. Almost all are process oriented and do not have significant cost implications.
- FDFR EMS provides a safety net for the community. However, further expansion of its EMS response will weaken the TRMC system, which also provides ambulance service throughout the region.
- Of the options reviewed by Fitch, implementation of a 28 E public/private partnership is the recommended way forward. It offers independent system-wide governance, future operational flexibility, and has the potential to stabilize system finances despite a changing and challenging reimbursement environment.

# METHODOLOGY

Review of the TRMC Ambulance Service (TRMC EMS) and Fort Dodge Fire Rescue's (FDFR) EMS System was completed using a combination of data provided by both entities, the County 911 Communications Center, on-site interviews conducted by the Consultant team, analysis and benchmarking against categories aligned with the Institute for Healthcare Improvement's Triple Aim goals. This approach was utilized in order to compare performance of the EMS System against 50 baseline metrics in eight recognized process areas.

Interviews were conducted with representatives from TRMC and FDFR EMS agencies, rural Webster County EMS and First Responder agencies, the Webster County Sheriff's Office, the County 911 Communications, and City and County elected and appointed officials. Additionally, statutes and ordinances at both the state and county level were reviewed.

Response data was derived from the County's Computer Aided Dispatch (CAD) system. The data was incomplete and fragmented. Where necessary, call volumes and response time performance was analyzed on the larger data set of January 2014 through June 2017, unless otherwise noted.

The report is organized around eight best practice benchmarks as follows:

911 and Communications Medical First Response Medical Transportation Medical Accountability Customer and Community Accountability Prevention and Community Education Organizational Structure and Leadership Ensuring Optimal System Value

Each benchmark section describes best practices, provides observations and findings specific to the Webster County EMS system and includes actionable recommendations for system improvement. Attachment A – Enhancement Opportunities Summary, collects the improvement recommendations across all benchmark areas into one document. Attachment B – Benchmarks Assessment, comments on how well the Webster County EMS system compares to 50 optimal EMS system benchmarks.

# INTRODUCTION

## SERVICE AREA DESCRIPTION

The service area is located in north central lowa approximately 50 miles north of Des Moines. Both agencies are responsible for responding to medical emergencies for the City of Fort Dodge, a community of approximately 25,000 persons in an area of 16 square miles. TRMC responds within the larger catchment area including the entire County which exceeds 700 square miles. Webster County has a total population of approximately 37,071. The economy in the County is represented by healthcare, government, agriculture, finance, manufacturing and retail. The County's median household income is \$35,334.<sup>1</sup> Further, it has a below-average cost of living, with an index of 81.60 (2016).<sup>2</sup>

## **Anticipated Future Demand for EMS Service**

After a century of steady growth in population to a peak of 48,000, Webster County's population has seen a decrease of 23.4% since the 1970s. US Census data indicates that Webster County's population decreased 3.3% between the April 2010 Census and the July 2016 estimates.

The Webster County Comprehensive Development plan provides population projections based on six modeling techniques based on trend analysis, cohort survival analysis, and modified cohort survival analysis. From the six techniques, the Plan displays three scenarios: 1) a low series, 2) a medium series and 3) a high series. The scenarios are represented in the figure below.<sup>3</sup>



Figure 1. Webster County, IA, Population Trends – Three Estimate Methods

Two of the three scenarios indicate a decline in Webster County's population continuing to 2030.

<sup>&</sup>lt;sup>1</sup> United States Census Bureau Webster County, Iowa. http://www.census.gov/quickfacts/table/PST045215/46099 <sup>2</sup> The average cost of living in the United States is assigned an index of 100.0. http://www.city-

data.com/county/Webster\_County-IA.html

<sup>&</sup>lt;sup>3</sup> Populations Trends and Projections, Webster County, 1900 to 2030. Webster County Comprehensive Development Plan, 2008, p. 16. www.webstercountyia.org/Zoning/WebsterCountyComprehensivePlan.pdf.

Age cohorts are of particular significance for EMS systems. Several studies indicate that individuals older than 65 years of age, utilize 911 and ambulance services more than younger persons. The age cohort of 65 years and over in Webster County increased from 16.7% of population in 2010 to 17.8% in 2016.<sup>4</sup> In addition, there has been recent industrial growth planned to the east and west of Fort Dodge that is contrary to the 2008 Development Plan. This possible growth along with an increase in the 65 and older age cohort, has the potential to place stressors on the current EMS system. The system will likely need to plan for future expansion to keep up with demand.

# **EMS Regulatory Structure in Iowa**

Emergency Medical Services in the State of Iowa is governed by Iowa Code Title IV, Chapter 130, Chapter 131 and Chapter 132 Emergency Medical Services – Service Program Authorization and Chapter 147A, Emergency Medical Care – Trauma Care. The Bureau of Emergency and Trauma Services (BETS) as designated by code is responsible for the development, management, implementation, and evaluation of the State's EMS System.

Furthermore, City of Fort Dodge municipal ordinance Chapter 2.52 - DEPARTMENT OF FIRE AND RESCUE Section 2.52.030 function (4) States that "Emergency Medical Services. Take all steps necessary for the providing of emergency medical services within the city, in coordination with Trinity Regional Hospital."

Additional relevant sections of Chapter 132 establish the regulatory framework for EMS personnel, including their minimum education necessary, licensing requirements, professional conduct standards, scope of permissible practice, and mandate that they be supervised by a physician, physician assistant, or registered nurse. Further, this section outlines the requirements for examination and licensure of EMS personnel.

The State of Iowa provides municipalities significant opportunities to enter into joint ventures with private not-for-profit entities such as Trinity Regional Medical Center under Iowa Code (Chapter 28E.4) for the provision of services.

# System Overview

The EMS System that operates in the City of Fort Dodge and surrounding areas consists of multiple public and private organizations. The EMS System includes:

- A single governmentally funded communications center: Webster County 911 Telecommunications.
- Two ALS transport providers: Trinity Regional Medical Center EMS, Fort Dodge Fire Rescue
- Four BLS transport providers: Clare Rescue, Gowrie Fire EMS, Dayton Fire EMS, Vincent Rescue
- Seven BLS non-transport providers: Barnum Fire, Inc., Badger Fire Department, Harcourt Fire Department, Lehigh Fire Department, Otho Fire Department, Duncombe Fire Department, Callendar Fire Department
- One agency provides fire response only: Moorland Fire Department.

<sup>&</sup>lt;sup>4</sup> United States Census Bureau Webster County, Iowa. http://www.census.gov/quickfacts/table/PST045215/46099.

Both the City of Fort Dodge and Unity Point Health subsidize their respective operations. Local tax dollars subsidize FDFR while Unity Point Health payers subsidize the hospital's EMS operation. The County provides an annual financial subsidy to the small rural Fire/EMS providers in the county. There are no known performance requirements associated with receiving governmental funding.

TRMC EMS has historically provided 911 EMS response to the City of Fort Dodge and surrounding areas, as well as, interhospital transport for Unity Point Health. The service provided by TRMC EMS is accredited by the Commission on Accreditation of Ambulance Services.

FDFR began providing first aid service to the community in the 1930's and by the late 1990's services had evolved to a mix of BLS and ALS Medical First Responder level. FDFR added ambulance transport capabilities in 2011, when Fort Dodge Fire and Trinity Regional Medical Center entered into a Memorandum of Understanding such that the Fire Department would "provide a back-up transport ambulance service in support of Trinity Regional Medical Center."<sup>5</sup> The MOU reportedly occurred to facilitate the City's desire for an expanded role in EMS and to avoid adding additional personnel costs at the Hospital. FDFR began to train more paramedics and by 2015, the department provided full ALS level services.

The MOU states that the City is responsible for the establishment and collection of fees for paramedic assists and any transports it performs. When the Fire Department transports a patient who is indigent, TRMC will be the payer of last resort and reimburse the City for that transport at the established Medicare rates. This is an unusual provision that, in effect, requires the Hospital subsidize the City's bad debt for indigent patients in its operation of its ambulance service.

TRMC EMS typically staffs two ALS units from 0700 to 2300 and one ALS unit staffed 2300 to 0700. FDFR typically staffs one ALS unit with the capability of providing a second response ready unit from within its on-duty pool of suppression personnel.<sup>6</sup> By formal agreement, FDFR augments the service provided by TRMC EMS by providing the 3<sup>rd</sup> called out 911 ALS unit during the hours of 0700 to 2300 and 2nd called out ALS unit 2300 to 0700. FDFR continues to provide interhospital transport support to Unity Point upon request for service.

When a request for ambulance service is received in 911 dispatch, both TRMC EMS and FDFR are notified simultaneously. This allows both services to respond when appropriate and keeps both services apprised of the location of ambulance units. Furthermore, it allows FDFR to know when TRMC EMS units are depleted and to be ready to respond to the next request for service.

<sup>&</sup>lt;sup>5</sup> Memorandum of Understanding (MOU) between Fort Dodge Fire Department and Trinity Regional Medical Center, agreement signed by City Mayor Matt Bemrich and Sue Thompson, President and CEO, Trinity Regional Medical Center. Document is undated with no page numbers. It is our understanding that the MOU was agreed to in mid-2011 and implemented in January 2012.

<sup>&</sup>lt;sup>6</sup> TRMC EMS has a total of five units. FDFR has three ALS units and a BLS interhospital transport unit.

# **KEY CONTEXT AND CURRENT NATIONAL TRENDS**

An EMS system key goal is to ensure access and appropriate response for those in need of emergency services and medical transportation. The mission of EMS can be isolated to three core functions. They are: preventing and reducing the number of lives lost; minimizing the patient's pain and suffering, and reducing the expenses associated with catastrophic injuries and illnesses.

Modern EMS suffers from an identity crisis since its creation five decades ago to handle the carnage on the highways<sup>7</sup> and provide out-of-hospital cardiac care<sup>8</sup>. Does EMS fall under public safety, health care or public health?

In 2007, the National Academies of Sciences' Institute of Medicine (IOM) issued a White Paper titled: "EMS at the Crossroads." IOM identified six primary issues.

- Insufficient Coordination
- Disparities in Response Time
- Uncertain Quality of Care
- Lack of Disaster Readiness
- Divided Professional Identity
- Limited Evidence Base9

Rural communities have additional issues:

- Areas with low population density generally cannot support a 24-hour full-time paid ALS EMS response system.
- Low population density also results in a smaller pool of people from which to recruit volunteer EMS personnel.
- EMS caregiver initial and continuing education requirements require a significant time commitment and often are not locally available.
- Large geographic areas with secondary roadways are often difficult to navigate and hinder response time.<sup>10</sup>

Although ten years have passed since the IOM report was published, as the Consultant team conducted this review, it was clear that many of the issues present at that time are still prevalent in the rural areas outside the City of Fort Dodge.

<sup>&</sup>lt;sup>7</sup> National Research Council. (1966). Accidental Death and Disability: The Neglected Disease of Modern Society. Washington DC, National Academies of Science.

<sup>&</sup>lt;sup>8</sup> Pantridge, JF and JS Geddes. (1967). "A mobile intensive-care unit in the management of myocardial infarction." Lancet (2): 271

<sup>&</sup>lt;sup>9</sup> Committee on the Future of Emergency Care in the United States Health System (2007). Emergency Medical Services: At the Crossroads. Washington, DC, Institute of Medicine.

<sup>&</sup>lt;sup>10</sup> Simon, L. (2015). Rural EMS faces its own emergency. American City and County. New York City, Penton.

# THE OPTIMAL EMS SYSTEM

An optimal EMS System is best designed with a patient focused and customer centered perspective. Research shows that the EMS System involves much more than the common perception of emergency ambulance and first responder services. It incorporates frequent community education and participation, medical direction and system direction and oversight, in addition to clinically sophisticated, evidenced based response and emergency transportation. Since the EMS System has a limited number of resources, the overall design of the system should ensure that the allocation of these resources be directed to provide the greatest benefit to patients.

The 2015 <u>American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and</u> <u>Emergency Cardiac Care</u> focuses on the impact the community has on patient outcomes. The American Heart Association uses a metaphor known as the *Chain of Survival* to outline five key links in the Emergency Cardiac Care sequence for adult out-of-hospital cardiac arrest.<sup>11</sup> The 5 links are:

- Recognition of cardiac arrest and activation of the emergency response system
- Early cardiopulmonary resuscitation (CPR) with an emphasis on chest-compressions
- Rapid defibrillation (with an AED)
- Basic and advanced emergency services
- Advanced life support and post-cardiac arrest care



#### Figure 2. American Heart Association

Systems that are able to execute a rapid, team oriented response see a cardiac arrest survival rate near the 50% mark. Team-oriented, goal aligned response, along with the help of both the community and medical first responders, should be able to deliver high-quality CPR and arrive at the patient's side within four to six minutes of a 911 dispatch, with 90% reliability.

<sup>&</sup>lt;sup>11</sup> American Heart Association Out-of-hospital Chain of Survival

http://cpr.heart.org/AHAECC/CPRAndECC/AboutCPRFirstAid/CPRFactsAndStats/UCM\_475731\_Out-of-hospital-Chain-of-Survival.jsp

Once the response phase is completed and care initiated, the patient should be transported to the closest, most appropriate hospital that can treat their presenting medical condition. Simply put, an EMS system first determines the need, sends the appropriate resource, and provides the patient an appropriate disposition for care. Ultimately, the system should deliver a good value for the resources invested. However, the economic reality is that sending the right resource at the right time comes at a cost.

# EMS DESIGNS, BEST PRACTICES AND BEST SYSTEMS

Milestone documents in the early development of Emergency Medical Services Systems (EMSS) included the National Academy of Sciences-National Research Council White Paper "Accidental Death and Disability: The Neglected Disease of Modern Society," the federal Highway Safety Act of 1966, and the federal Emergency Medical Services (EMS) Systems Act of 1973. They guided the first 50 years of Emergency Medical Services System growth on the local, regional, and state levels.

These early systems evolved from "neighbor helping neighbor" volunteer groups to highly complex response systems of physician extenders that function as part of the larger healthcare delivery system.

EMS systems nationwide are struggling to meet clinical, operational, and financial performance objectives. Ambulance services are primarily funded under a complex and flawed federal reimbursement methodology that does not cover the full cost of operations or the cost of readiness. Studies, including those prepared for the International City and County Management Association (ICMA) and the National Academies of Science Institute of Medicine, (IOM) document the underlying issues.

The fragmented nature of EMS means that there are many organizations that provide recommendations, protocols, and best practices from their clinical, operational, or regulatory viewpoint. State EMS regulations typically reflect minimum performance requirements.

Other commonly accepted "standards" are drawn from a variety of sources, including:

- "10 EMS Standards," currently used to evaluate state EMS systems
- "EMS Clinical Practice and Systems Oversight" developed by the National Association of EMS Physicians as core curriculum for American Board of Emergency Medicine certification in EMS
- "Evidence-Based Performance Measures for Emergency Medical Services Systems: A Model or Expanded EMS Benchmarking." Position statement by the 2007 Consortium of U.S. Metropolitan Municipalities' EMS Medical Directors
- "EMS Agenda for the Future," developed by the US Department of Transportation
- "EMS at the Crossroads," developed by the National Academies of Sciences' Institute of Medicine 2007
- "The 7 Pillars of EMS Officer Competency" developed by the National EMS Management Association
- "EMS In Critical Condition: Meeting the Challenge," produced by The International City/County Management Association

- "EMS Structured for Quality: Best Practice in Designing, Managing and Contracting for Emergency Ambulance Service," published by the American Ambulance Association
- International Academies of Emergency Dispatch
- Commission on the Accreditation of Ambulance Services
- National Fire Protection Association

In summary, there is not a one-size-fits-all, universally best EMS system design model or single "best practice system" that can be identified.

# **PROCESS AREA SUMMARIES**

Every EMS organization is composed of numerous process areas to confront individual functions of system operations. The Consultant team met with key system participants, as well as with community local stakeholders. An overview of the best practices and findings for each process is described below. Enhancement opportunities are included where relevant.

Specific benchmarks and Webster County's performance in each of the following categories are described:

911 and Communications Medical First Response Medical Transportation Medical Accountability Customer and Community Accountability Prevention and Community Education Organizational Structure and Leadership Ensuring Optimal System Value

The summary of these 50 benchmarks can be found in Attachment B – Benchmark Summary

# 911 and COMMUNICATIONS

## **DESCRIPTION OF BEST PRACTICES**

Best practice EMS systems are organized to facilitate wire-line, cellular, voice over internet protocol (VoIP), automatic crash notification, patient alerting system devices and other public 911 access to the Emergency Medical Services System. Voice, video, telemetry, and other data communications conduits are employed, as necessary, to best enhance real-time information management for patient care.

A medically directed system of protocol-based Emergency Medical Dispatch (EMD) and communications is in place. The call reception and EMS call processes are designed logically and do not delay activation of medical resources. Technology supports the caller being directed to the appropriate Public Safety Answer Point (PSAP) for the geographic location of the call. All 911 callers should receive call prioritization and pre-arrival instructions in accordance with International Academies of Emergency Dispatch (IAED) or similar process. Automated quality improvement (QI) processes are used for facilitating results being reported to clinical and operations executives in a concise manner. Data collection facilitates the analysis of key service elements and this data is routinely benchmarked and reported. Technology supports interface between 911, medical dispatch functions and administrative processes. Radio/cellular linkages between dispatch, field units and medical facilities provide adequate coverage and facilitate both voice and data communications. There is interoperability between allied public safety agencies. The figure below displays the time segments of an emergency medical call and transport from phone ring-in at 91 to crew arrival on scene, treatment and transport and unit available for the next call.



#### Figure 3. Typical EMS Call Processing Flow-Chart

Best practice systems can provide time stamps for each of the time segments, T0 through T10.

#### **Communications Benchmarks**

- Public access through a single number preferably enhanced 911.
- Single PSAP exists for the system.
- Effective connection between PSAP and dispatch points, with minimal handoffs required for callers.
- Certified personnel provide pre-arrival instructions and priority dispatching (EMD) and this function is medically supervised.
- Data collection, which allows for key service elements to be analyzed.
- Technology supports interface between 911, dispatching and administrative processes.
- GPS/AVL in each vehicle enables dispatch to alert the closest unit.
- Radio linkages between dispatch, field units and medical facilities provide adequate coverage and facilitate communications.

## **OBSERVATIONS AND FINDINGS**

The 911 public safety access point (PSAP) in Webster County is provided by Webster County Communications based at the Webster County Law Enforcement Center (LEC). Day to day operations in the Dispatch Center are managed by the County Sheriff or the Fort Dodge City Chief of Police that annually rotate leadership responsibilities. There are two Boards involved in the management of the 911 system. The Telecommunications Board manages Operations and Salary and is made up of representatives from the incorporated towns/cities within the county, two representatives from the Sheriff's Department and two representatives from the Fort Dodge Police Department. The 911 Board manages the equipment and hardware and is made up of representatives from the incorporated towns/cities within the county. They elect a Chair every two years. The current Webster County 911 management oversite structure has no direct process for input by the EMS System.

The 911 Dispatch Center employs six full-time dispatchers and six, as needed, dispatchers to include a working staff supervisor. Communications coverage of two dispatchers 24/7 is not achieved due to an on-going staffing shortage. Dispatch operations include dispatching law enforcement, fire and emergency medical services for all areas of Webster County.

Calls to 911 are received on a modern telephone system that has ANI/ALI capabilities and the telephone system is FCC Phase 2 compliant (geographically provides approximate latitude and longitude location for cell phones and provides street addresses for calls originating from landline telephones). Calls are entered into Shieldware<sup>™</sup> computer aided dispatch (CAD) software.

Ambulances and the Dispatch Center are not equipped to utilize Automatic Vehicle Location (AVL), which renders all ambulances invisible to dispatch personnel. Additionally, the CAD system does not electronically interface the Electronic Patient Care Reporting (ePCR) system used by EMS agencies to automatically populate response times.

A detailed list of data required to properly evaluate the TRMC and FDFR EMS system was provided. The Information and Data Request (IDR) included not only fiscal and operational data, but access to raw data points from the dispatch software to allow a detailed analysis of the temporal demand and geospatial location of call volumes. Due to lack of data integrity, the quality of the usable data significantly limited the Consultant's ability to validate much of the of analyses presented. Further validation of the data is required to allow for actionable decision-making as it relates to geospatial and temporal demand.

It appears that there are no clear performance expectations or tracking in the Webster County EMS system. This is evident by the lack of complete and accurate data available from the Shieldware<sup>™</sup> dispatch software. It is a result of both staffing issues and input errors on the part of dispatch personnel and the lack of formal processes to retroactively identify and amend data records.

A baseline service level in 911 centers is to be able to effectively process medical calls and provide prearrival instructions to bystanders until first responders arrive.<sup>12</sup> This does not occur in the Webster County 911 center. The need was recognized several years ago and TRMC purchased the necessary tools to implement Emergency Medical Dispatch. Chronic staffing issues were the reason given for this life saving technique having never been implemented.

Response time tracking and reporting feedback to agencies is another key function of an effective 911 communication center. Historically, response times were reported on an average basis. Modern public safety agencies use the fractile method to identify at exactly when 90% of requests receive service. The most commonly used EMS response time benchmark is nine minutes (8:59) with 90% reliability. Average response times report the 50% of reliability (with approximately half receiving service less than the benchmark and half above). Fractile response times are not measured by the 911 center.

# **ENHANCEMENT OPPORTUNITIES**

- 1. Add EMS representatives to the 911 Boards and include EMS leadership in 911 operations oversight.
- 2. Maintain minimum coverage of two communications personnel on duty 24 hours per day.
- 3. Develop a system status board so staffing/capabilities changes be consistently reported to 911 to allow back-up ALS resources to be immediately dispatched should the situation require that level of service.
- 4. All ambulances and other EMS vehicles should utilize automated vehicle location (AVL), which provides location and travel information to the vehicle and 911 Communications Center.
- 5. The CAD system should electronically interface with the electronic patient care reporting (ePCR) system used by all agencies providing emergency medical services in Webster County.
- 6. Train staff and implement EMD processes immediately.
- 7. Develop protocols for a tiered dispatch system for all EMS requests for service (i.e., only dispatch lights and sirens for true life-threatening emergencies).
- 8. Develop a Quality Assurance program to improve the integrity of all data collected to support better system wide decision-making.
- 9. Report all response times using the fractile measurement method.

<sup>&</sup>lt;sup>12</sup> This is mandated by a number of states as a condition of receiving 911 tax support.

# **MEDICAL FIRST RESPONSE**

# **DESCRIPTION OF BEST PRACTICES**

Medical first responders in best practice systems are organized appropriately for the communities in which they serve. They function as part of an integrated response system that is guided by state and local legislative authority, and which reflects accepted medical practice. First responders (paid or volunteer) are certified at a minimum EMT-Defibrillator or Medical First Responder (MFR) level. They are medically supervised by the system medical director, including participation in performance improvement audits/activities. Defined response time standards exist for formal first responders and those response times are reported along with those of the system. Early defibrillation capabilities are available for EMS first responders, as well as in areas of high-density such as airports and hotel complexes. When community or first response personnel are involved in patient care, a smooth transition of care is achieved.

#### Medical First Response (MFR) Benchmarks

- MFRs are part of an integrated response system and medically supervised by a single system medical director.
- Defined response time standards exist for MFRs.
- MFR agencies report fractile response times.
- AED capabilities on first line apparatus.
- Smooth transition of care is achieved.

### **OBSERVATIONS AND FINDINGS**

#### **MEDICAL FIRST RESPONDERS**

Medical first responders have an essential role in mitigating life-threatening emergencies and supporting the communities' EMS efforts as part of the public safety mission. In the majority of North American cities, this role is generally funded by tax dollars as part of the public safety budget rather than from user fees.

Medical first responder services are provided by the City of Fort Dodge and other fire departments throughout the County. All first response apparatus are equipped with an automated external defibrillator (AED) and providers are a mix of firefighters, Emergency Medical Responders (EMRs), EMTs and paramedics. The majority of responses are conducted using lights and sirens regardless of the severity of the patient's condition. This puts both the responders and the public at greater risk for accidents and injury and creates liability for the responding agencies.

The National Fire Protection Association Standard 1720: "standard for effective organization and deployment of fire suppression operations, emergency medical operations, and special operations to

the public by volunteer and combination fire departments to protect citizens and the occupational safety and health of fire department employees" classifies areas with a population density less than 500 people per square mile as "Rural" and recommends a response time standard of 14 minutes with eight percent (80%) reliability. This time period begins at the time of dispatch and ends on arrival of the resource at the incident.<sup>13</sup>

The transition of care between first response and transport agencies was reported as seamless.

The American Heart Association advocates a team-based System of Care (SOC). The community and medical first responders should be able to deliver rapid defibrillation and high-quality CPR, arriving to the patient's side within four to six minutes of a 911 dispatch, with 90% reliability in urban areas.<sup>14</sup> The figure below is a graphic of American Heart's System of Care.



#### Figure 4. AHA System of Care

Accomplishing this performance requires creative utilization of public access AEDs, CPR-trained community members, and innovative use of social media and information technology to alert the nearest CPR-trained person, and match patient location with nearest AED.

## **ENHANCEMENT OPPORTUNITIES**

10. As Emergency Medical Dispatch is implemented, consider responding with a tiered response to nonlife-threatening emergencies.

<sup>&</sup>lt;sup>13</sup> National Fire Protection Association Standard 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments: 2014 Edition.

<sup>&</sup>lt;sup>14</sup> Kronick SL, Kurz MC, Lin S, Edelson DP, Berg RA, Billi JE, Cabanas JG, Cone DC, Diercks DB, Foster J, Meeks RA, Travers AH, Welsford M. Part 4: systems of care and continuous quality improvement: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2015;132(suppl 2): S397–S413.

11. Develop the tiered response model to reduce response by and use of large fire apparatus.

# **EMS CARE, TRANSPORTATION & OPERATIONS**

# **DESCRIPTION OF BEST PRACTICES**

In a best practice EMS system, a mechanism exists to identify and assure adequate deployment of ground, air and other transportation resources meeting specific standards of quality, to assure timely response, scaled to the nature of event. There is capability to monitor safety and response time issues. Defined response time targets come into play, according to the severity of call, and individual response components are measured by using both mean and 90th percentile measures.

Defined clinical service levels use current medical research to guide the medical interventions of the system. Changes to improve clinical practice can be introduced rapidly. Ambulances are staffed and equipped to meet the identified service requirements. Procurement, maintenance, and logistics processes function to optimize unit availability. Resources are efficiently and effectively deployed to achieve response time performance for projected demand with due regard for taxpayers and end users. When multiple agencies are involved, a smooth integration and transition of care is achieved.

The system is capable of scaling up day-to-day operations to meet the needs of larger, all-hazards events, based on threat and capabilities assessments of the likeliest events to occur in the service area. It is essential that mass casualty responses involve logical expansion and extension of daily practices and not the establishment of new practices reserved for large-scale events.

#### **Medical Transportation Benchmarks**

- Defined response time standards exist.
- Agencies report fractile response times.
- Units meet staffing and equipment requirements.
- Resources are efficiently and effectively deployed.
- There is a smooth integration of first response, air, ground and hospital services.
- Coordinated disaster plans are developed and maintained.

## **Observations and Findings**

Virtually all emergency calls within the City of Fort Dodge receive a paramedic level response. And while the majority of calls outside the City receive a paramedic-level response, due to the fluctuation in service levels outside the City during off-peak hours, there are times when a paramedic-level response is not available. This occurs primarily in rural parts of the county where MFR and BLS level service are first to arrive on scene. 911 Communications captures and measures response data, however, the Communications center does not maintain the response time data in a manner that allows benchmarking to other similar communities. Many data points are missing from response requests, making response time performance analysis inaccurate and unreliable. The system's inability to capture, monitor and subsequently report reliable and accurate data is a serious system deficit that must be addressed.

## **EMS System Data & Analysis**

The goal of the response data analysis is to report current EMS system performance, identify potential reduction in duplicated efforts and propose system enhancements to Fort Dodge Fire Rescue and Trinity Regional Medical Center EMS to achieve optimal system performance if utilized.

## **Call Volume**

The determination of activity and performance of the EMS System is imperative in order to identify opportunities for improvements in resource allocation and effective service delivery. The design of an EMS system is dependent upon understanding demand on a temporal and geographic basis. Response data was examined using a range of EMS analytical techniques to understand what was occurring in the System and provide recommendations based from the results of the analysis.

The purpose of the data analysis process was to:

- Quantify activity levels of the EMS providers
- Measure time intervals for the components of an emergency response
- Identify the geographic distribution of EMS calls within the System
- Identify the temporal distribution of EMS calls within the System

The following results were observed:





The patterns illustrated is typical of 911 EMS systems with similar system size and geography, where call volumes are low in the early morning hours and slowly rise throughout the day while tapering off at the end of the day.



Figure 6. Call Volume by Day of Week

The patterns depicted for call volume by Day of Week with no appreciable difference in volume throughout the week except for Sunday.

The figure below indicates the distribution of calls for all Webster County agencies for the period CY2014 through June of CY2017.





From CY2014 through June 2017, there was a total of 12,168 responses: Trinity Regional Medical Center (TRMC) responded to 87 %, Fort Dodge Fire Rescue (FDFR) 8 %, Dayton Fire & EMS (DEMS) 4 %, Clare EMS (CEMS) 1 %, and Gowrie Fire & EMS (GEMS) <1%.

The figure below indicates the percent of all responses completed by TRMC, Fort Dodge Fire Department (FDFD) and other area responders starting in CY2014. The figure that follows is a graphic representation of the call distribution for each of the complete Calendar Years.<sup>15</sup>

			-	
Agency	СҮ2014	CY2015	CY2016	CY2017 Projection
Trinity Regional Medical	88%	89%	85%	85%
Fort Dodge Fire	8%	7%	9%	11%
DEMS	3%	4%	5%	3%
CEMS	1%	1%	1%	1%
GEMS	<1%	<1%	<1%	<1%

Figure 8. Response Distribution Among Agencies By Percentage of Calls

#### Figure 9. Graphic Representation of 911 Response Distribution Among Agencies



According to the raw data provided to the consultants by Webster County E911, there were 1,973 responses for all medical call types for the six-month period from January 1, 2017 to June 23, 2017. A

<sup>&</sup>lt;sup>15</sup> While the figures above represent actual call volume, for more 911 medical calls originating within the city limits, FDFR dispatches an engine along with either the TRMC or FDFR ambulance. A detailed time-on-task study is needed to provide a more complete picture of unit and firefighter utilization.

straight-line projection estimates CY2017 annual call volume at 4,166, which is some 21% higher than prior calendar year.

# **DENSITY AND RESPONSE TIMES**

Call volume density and population are two components to be considered in establishing future response time standards for the EMS System. Sixty-six (66%) of the population in Webster County lives in the City of Fort Dodge, which is an urban area as compared to 18% in other municipal/townships and 16% in rural areas of the County.

This is important to note because a key component of EMS day-to-day workload is driven by population density. If the City of Fort Dodge and/or Webster County's population density grows, so too will the daily demand for Emergency Medical Services.

Due to poor data integrity, the Consultants could not develop call density heat maps to analyze call location and density. The data lacked latitude and longitude as well as consistent city and postal code information.<sup>16</sup>

In order to determine baseline operational performance, average response time performance was analyzed for each agency from January 2014 through June 2017. The figures below illustrate the average time it took for each agency to respond on scene.

Agency	Average Response Time
CEMS	12:10
DEMS	14:20
FDFD	05:27
GEMS	11:03
TRMC	06:49
Overall	10:01

#### Figure 10. 2014-2017 ADJUSTED - Average Response Time Performance by Agency<sup>17</sup>

While the data integrity does not allow comparison of response times, the stakeholders did not report concerns about the response performance within the City. <sup>18</sup>

<sup>&</sup>lt;sup>16</sup> The data contained approximately; 10% duplication of records, 10% outliers (response times of 0.0 or > 60 minutes) and 53% of records were missing data points.

<sup>17</sup> Adjusted response time data has outlying data and duplicates removed. It should be noted that FDFR and TRMC EMS response times within the City appear to be reasonably comparable given that TRMC provides responses outside the City of Fort Dodge.

<sup>18</sup> There were anecdotal comments made by FDFR personnel that TRMC EMS staff are sometimes involved in patient activities outside the ED and have longer activation times due to that factor. TRMC-EMS personnel do provide in-house patient transport and code responses, IV starts and ED patient triage assistance.

#### **DETERMINING APPROPRIATE RESPONSE TIMES**

EMS Systems once operational and routinely validated from a clinical perspective, typically establish density based response times with varying levels of response based on the prospective priority assigned at dispatch (life-threatening responses, non-life-threatening responses and non-life threatening/non-urgent responses). Local governments customarily set response time standards contingent on operational, clinical and political factors. Urban areas typically utilize 8 minutes, 59 seconds at the 90th percentile for life-threatening emergencies; 11 minutes, 59 seconds at the 90th percentile for non-life-threatening emergencies and 14 minutes, 59 seconds for non-life-threatening/non-urgent responses. In rural areas similar to the majority of Webster County, the typical response time criteria would be set at 14:59 at the ninetieth percentile for life threatening emergencies.

The Fort Dodge Fire Department strives to meet NFPA 1710 which outlines the standards for career, urban area fire departments. Compliance is a concern when multiple FDFR ambulances is engaged in providing EMS potentially causing the department to callback firefighters to fill gaps in staffing to manage other incidents. It is particularly concerning that FDFR personnel are involved in performing non-emergent long-distance transfers that take them away from the City for extended periods of time. NFPA 1710 specifies for a combined response time of 9 minutes (8:59 min/sec for 90% of EMS calls. The figure below summarizes NFPA 1720 objectives applicable areas of the County and its volunteer first response agencies.

Demand Zone <sup>a</sup>	Demographics	Minimum Staff to Respond <sup>b</sup>	Response Time (minutes) <sup>c</sup>	Meets Objective (%)
Urban area	>1000 people/mi <sup>2</sup>	15	9	90
Suburban area	500–1000 people/mi <sup>2</sup>	10	10	80
Rural area	<500 people/mi <sup>2</sup>	6	14	80
Remote area	Travel distance ≥ 8 mi	4	Directly dependent on travel distance	90
Special risks	Determined by AHJ	Determined by AHJ based on risk	Determined by AHJ	90

#### Figure 11. NFPA 1720 Staffing and Response Time Objectives

<sup>a</sup>Ajurisdiction can have more than one demand zone.

<sup>b</sup>Minimum staffing includes members responding from the AHJs department and automatic aid

Response time begins upon completion of the dispatch notification and ends at the time interval shown in the table.

Establishing response time performance requirements requires balancing the appropriate response performance with the cost of providing appropriate service levels. Additionally, the expectations of the citizens in the community must also be considered. In rural areas, the number of calls per square mile is usually very low, this results in high costs for ambulance agencies to provide resources that will handle a low number of calls, simply put – the supply often does not meet the demand.

## **ENHANCEMENT OPPORTUNITIES**

- 12. Establish fractile (90th percentile compliance) response time requirements for life-threatening, non-life-threatening and non-life-threatening/non-urgent responses; potentially requiring more stringent response times in higher density areas.
- 13. The response times of each need to be provided each month to both agencies and the City Council as part of a comprehensive QI program.
- 14. Amend the Unity Point Health/City of Fort Dodge Memorandum of Understanding so FDFR ambulances reduce the number of non-emergent long distance transports to maintain fire suppression staffing capabilities.

# MEDICAL ACCOUNTABILITY

#### Medical Accountability Benchmarks

- Single point of physician medical direction for entire system.
- Written agreement (job description) for medical direction exists.
- Specialized Medical Director training/certifications.
- Physician is involved in establishing local care standards that reflect current national standards of practice.
- Proactive, interactive and retroactive medical direction is facilitated by the activities of the Medical Director.
- PCR data transparency facilitates MD review.
- Clinical education effectiveness efficiency.

## **OBSERVATIONS AND FINDINGS**

FDFR and TRMC EMS predominately provide services at the ALS level and rarely provide service at the BLS level for second assignments or when staffing is limited. There is a single point of medical direction for the both FDFR and TRMC EMS. The level of involvement of the Medical Director at TRMC is much more involved and a part of the clinical decision-making process, in part due to the fact that the TRMC crews are routinely engaged in patient care in the ED. TRMC has a well-developed QA/QI process with loop closure and the medical personnel are afforded more aggressive clinical protocols than does FDFR<sup>19</sup>.

The Medical Director is working into his new role for both TRMC and FDFR and both entities could benefit from greater visibility and participation. The FDFR operational decision-making process does not lend itself to inclusion of the Medical Director proactively. As such, FDFR has historically received less feedback on clinical effectiveness from the Medical Director thus limiting their ability to proactively improve clinical care.

The role of the medical director in a modern EMS system is defined by the American Board of Emergency Medicine as follows:

As part of their clinical practice, EMS physicians are responsible for medical oversight of the <u>whole</u> EMS team. EMS physician practice combines direct patient care in the field with supervisory and other functions that ensure an effectively functioning response system. This includes daily direct medical decision-making and control of care provided by EMS personnel. Some examples of this include verbal medical treatment orders based on clinical information provided by allied health personnel, transport modality and destination appropriate patient care decisions, developing and deploying written patient treatment guidelines for the EMS team, and ensuring procedural

<sup>&</sup>lt;sup>19</sup> FDFR personnel provide a limited number of clinical skills (i.e. intubations, etc.) in the field that are augmented by TRMC EMS.

competency training of allied health personnel. EMS physicians also lead quality management activities relating to medical care delivered by the entire EMS system. <sup>20</sup>

An electronic patient care reporting (ePCR) system is a documentation and database management software. These systems establish a standardized approach to document response and treatment information and specialize in storing, reviewing and retrieving information. Further, they serve as the repository for an agency's clinical and operational data. There is a single ePCR software system used by FDFR and TRMC EMS as well as by other EMS agencies in the County. The use of this single ePCR software has the potential to develop a strong systematic QI processes for all county providers.

Critical to the success of an EMS system is the ability to fully utilize clinical performance data from technology and information systems to improve prehospital care and patient outcomes. Improvements can only be made if data such as that outlined below is available in a timely and reliable manner. Best practice EMS systems provide the following data that is regularly reviewed and reported to the community:

- Response times to emergency calls for each provider, aggregated Countywide, and often broken down in to "equity zones" in larger systems
- Cardiac arrest survival per the industry standard "Utstein template"
- Time from 911 call to "balloon inflation" at the cardiac percutaneous coronary intervention (PCI or "cardiac cath lab") laboratory
- Scene intervals for patients meeting the American College of Surgeons criteria for transport to a trauma center
- Airway management success rates
- Critical vehicle and equipment failures
- Response vehicle crash rates per 100,000 miles
- Rapid Sequence Induction (RSI) utilization or other advanced airway application
- Stroke center time from onset to therapy
- Appropriate use of air-medical services

Preserving a focus on the reason for the delivery of EMS services to improve patient outcomes is vital. Measuring the clinical impact that a service has on the community is a key element of this focus. While TRMC EMS personnel regularly interact with the Medical Director as part of their work in the EE, there is less opportunity for proactive and interactive engagement with FDFR caregivers.

# **ENHANCEMENT OPPORTUNITIES**

15. The Medical Director should play a more active role in all EMS clinical activity, including ongoing development and review of 911 communications processes and compliance to protocols.

<sup>&</sup>lt;sup>20</sup> American Board of Emergency Medicine <u>http://www.naemsp.org/Documents/EMSEligCriteriaFINALApril2011.pdf</u> accessed, June, 2016.

- 16. Provide interactive and retrospective clinical feedback in a progressive manner to create increased accountability among all caregivers (call takers, dispatchers, first responders, EMTs and paramedics).
- 17. TRMC EMS and FDFR should consider combining the use of their ePCR software data to improve the QA/QI process and allow for greater results driven care.
- 18. The Medical Director and/or their designee should regularly interact with caregivers through continued education, ride-alongs, and ePCR review feedback.
- 19. TRMC EMS and FDFR should develop joint clinical skills training and drill regularly as a team.
- 20. FDFR should participate in clinical rotations at TRMC on a regular basis to augment field skills (i.e. intubations, etc.) and include possible per diem employment.
- 21. Develop a single standard of care for both TRMC EMS and FDFR to include the same patient treatment protocols and clinical skills.
- 22. Clinical outcomes of the EMS system should routinely be provided to system stakeholders.

# CUSTOMER AND COMMUNITY ACCOUNTABILITY

#### Customer and Community Accountability Benchmarks

- Legislative authorities to provide service and written service agreements are in place.
- Units and crews have a professional appearance.
- Formal mechanisms exist to address patient and community concerns.
- Independent measurement and reporting system performance are utilized.
- Internal customer issues are routinely addressed.

## **OBSERVATIONS AND FINDINGS**

The City of Fort Dodge and Unity Point Health work jointly to support the citizens of Fort Dodge and surrounding areas. Iowa Code Chapter 28E, Title IV Chapters 130-132, and Local Fort Dodge City ordinances support these efforts.

City of Fort Dodge municipal ordinance Chapter 2.52 – DEPARTMENT OF FIRE AND RESCUE section 2.52.030 function (4) States that "Emergency Medical Services. Take all steps necessary for the provision of emergency medical services within the city, in coordination with Trinity Regional Hospital." Historically, both TRMC EMS and FDFR have benefited from a collegial partnership and have served the residents of Fort Dodge and the County well. However, the relationship has become more strained in recent years as FDFR has shifted from a traditional medical first responder role to an EMS transport service role. This has created a more competitive environment for the limited number of annual patient transports (and dollars).

Ambulance units at both TRMC EMS and FDFR observed during the site work appeared to be clean and in good working order. Furthermore, medical personnel were well dressed in uniform and had an overall professional demeanor.

There does not appear to be a single formally recognized system that is utilized to address patient, citizen or interagency concerns. A typical system would define how service inquiries from any source (patient, hospital ED, first responder, citizen) are to be documented and reviewed along with specific timeframes for the completion of the review or escalation to a higher level. The lack of an organized system to address patient, citizen and interagency concerns is a system deficit.

# **Enhancement Opportunities**

- 23. Develop comprehensive performance based measures (e.g. response times, 911 notification/to be dispatched, and minimum availability) with standard reporting and actions to improve poor or non-performance.
- 24. Compose and provide an internal monthly report of first responder and ambulance response times to all key system stakeholders.
- 25. Implement a joint TRMC EMS and FDFR formal mechanism where patient, citizen, caregiver and interagency concerns can be documented and reviewed in a timely and efficient manner.

# PREVENTION AND COMMUNITY EDUCATION

#### **Prevention and Community Education Benchmarks**

- System personnel provide positive role models.
- Programs are targeted to "at risk" populations.
- Formal and effective programs with defined goals exist.
- Targeted objectives are measured and met.

## **OBSERVATIONS AND FINDINGS**

The number of hours the providers in the EMS system dedicate to community education and public awareness is not reported by the EMS system. Each agency conducts public outreach activities; however, they are not coordinated in any fashion with the other system providers.

Expanding the capabilities of community members through community education has a positive impact in patient outcomes. School and community CPR training, publication of public access automated external defibrillator (AED) locations, citizen-bystander 911 activation and community education on prevention and recognition of cardiac emergencies are low cost, high return leverage points that demonstrate improved outcomes, especially in Sudden Cardiac Arrest (SCA). The FDFD is well positioned to lead and accomplish this mission.

There are several opportunities for system participants to work closely together and increase public education and awareness. These can be accomplished through local outreach programs and allied organizations such as American Heart Association, American Stroke Association, and Red Cross.

## **ENHANCEMENT OPPORTUNITIES**

- 26. Develop a joint program and identify available resources to improve community education and awareness of the EMS system.
- 27. Develop a joint committee (TRMC EMS, FDFR and 911) to educate the community about Emergency Medical Dispatch to ensure its success and acceptance by the community.
- 28. Compose and provide a semi-annual report to the community that demonstrates current activities and accomplishments of the EMS system as well as any public education initiatives that are being offered.

# ORGANIZATIONAL STRUCTURE AND LEADERSHIP

#### Organizational Structure and Leadership Benchmarks

- A local agency is identified and coordinates system activities.
- Organizational governance, structure, and relationships are well defined.
- Human resources are developed and otherwise valued.
- Business planning and measurement processes are defined and utilized.
- Operational and clinical data guides the decision making process.
- A structured performance/quality improvement (QI) system exists, addressing administrative as well as clinical issues.

## **OBSERVATIONS AND FINDINGS**

#### **COORDINATION AND OVERSIGHT**

The individual EMS agencies operate independently with no formal oversight. However, the individual agencies appear to have a good working relationship through participation on the Webster County EMS Advisory Committee. The group meets regularly for the purpose of coordinating care and the provision of mutual aid response.

As the two key EMS agencies in the community, TRMC EMS and FDFR share responsibility for response and transport. However, essential oversight tasks, such as measuring, evaluating and reporting EMS system performance, investigating concerns and complaints from citizens, caregivers and agencies, and ensuring optimal prehospital care delivery need to be addressed in a proactive and organized manner.

#### **HUMAN RESOURCES**

#### The Future of Volunteer Providers in Webster County

For decades, Webster County's more rural citizens have depended on dedicated volunteer agencies to provide Emergency Medical Services. Since the early 2000's volunteer agencies have had difficulty attracting, recruiting, and retaining volunteers to meet calls for service. An increase in training and education requirements, rising cost of education, decrease in citizens who both live and work locally and an increase in less flexible employers have all contributed to the decline. Additionally, time away from family is also a contributing factor. A study conducted by the Iowa Emergency Medical Services Association found that volunteer providers spend an average of 30.56 hours fundraising annually and an average of 344.25 hours engaged as a volunteer.<sup>21</sup> Community leaders should engage the public as the volunteer population continues to decline and current volunteers retire.

17 IEMSA Legislative EMS Study Committee

http://www.iemsa.net/pdfs/EMS\_study\_committee/IHNRH014.PDF

It is essential that both TRMC EMS and FDFR ensure that there is a stable workforce available to support the ALS EMS operations. There appears to be an increase in employee turnover in recent years. This will necessitate a closer review of compensation packages and development of long-term planning to address the issue. TRMC EMS is currently experiencing recruitment and retention challenges that appear to be related to concerns that FDFR may take over the entire EMS operation. This has made it increasingly difficult to attract a stable workforce.

#### **Organizational Quality Improvement Processes**

One of the most difficult tasks in an EMS system is providing and sustaining high quality service. Caregiver competency and a system that supports such, ultimately drives the delivery of high quality patient care. Nationwide, EMS agency service leaders are encouraged to integrate continuous quality improvement (CQI) practices into the clinical, operational and administrative sectors of the business.

Developing a comprehensive QI plan allows an EMS agency the ability to design a strategy that addresses the unique elements present in an EMS system. Further, it creates an environment that makes quality improvement practices a seamless part of the culture of the system. Quality improvement goals, methodology, key indicators and critical success factors should be clearly defined in the plan. Indicators should be consistently monitored until improvement has occurred and the goal achieved in a timely manner. Responsibility for the QI plan should be clearly outlined. The medical director should be involved in the design of the plan and any evaluation and revision of the plan. Additionally, the medical director should receive regular status updates. Key leadership should review and update the plan annually.

The local QI plan should include statistical indicators monitored monthly, including:

- Customer Satisfaction
- Deviation from Medical Protocols
- Fractile Response Times
- High Risk Procedures
- Productivity
- Unit Hour Utilization (UHU)
- Time on Task
- Time on Scene
- Pain Management
- Patient Outcomes
- Patient Signature Compliance
- Regulatory Compliance
- Vehicle Preventive Maintenance

Additional QI measures deemed necessary can be added to the plan at any time.

Figure 12. Sample QI Process



## **ENHANCEMENT OPPORTUNITIES**

- 29. Develop an interagency communications structure to support improved outcomes and on-going collaboration efforts that does not advance agency agendas but addresses longer term system issues.
- 30. Develop a long-term plan to recruit and retain EMS personnel.
- 31. Implement a joint TRMC EMS and FDFR Continuous Quality Improvement Plan that will position the EMS system to provide high quality care now and in the future.

# **ENSURING OPTIMAL SYSTEM VALUE**

#### **Ensuring Optimal System Value Benchmarks**

- Clinical and customer satisfaction outcomes are enhanced by the EMS system.
- Unit Hour Utilization is measured and hours are deployed in a manner to achieve efficiency and effectiveness.
- Cost per unit hour and transport document good value.
- Financial systems accurately reflect system revenues and both direct and indirect costs.
- Revenues are collected professionally and in compliance with federal regulations.
- Local tax subsidies are minimized.

#### **OBSERVATIONS AND FINDINGS**

Regardless of the initial design, EMS systems must adapt to changes in the healthcare delivery environment. Agility and flexibility are key elements in guiding change in the future and EMS systems must remain prepared to implement changes to keep abreast of evolving standards of care. Quality processes that support the determination of the efficacy of the treatment modalities and patient satisfaction are becoming increasingly common in EMS. Tracer conditions such as cardiac arrest and trauma have not been sufficiently quantified to demonstrably document the benefits of pre-hospital service. Pain relief and customer satisfaction are not measured within the EMS system.

Building short and long-term operational plans that are tied to a Quality Improvement Process will add value to the EMS system. Showing value is particularly important when evaluating the cost of providing ambulance coverage to the respective communities. The goal is to provide high-quality and cost-effective service that meets the needs and expectations of the community.

The Trinity Regional and City of Fort Dodge 2015 Memorandum of Agreement (MOA) is an example of two entities forging a working relationship to enhance the efficiency and effectiveness of their EMS system. Trinity Regional typically staffs two ambulances from 0700 to 2300. The Hospital staffs one ambulance during the slower nighttime hours when fewer personnel are needed to assist in the emergency department and when there are fewer 911 calls.

As is typical with fire departments in the US, Fort Dodge personnel work 24 hour shifts and are therefore on duty during the quieter nighttime hours. Recognizing this fact, rather than adding Hospital ambulance hours during a low call volume time, the MOA calls for Fort Dodge Fire to respond on calls and to conduct patient transports during those hours.

This arrangement is a win/win for the entities and the community. The City gains transport revenue that defrays some portion of personnel costs for firefighters who are on duty, but during a time when fire and medical calls are at their lowest. Through the MOA, response units are made available county-wide

and the system avoids duplicated effort (costs) that are eventually passed on to the community. The MOA arrangement is clearly a business decision by the Hospital and an opportunity for City personnel to use their skills, increase utilization and benefit from found revenue.

Once many of the enhancement opportunities are implemented, a more comprehensive assessment of the system's financial efficiencies can be determined.

# **ENHANCEMENT OPPORTUNITIES**

- 32. TRMC EMS and FDFR jointly implement a plan to objectively coordinate EMS care delivery, evaluate progress at regular intervals, and report out results.
- 33. Unity Point Health and The City of Fort Dodge executives should meet quarterly to evaluate system administration and review system QI.
- 34. Free TRMC EMS staff of <u>non-clinical</u> duties in the hospital to allow for greater flexibility and faster response times.
- 35. TRMC EMS staff should clean and restock ambulances immediately after transports prior to performing other ancillary duties within the hospital.
- 36. Consider developing non-EMS resources to transport medically cleared Psych patients.

# MOVING FORWARD: FORMING A SHARED GOVERNANCE EMS SYSTEM

The consultants considered a variety of models to enhance service sustainability throughout the region. These ranged from the City operating the entire EMS system for the region to Trinity/Unity Point operating the entire EMS system to contracting with a private for-profit service. However, due to the limited transport volume and the considerations noted throughout the report, none of these models offered a significant long term clinical or economic benefit to the community. The single model that offered the best opportunity for the future sustainability of the EMS system is conceptually described below.

The State of Iowa, through Chapter 28E, provides for public and private entities to jointly exercise governmental powers. The purpose of the legislation is to "permit state and local governments in Iowa to make efficient use of their powers by enabling them to provide joint services and facilities with other agencies [both private and public] and to cooperate in other ways of mutual advantage".<sup>22</sup> Under the provisions of 28E, any public agency may enter into such an agreement that includes the creation of a separate entity to carry out the purpose of the agreement.

The Fitch recommendation contemplates a separate 501(c)3 entity being established and the utilization of the 28E arrangement between the City, County and Hospital. Conceptually, both the Hospital and City would contribute current ambulance assets and County would provide the necessary 911 improvements. The entity would operate with neutral branding as an enterprise fund entity and would utilize its quasi-governmental status to purchase or lease future assets via municipal bonds.

The 501(c)3 entity would own the Medicare provider number, contract with the City and Hospital for personnel and contract its billing and collection and/or other administrative services. User fees would be set at a level to optimize reimbursement from 3<sup>rd</sup> party insurance payers and reduce current subsidies of both City and Hospital.

The governance for this model would typically include an independent seven-member noncompensated board comprised of a city administrator, a county administrative or elected official, hospital administrator, medical director and three business leaders including an attorney, accountant and business owner recommended by the Greater Fort Dodge Growth Alliance. Normally, this type governance structure does not involve direct providers of service (e.g. fire chief, ES chief, 911 director, etc.) as board members. While each of these positions has a direct reporting relationship with their primary agency, they also provide reports and have collateral reporting relationship contractually to the board of the 28E entity.

<sup>&</sup>lt;sup>22</sup> Iowa Code 2017, Chapter 28E.1 and 28.2.

The 28E Governance Model is graphically illustrated below:



Advantages —

- An independent board makes decisions in the interest of the patients and consumers
- FDFR and TRMC continue to utilize personnel in other roles as desired
- Allows an independent board to make decisions about call load and resource availability requirements from each entity
- Takes advantage of any cost savings and innovative revenue options available as a 28E quasigovernmental entity

Disadvantages—

- Requires high levels of collaboration among all parties
- Requires experienced/sophisticated billing and administrative contractor
- May be difficult and time consuming to operationalize

EMS systems nation-wide are being challenged by a changing and uncertain reimbursement landscape. It is expected that healthcare service requirements will increase and healthcare funding will decrease dramatically in the coming years. Further healthcare consolidation and regionalization is expected. A future model should be flexible to accommodate these changing dynamics.

Implementation of the improvement recommendations and careful consideration of a shared service model utilizing a 501(c)3 entity and a 28E public private partnership Agreement is recommended. This approach offers future flexibility and combined system subsidy required.

# **Attachment A**

# ENHANCEMENT OPPORTUNITIES SUMMARY



# ATTACHMENT A

# **ENHANCEMENT OPPORTUNITIES SUMMARY**

- 1. Add EMS representatives to the 911 Boards and include EMS leadership in 911 operations oversight.
- 2. Maintain minimum coverage of two communications personnel on duty 24 hours per day.
- 3. Develop a system status board so staffing/capabilities changes be consistently reported to 911 to allow back-up ALS resources to be immediately dispatched should the situation require that level of service.
- 4. All ambulances and other EMS vehicles should utilize automated vehicle location (AVL), which provides location and travel information to the vehicle and 911 Communications Center.
- 5. The CAD system should electronically interface with the electronic patient care reporting (ePCR) system used by all agencies providing emergency medical services in Webster County.
- 6. Train staff and implement EMD processes immediately.
- 7. Develop protocols for a tiered dispatch system for all EMS requests for service (i.e. only dispatch lights and sirens for true life-threatening emergencies).
- 8. Develop a Quality Assurance program to improve the integrity of all data collected to support better system wide decision-making.
- 9. Report all response times using the fractile measurement method.
- 10. As Emergency Medical Dispatch (EMD) is implemented, consider responding with a tiered response to non-life-threatening emergencies.
- 11. Develop the tiered response model to reduce response by and use of large fire apparatus.
- 12. Establish fractile (90th percentile compliance) response time requirements for life-threatening, nonlife-threatening and non-life-threatening/non-urgent responses; potentially requiring more stringent response times in higher density areas.
- 13. The response times of each need to be provided each month to both agencies and the City Council as part of a comprehensive QI program.
- 14. Amend the Unity Point Health/City of Fort Dodge Memorandum of Understanding so FDFR ambulances reduce non-emergent long distance transports to maintain fire suppression staffing capabilities.
- 15. The Medical Director should play a more active role in all EMS clinical activity, including ongoing development and review of 911 communications processes and compliance to protocols.
- 16. Provide interactive and retrospective clinical feedback in a progressive manner to create increased accountability among all caregivers (call takers, dispatchers, first responders, EMTs and paramedics).
- 17. TRMC EMS and FDFR should consider combining the use of their ePCR software data to improve the QA/QI process and allow for greater results driven care.
- 18. The Medical Director and/or their designee should regularly interact with caregivers through continued education, ride-alongs, and ePCR review feedback.
- 19. TRMC EMS and FDFR should develop joint clinical skills training and drill regularly as a team.
- 20. FDFR should participate in clinical rotations at TRMC on a regular basis to augment field skills (i.e. intubations, etc.) and include possible per diem employment.
- 21. Develop a single standard of care for both TRMC EMS and FDFR to include the same patient treatment protocols and clinical skills.
- 22. Clinical outcomes of the EMS system should routinely be provided to system stakeholders.

# ATTACHMENT A

- 23. Develop comprehensive performance based measures (e.g. response times, 911 notification/to be dispatched, and minimum availability) with standard reporting and actions to improve poor or non-performance.
- 24. Compose and provide an internal monthly report of first responder and ambulance response times to all key system stakeholders.
- 25. Implement a joint TRMC EMS and FDFR formal mechanism where patient, citizen, caregiver and interagency concerns can be documented and reviewed in a timely and efficient manner.
- 26. Develop a joint program and identify available resources to improve community education and awareness of the EMS system.
- 27. Develop a joint committee (TRMC EMS, FDFR and 911) to educate the community about EMD to ensure its success and acceptance by the community.
- 28. Compose and provide a semi-annual report to the community that demonstrates current activities and accomplishments of the EMS system as well as any public education initiatives that are being offered.
- 29. Develop an interagency communications structure to support improved outcomes and on-going collaboration efforts that does not advance agency agendas but addresses longer term system issues.
- 30. Develop a long-term plan to recruit and retain EMS personnel.
- 31. Implement a joint TRMC EMS and FDFR Continuous Quality Improvement Plan that will position the EMS system to provide high quality care now and in the future.
- 32. TRMC EMS and FDFR jointly implement a plan to objectively coordinate EMS care delivery, evaluate progress at regular intervals, and report out results.
- 33. Unity Point Health and The City of Fort Dodge executives should meet quarterly to evaluate system administration and review system QI.
- 34. Free TRMC EMS staff of <u>non-clinical</u> duties in the hospital to allow for greater flexibility and faster response times.
- 35. TRMC EMS staff should clean and restock ambulances immediately after transports prior to performing other ancillary duties within the hospital.
- 36. Consider developing non-EMS resources to transport medically cleared Psych patients.

# **Attachment B**

# **Benchmarks Assessment**



## ATTACHMENT B

# **Trinity Regional Medical Center & Fort Dodge Fire Rescue**

# System Components Benchmarks Assessment

<b>Communications Benchmarks</b>		Comments
Public access through a single number,	D	911 available
preferably enhanced 911.		
Coordinated PSAPs exist for the system.	D	Countywide 911 service
Certified personnel provide pre-arrival	ND	Staffing not adequate, trained nor medically
instructions and priority dispatching (EMD) and		supervised
this function is fully medically supervised.		
Data collection which allows for key service	ND	Credible data not available from 911
elements to be analyzed.		
Technology supports interface between 911,	ND	As noted data cannot by relied upon for
dispatching & administrative processes.		administrative processes
Radio linkages between dispatch, field units &	D	
medical facilities provide adequate coverage and		
facilitate communications.		

Medical First Response Benchmarks		Comments
First responders are part of a coordinated response system and medically supervised by a single system medical director.	D	
Defined response time standards exist for first responders.	PD	Fractile not utilized
First response agencies report/meet fractile response times.	ND	
AED capabilities on all first line apparatus.	D	
Smooth transition of care is achieved.	D	

Medical Transportation Benchmarks		Comments
Defined response time standards exist.	ND	
Agency reports/meets fractile response times.	ND	No fractile reporting
Units meet staffing and equipment	PD	Agencies combined efforts provide adequate
requirements.		service levels
Resources are efficiently and effectively	PD	Neither agency has adequate volume to be
deployed		independently sustainable
There is a smooth integration of first response,	D	Providers report good field interactions
air, ground and hospital services.		
Develop/maintain coordinated disaster plans	D	

Key D=Documented ND=Not Documented PD= Partially Documented NA=Not Applicable

# ATTACHMENT B

Medical Accountability Benchmarks		Comments
Single point of physician medical direction for	D	Different level of effort with TRMC and FDFR
entire system.		noted
Written agreement (job description) for medical	D	
direction exists.		
Specialized medical director	D	
training/certification.		
Physician is effective in establishing local care	D	
standards that reflect current national standards		
of practice.		
Proactive, interactive and retroactive medical	PD	Increased level of interaction for FDFR
direction is facilitated by the activities of the		needed
medical director.		
PCR/QI data transparency for MD review.	D	
Clinical Education/Development Effectiveness.	D	
Clinical Education Efficiency.	D	

Customer/Community Accountability Benchmarks		Comments
Legislative authority to provide service and written service agreements are in place.	D	Memorandum of Understanding exists between TRMC EMS & FDFR
Units and crews have a professional appearance.	D	
Formal mechanisms exist to address patient and	PD	System-wide approach needed
community concerns.		
Independent measurement and reporting of	ND	
system performance are utilized.		
Internal customer issues are routinely	PD	Rumors of Takeover – destructive
addressed.		

Prevention and Community Education Benchmarks		Comments
System personnel provide positive role models.	D	
Programs are targeted to "at risk" populations.	D	TRMC Community Paramedicine Program
Formal and effective programs with defined	PD	
goals exist.		
Targeted objectives are measured and met.	PD	

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# ATTACHMENT B

Ensuring Optimal System Value Benchmarks		Comments
Clinical outcomes are enhanced by the system.	D	
Amb Response Utilization and transport	ND	
Utilization (UHU) is measured and hours are		
deployed in a manner to achieve efficiency and		
effectiveness.		
Ambulance cost per unit hour & transport	PD	Current structure results in overtime
document good value.		
Service agreements represent good value.	PD	
Non-emergency ambulance effective & efficient.	PD	
Non-Ambulance but medically necessary (MAV)	NA	
services are effective and efficient.		
System facilitates appropriate medical access.	ND	
Financial systems accurately reflect system	ND	
revenues and both direct and indirect costs.		
Revenues are collected professionally and in	ND	
compliance with regulations.		
Tax subsidies when required are minimized.	ND	

Organizational Structure and Leadership Benchmarks		Comments
A lead agency is identified and coordinates	ND	
system activities.		
Organizational structure and relationships are	PD	Formal MOU in place
well defined.		
Human resources are developed and otherwise	D	
valued.		
Business planning and measurement processes	PD	
are defined and utilized.		
Operational and clinical data informs/guides the	D	
decision process.		
A structured and effective performance based	PD	
quality improvement (QI) system exists.		

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