

June 27, 2016

EMERGENCY MEDICAL SERVICES STUDY



**Madison County
Wampsville, NY**

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CONSULTANT FINAL REPORT

Madison County, NY Emergency Medical Services Study

Table of Contents

EXECUTIVE SUMMARY	1
KEY RECOMMENDATIONS INCLUDE:	1
METHODOLOGY	2
INTRODUCTION	4
Figure 1: Madison County	4
THE REGION	4
NEW YORK PREHOSPITAL CARE	5
PRE-HOSPITAL CARE IN MADISON COUNTY	7
Figure 2: Ambulance Districts	7
County Office of Emergency Management (MCOEM)	7
KEY CONTEXT AND CURRENT NATIONAL TRENDS	8
THE OPTIMAL EMS SYSTEM	8
EMS DESIGNS, BEST PRACTICES AND BEST PRACTICE SYSTEMS	9
PROCESS AREA SUMMARIES	11
9-1-1 AND COMMUNICATIONS	11
Description of Best Practices	11
Figure 3: Typical EMS Call Processing Flow-Chart	12
OBSERVATIONS AND FINDINGS	13
Public Access to EMS	13
Radio Communications	14
Digital Data	14
EMS workload - countywide	15
Figure 4: EMS responses per month	15
Figure 5: Responses by Day of Week	15
Figure 6: EMS Response by hour of day - combined	16
RECOMMENDATIONS	16
MEDICAL FIRST RESPONSE	17
Description of Best Practices	17
OBSERVATIONS AND FINDINGS	17
Medical First Responders	17
Figure 7: First responder response times	19
City of Oneida – Paramedic 1st responder	20
Figure 8: City of Oneida Rescue 295	20
Community Volunteer Fire departments: Training, Staffing and Distance	20

Figure 9: AHA System of Care _____	21
RECOMMENDATIONS _____	21
MEDICAL TRANSPORTATION _____	22
<i>Description of Best Practices</i> _____	22
OBSERVATIONS AND FINDINGS _____	22
<i>Certification Training Access and Success</i> _____	23
<i>Density and Response Times</i> _____	25
Figure 10: Urban areas _____	25
Figure 11: 2015 EMS Incident Heat Map _____	26
Figure 12: NFPA 1720 Response Times _____	27
Figure 13: Urban and Suburban communities _____	27
<i>Response to second EMS call in Town of Sullivan</i> _____	28
DESCRIPTION OF EACH AMBULANCE SERVICE PROVIDERS _____	29
Figure 14: 2015 Responses per EMS Service _____	29
Figure 15: Time-on-Task by EMS service _____	30
<i>Commercial Ambulances: Vineall, Rural/Metro and Smith</i> _____	31
Figure 15: Type II Ambulance - Vineall _____	31
Figure 17: Vineall 14:59 minute travel time map _____	31
Figure 18: Rural Metro 14:59 minute travel time map _____	32
Figure 19: Smith Ambulance 14:59 minute travel time map _____	33
<i>Not-For-Profit Ambulance Services: SOMAC, SEVAC, WAVAC, CAVAC and GLAS</i> _____	34
Figure 20: SOMAC 14:59 minute travel time map _____	34
Figure 21: SEVAC 14:59 minute travel time map _____	35
Figure 21: Type I Ambulance - CAVAC _____	36
Figure 23: CAVAC 14:49 minute travel time map _____	36
Figure 23: Type III Ambulance - GLAS _____	37
Figure 25: GLAS 14:59 minute travel time map _____	37
Figure 26: WAVAC 14:59 minute travel time map _____	38
<i>Volunteer Fire Department Affiliated Ambulances: Georgetown, Eaton, Madison, Bridgewater, Sherburne and West Winfield</i> _____	39
Figure 27: Georgetown EMS 14:59 minute travel time map _____	39
Figure 28: Eaton 14:59 minute travel time map _____	40
Figure 29: Madison 14:59 minute travel time map _____	41
Figure 30: Bridgewater Ambulance 14:59 minute travel time map _____	42
Figure 31: Sherburne Ambulance 14:59 minute travel time map _____	43
Figure 32: West Winfield 14:59 minute travel time map _____	44
MASS CASUALTY SURGE CAPABILITY _____	45
<i>College Campus EMS</i> _____	46
<i>Low airmedical utilization</i> _____	46
<i>Determining Appropriate Response Times</i> _____	47
RECOMMENDATIONS _____	47
MEDICAL ACCOUNTABILITY _____	47
OBSERVATIONS AND FINDINGS _____	48
RECOMMENDATIONS _____	49
CUSTOMER AND COMMUNITY ACCOUNTABILITY _____	49
OBSERVATIONS AND FINDINGS _____	49
RECOMMENDATIONS _____	49
PREVENTION AND COMMUNITY EDUCATION _____	50

OBSERVATIONS AND FINDINGS _____	50
RECOMMENDATIONS _____	52
ORGANIZATIONAL STRUCTURE AND LEADERSHIP _____	53
OBSERVATIONS AND FINDINGS _____	53
<i>Human Resources</i> _____	53
<i>Business Planning and Measurement</i> _____	54
Figure 33: Proposed Retrospective QI process _____	55
RECOMMENDATIONS _____	55
ENSURING OPTIMAL SYSTEM VALUE _____	56
OBSERVATIONS AND FINDINGS _____	56
RECOMMENDATIONS _____	56
STATE TRENDS _____	57
EMS SERVICE OPTIONS _____	59
<i>Option Zero – Status Quo</i> _____	59
<i>Option One – County ALS Ambulance service</i> _____	59
<i>Option Two –Community Based Emergency Caregivers and Paramedic Fly Cars</i> _____	61
<i>Option Three –Reinforce Existing Providers Through Regional Support</i> _____	62
<i>Option Four –County-Wide Contracting of EMS Services</i> _____	63
SUMMARY: BUILDING MADISON COUNTY EMS 3.0 _____	64
RECOMMENDATION SUMMARY _____	65
9-1-1 AND COMMUNICATIONS _____	65
MEDICAL FIRST RESPONSE _____	65
MEDICAL TRANSPORTATION _____	65
MEDICAL ACCOUNTABILITY _____	66
CUSTOMER AND COMMUNITY ACCOUNTABILITY _____	66
PREVENTION AND COMMUNITY EDUCATION _____	66
ORGANIZATIONAL STRUCTURE AND LEADERSHIP _____	67
ENSURING OPTIMAL SYSTEM VALUE _____	67
GLOSSARY OF TERMS _____	68

Attachments –

- Attachment A – Ambulance Benchmark Summary
- Attachment B – Recommendations Ranked by Priority
- Attachment C – Response Workload by Day

EXECUTIVE SUMMARY

EMS in Madison County is a community of contrasts, with pockets of urban communities adjacent to large rural landscapes. This diversity is reflected in the many different types of organizations providing ambulance service. Many services were established by dedicated residents reacting to a community need by donating vehicles and garages to establish a local ambulance service. EMS volunteers spent hundreds of hours traveling to Syracuse or Utica to obtain initial training as caregivers.

Fitch and Associates (*FITCH*) was engaged to conduct an Emergency Medical Service Study for the county. The effort was undertaken with the region's pre-hospital care community to conduct a comprehensive, thorough and objective review of the emergency medical services system.

The County requested *FITCH* provide three options to improve service and enhance program sustainability, quality, efficiency and affordability.

Specifically, the *FITCH* study found:

- Quality improvement/quality assurance programs significantly vary at the ambulance and 1st responder agency level.
- There is a gap between the available recertification training courses and the number of caregivers needing to certify by 2019.
- Rural-based services are struggling with decreasing numbers and aging staff resources.
- Inadequate reports from 9-1-1 records management system.
- Custodial physician medical direction occurs at the ambulance service level.
- The nearest staffed ambulance may not be dispatched to an emergency.
- Episodic medical quality assurance.
- Frustration with student results in initial (original) first responder and emergency medical technician training.
- No patient outcome feedback is provided by hospitals.

Key Recommendations Include:

- Develop a working group (911, 1st responders, EMS, hospital and citizens) to determine EMT and Paramedic response time standards for each community. This group should examine existing data and determine future response times goal.
- Provide closer coordination between training provider and response agency to achieve 90% student success on initial Emergency Medical Responder (EMR)/ Emergency Medical Technician (EMT) certification and 85% student success on initial paramedic certification.

- Establish a work group involving agency medical directors, ambulance services, first responders, 911, hospital and council to create a state of the art Quality Improvement (QA/QI) program for each and every service.
- All EMS services operating in the county should be fully integrated into the 911 radio/dispatch system for activation and measurement of performance. This includes automatic vehicle locators (AVL).
- Explore methods to expand access to initial and continuing emergency medical responder education.
- All EMS services should examine response time performance criteria of simultaneous ambulance responses.
- Increase coordination with Community (Hamilton) and Oneida Healthcare (Oneida) hospitals and EMS providers in continuing education, quality improvement.
- Establish a continuing pre-hospital education program that is built from the local QI process and reflects national best practices in pre-hospital care.
- Quarterly 9-1-1 center performance metrics should be reported to the Public Safety Committee of the Board of Supervisors.
- Expand access to initial and continuing emergency medical responder education.
- Develop a program and identify resources to improve community awareness of the EMS system and promote involvement in the volunteer agencies.

METHODOLOGY

Madison County retained Fitch & Associates (*FITCH*) to conduct an Emergency Medical Service Study for its service area. The effort was undertaken with the county's pre-hospital care community to conduct a comprehensive, thorough and objective study of the emergency medical services system.

Madison County initiated the project with a kick-off meeting on December 11, 2015, with 52 people from 13 fire departments, 6 ambulance agencies and other organizations attending. Emergency Manager Ted Halpin provided a presentation that described the study's objectives, process and timelines. Established a website for the study <https://www.madisoncounty.ny.gov/em/ems-study>.

Two on-line surveys were developed – one for the fire and ems responders and one for the stakeholders. Surveys deployed January 12, 2016, with re-deployments made when a “bad email” bounced the survey back. The survey closed January 29th.

FITCH made its first site visit January 25-27, 2016. We met with Mr. Halpin and county staff to discuss the scope of the study. We conducted face-to-face interviews at 6 ambulance services, 5 fire departments and one hospital. We met with the Board of Supervisors, regional ems officials. and the EMS Study committee. A request for dispatch data was submitted to 911 center.

FITCH made a second site visit February 29 and March 1, 2016. We conducted face-to-face interviews at 4 ambulance services, 3 fire departments, and 1 hospital. We also met with the 911 center and regional ems/fire officials. Shared preliminary findings with Mr. Halpin and the EMS Study committee during this site visit.

Obtaining dispatch data to document the system's performance was problematic. There was a delay in obtaining initial data files and then issues with usability of data became apparent. Multiple efforts were made by 911 center, CAD vendor and the *FITCH* data team. Usable data was developed in early May, 2016.

A preliminary version of the report was reviewed by Mr. Halpin on May 19, 2016. Feedback and additional information was provided to *FITCH*. A revised work plan was developed to obtain additional 1st responder data that included working with the 911 center and deploying a third survey to the 1st responder chiefs on June 13. The survey closed June 17. A final version of the report was reviewed by Mr. Halpin on June 27, 2016.

INTRODUCTION

THE REGION

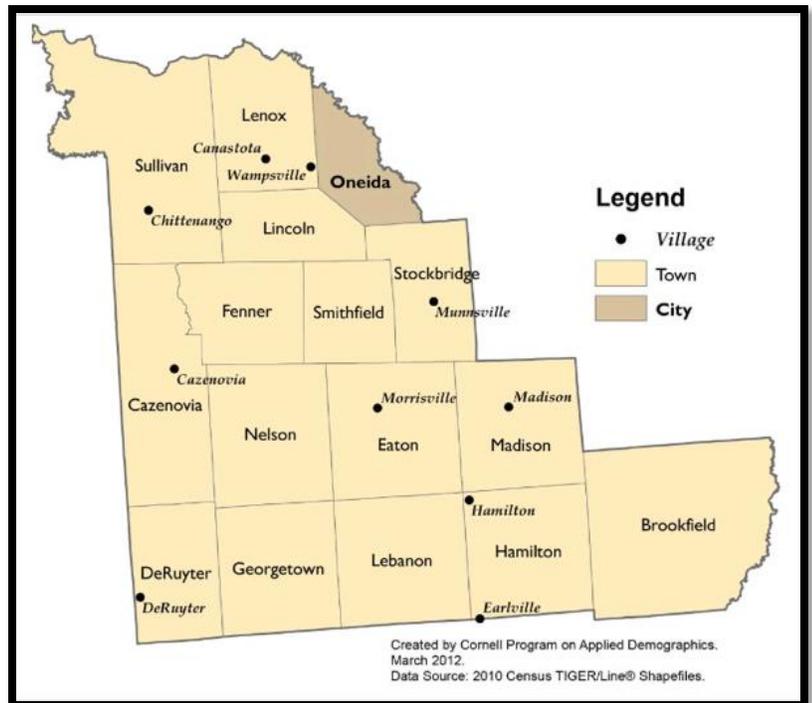
Madison is a 661 square mile county that includes the geographic center of New York State.

US Census 2015 population estimate is 71,849 residents.¹ The 2012 census analysis showed 59% living in rural communities.²

The southeastern part of the county, below Route 20, is the most rural and home to 18,000 residents living in Brookfield, Hamilton, Madison, Lebanon, Eaton and Nelson.

The county has two hospitals: Community (Hamilton) and Oneida Healthcare (Oneida).

Figure 1: Madison County



Chest pain patients with ST-Elevation Myocardial Infarction (STEMI) patients need to travel to Syracuse, Utica, Cooperstown or Johnson City for definitive treatment. Designated Stroke Centers are in Utica and Syracuse.

Community Memorial Hospital transitioned to a 25 bed critical access hospital in June 2014.³ Oneida Healthcare is a 101-bed acute care hospital and a 160 bed skilled nursing facility.

The 2014 Madison County Department of Health annual report shows about 15% of the Madison County population are in “poor or fair health.”⁴

The 2013-2017 Madison County Community Health Improvement Plan identified “Decrease stroke related mortality” as a Tier I priority.⁵ Madison County’s stroke mortality is almost double the state average (43.7 vs. 27.5 patients per 100,000)⁶

¹ United States Census. Retrieved 3/30/2016 from <http://www.census.gov/quickfacts/table/PST045215/36053>

² City-Data. Retrieved 3/30/2016 from http://www.city-data.com/county/Madison_County-NY.html

³ Community Memorial Hospital Comprehensive Three-Year Community Plan: Progress Report 2014

⁴ Madison County Department of Health (2015) 2014 annual report.

⁵ Madison County Department of Health (2013 November) Community Health Improvement Plan: Madison County

⁶ Oneida Healthcare (2013) 2014 Community Service Plan

NEW YORK PREHOSPITAL CARE

The Bureau of Emergency Medical Services is located within the state Department of Health, Office of Health Systems Management⁷. The Bureau is responsible for the general oversight of the EMS system statewide. Activities include:

- providing both financial and staff support to the State EMS Council and Regional EMS Councils,
- coordinates and develops contracts with the EMS Program Agencies to assist in the development of local EMS systems,
- approves all EMT certification courses and assists in development of curricula,
- approves county EMS plans supported by state aid,
- conduct examinations and issue individual EMT certification,
- administers the state aid program that provides free training leading to certification,
- maintains a pre-hospital care data information system for use in evaluating the quality of the system,
- administers the trauma program, including the State Trauma Advisory Committee,
- designation of trauma centers and a Trauma Registry utilized for QI purposes,
- approve and manage a variety of legislatively and federally funded EMS grants,
- responsible for issuing agency certifications, conducting periodic inspections of ambulance services and investigations of complaints regarding the conduct of certified providers or services.

STATE EMS COUNCIL

The State EMS Council meets four times a year. Its membership consists of representatives from the 18 Regional Councils and 15 representatives appointed by the commissioner from various organizations and interest in the EMS community.

The Council assists the Department in providing leadership, developing rules and regulations and general guidelines for the operation of the EMS system. Section 3002-a of Article 30 describes the statutory responsibilities.

STATE EMERGENCY MEDICAL ADVISORY COMMITTEE (SEMAC)

A committee of the State EMS Council composed of voting physician representatives from the REMACs and others with demonstrated knowledge and experience in Emergency Medical Services. It was seated in August of 1995 and is responsible for developing and recommending to the State EMS Council statewide minimum standards for medical control, treatment, triage, transportation protocols and the use of regulated medical devices and drugs by certified EMS personnel. Section 3003 of Article 30 describes the statutory responsibilities.

⁷ New York State Department of Health. "Bureau of Emergency Medical Services and Trauma Systems" Accessed February 22, 2016 from <http://www.health.ny.gov/professionals/ems/>

REGIONAL EMS COUNCIL

Each of the 18 regional EMS councils is comprised of representatives of local ambulance services, physicians, nurses, hospitals and other EMS organizations. The county EMS coordinator shall serve as an ex-officio member of the council. The purpose of the councils is to allow for and foster regional cooperation and organization of local EMS systems. The council's regional authority and responsibilities are outlined in Section 3003 of Article 30. Madison County is part of the Mid-State Regional EMS Council.

EMS PROGRAM AGENCY

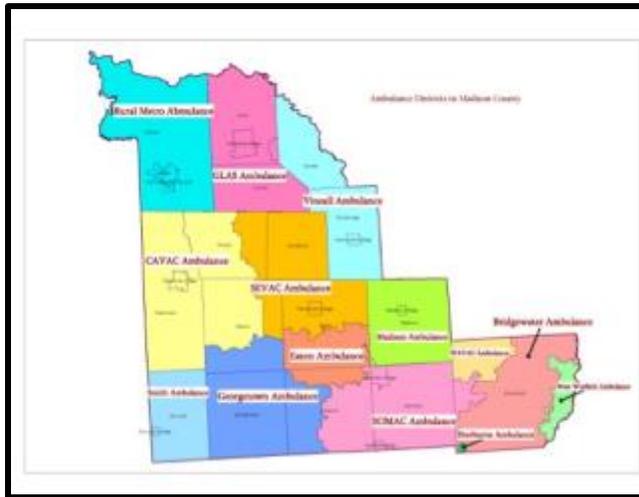
The department funds 19 EMS Program agencies to assist Regional EMS Councils and the department in activities to support and facilitate development of regional emergency medical service systems. While these organizations have no specific statutory authority they were created to provide for available day to day professional and clerical staff needed to implement and support the activities of the Regional EMS Councils and REMACs. These organizations and their role is described in Section 3003-a of Article 30. Madison County is part of Mid-State EMS.

REGIONAL MEDICAL ADVISORY COMMITTEES (REMAC)

The primary purpose of these 14 REMACs is to allow for local medical direction and guidance in the development of regional EMS systems. These committees are a committee of the Regional EMS Council but may be representative of more than one council with local agreement to do so. They are composed of five or more physicians and representatives from the council, hospitals and basic and advanced life support providers. They have the authority to develop policies, procedures, and triage, treatment and transportation protocols which are consistent with the SEMAC, and which address specific local conditions. Their authority and responsibilities are outlined in Section 3004-a of Article 30.

PRE-HOSPITAL CARE IN MADISON COUNTY

Figure 2: Ambulance Districts



Madison County has 14 ambulance districts served by a variety of EMS providers including community-based volunteers, non-profit and commercial providers.

Ambulance services provide a patient-side provider that is certified as an advanced EMT, EMT critical-care or EMT-paramedic capable of providing Advanced Life Support (ALS) treatment as defined by Part 800 of the State Emergency Medical Services Code⁸.

Fire departments provide a variable level of non-transport emergency medical first responder service (MFR). Madison County is served by one career and 22 volunteer fire departments that provide MFR firefighters certified as a first responder (CFR) or Emergency Medical Technician (EMT). Vehicles used for medical first response carry EMS care equipment, including an automatic external defibrillator (AED). Additional medical first responder service is provided by law enforcement, including AED and naloxone spray for heroin overdoses⁹.

COUNTY OFFICE OF EMERGENCY MANAGEMENT (MCOEM)

The County operates an Office of Emergency Management¹⁰. This Office manages the Preparation, Mitigation, Response and Recovery for emergencies. The Office has a Director, (who also serves as the County EMS Coordinator), a Fire Coordinator, and an EM Planner.

With over a combined 100 years of experience in emergency services, these three individuals are former EMTs or Paramedics. The Emergency Manager/EMS Coordinator served as a Senior State EMS Representative and directed a County paramedic service, selected as EMS agency of the year in New York State and recognized as “state-of-the-art” by the Journal of Emergency Medical Services magazine. To date, the office has had a very limited role in EMS. This office would be the lead towards executing any of this Study’s recommendations chosen to be pursued.

⁸ New York State Department of Health (2015) State Emergency Medical Services Code, Part 800, Emergency Medical Services. Accessed 3/10/2016 from http://www.health.ny.gov/professionals/ems/public_health_law/part_800.pdf

⁹ (2016 January 6) Narcan saves first life of the year in Madison County. WISHTV.com. Accessed 6/20./2016 from <http://wishtv.com/2016/01/08/narcan-saves-first-life-of-the-year-in-madison-county/>

¹⁰ www.madisoncounty.ny.gov/em

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 highways¹¹ and provide out-of-hospital cardiac care¹². Does EMS fall under public safety, health care or public health?

In 2007, the National Academies' 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 Base¹³

Rural-based Emergency Medical Services has additional issues:

- Areas with low population density generally cannot support a 24-hour full-time paid BLS 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.¹⁴

THE OPTIMAL EMS SYSTEM

An optimal EMS system is best designed from the patient's perspective. Patients should expect that the service will be engaged in illness and injury prevention, health education and early symptom recognition, in addition to responding to emergency and transportation requests. The EMS system

¹¹ National Research Council. (1966). *Accidental Death and Disability: The Neglected Disease of Modern Society*. Washington DC, National Academies of Science.

¹² Pantridge, JF and JS Geddes. (1967). "A mobile intensive-care unit in the management of myocardial infarction." *Lancet*(2): 271.

¹³ 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.

¹⁴ Simon, L. (2015). *Rural EMS faces its own emergency*. *American City and County*. New York City, Penton.

should provide a rapid and appropriate response when a caller dials 9-1-1 and routinely provide medical instructions until help arrives.

The 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiac Care focuses on the impact the community has on patient outcome. The revised Chain of Survival for Out-of-Hospital-Cardiac-Arrest (OHCA) emphasizes rapid identification of potential cardiac arrest, followed by immediate delivery of high quality CPR and early defibrillation with an AED. This chart from the AHA 2015 Guideline update shows the activities:



Communities able to implement a rapid response see a cardiac arrest survival rate approaching 50%. Team-based response, using 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 9-1-1 dispatch, with 90% reliability.

Patients should be transported to a hospital that can treat their specific condition. The EMS system should be externally and independently monitored, with participants held accountable for their responsibilities. Finally, the system should deliver good value for the resources invested.

EMS DESIGNS, BEST PRACTICES AND BEST PRACTICE 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 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 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 systems¹⁵
- “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 EMS¹⁶
- “Evidence-Based Performance Measures for Emergency Medical Services Systems: A Model for Expanded EMS Benchmarking.” Position statement by the 2007 Consortium of U.S. Metropolitan Municipalities’ EMS Medical Directors^{17 18}
- “EMS Agenda for the Future,” developed by the US Department of Transportation¹⁹
- “EMS at the Crossroads,” developed by the National Academies of Sciences’ Institute of Medicine 2007²⁰
- “The 7 Pillars of EMS Officer Competency” by the National EMS Management Association²¹.
- “EMS In Critical Condition: Meeting the Challenge,” produced by The International City/County Management Association²²
- “EMS Structured for Quality: Best Practice in Designing, Managing and Contracting for Emergency Ambulance Service,” published by the American Ambulance Association²³
- International Academies of Emergency Dispatch²⁴
- Commission on the Accreditation of Ambulance Services²⁵
- National Fire Protection Association²⁶

In like manner, there is no single universally best EMS system design model or single “best practice system” that can be identified.

¹⁵ <https://www.nasemso.org/Projects/ModelEMSPlan/index.asp>

¹⁶ <http://www.wiley.com/WileyCDA/WileyTitle/productCd-1118865308.html>

¹⁷ <http://gatheringofeagles.us/Presentations2008/myers%202%20Eagles2008EBM.pdf>

¹⁸ Myers, JB; Slovis, CM; Eckstein, M; et. al. Evidence-Based Performance Measures for Emergency Medical Services Systems: A Model for Expanded EMS Benchmarking: A statement developed by the 2007 Consortium U.S. Metropolitan Municipalities EMS Medical Directors. *Prehospital Emergency Care* 2008; 12:141-151

¹⁹ http://www.ems.gov/pdf/2010/EMSAgendaWeb_7-06-10.pdf

²⁰ <http://www.nap.edu/catalog/11629/emergency-medical-services-at-the-crossroads>

²¹ <https://www.nemsma.org/index.php/competencies>

²² www.icma.org

²³ www.the-aaa.org

²⁴ www.emergencydispatch.org

²⁵ www.caas.org

²⁶ www.nfpa.org

PROCESS AREA SUMMARIES

Every EMS organization is comprised of multiple process areas to address specific functions of the operation. The Consultant team met with key system participants, as well as with community, hospital and local stakeholders. A summary of the best practices and findings for each process is described below. Recommendations for enhancing activities are included where appropriate.

Specific benchmarks and Madison County’s performance in each of the following categories are described:

9-1-1 and Communications	Customer and Community Accountability
Medical First Response	Prevention and Community Education
Medical Transportation	Organizational Structure and Leadership
Medical Accountability	Ensuring Optimal System Value

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

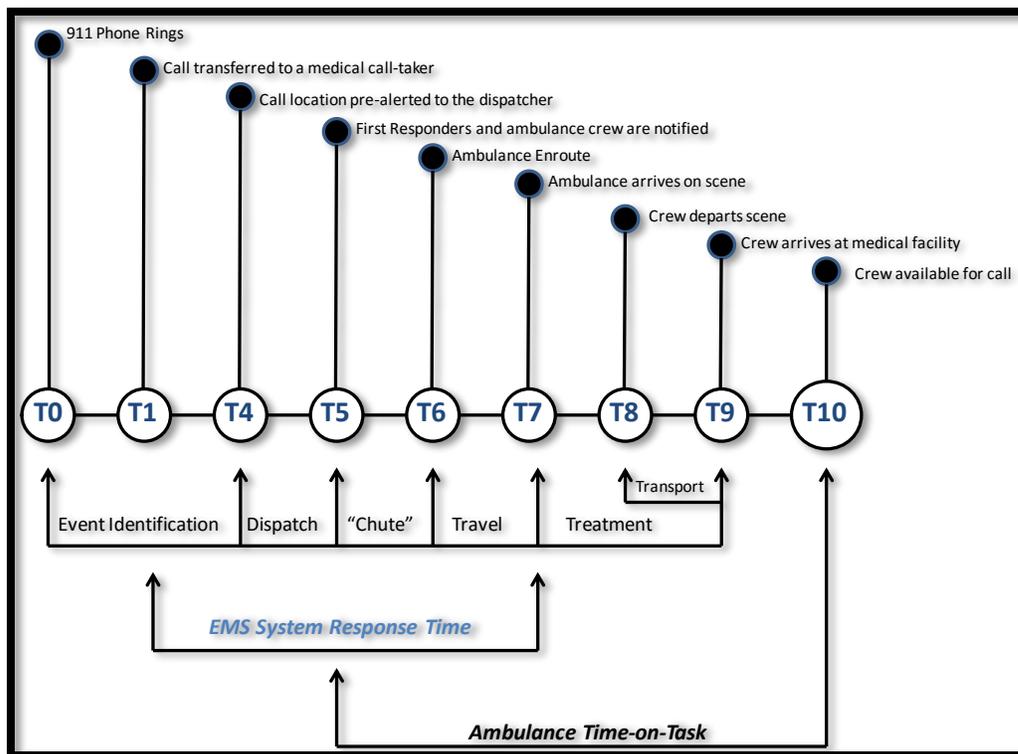
9-1-1 and COMMUNICATIONS

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 should 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 International Academies of Emergency Dispatch (IAED) [or similar process] call prioritization and pre-arrival instructions. Automated quality improvement (QI) processes are used for facilitating results being reported to clinical and operations executives in a concise manner.

Figure 3: Typical EMS Call Processing Flow-Chart



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. (Chart – Fitch & Associates, updated 2009)

Communications Benchmarks

- Public access through a single number preferably enhanced 911.
- Single Public Safety Answering Point (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.
- Global Positioning System (GPS) and Automatic Vehicle Locator (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

PUBLIC ACCESS TO EMS

Public access to emergency medical services is through Madison County 9-1-1. The communication center is the single PSAP for the county that handles Police, EMS and Fire emergencies. Staffing levels are a minimum of three and the center can staff up to 5 positions.

There is a one-button transfer of 911 calls to Vineall Ambulance, Rural/Metro and Smith Ambulance. Once Madison 911 enters the incident data into dispatch, a one-button push transfers the call to Vineall, Rural/Metro or Smith Ambulance.

Emergency medical dispatch (EMD) procedures are recommended by the International Academies of Emergency Dispatch (IAED). Madison County 911 uses ProQA for call-taking. There is a QA/QI module to give feedback to Madison County 911 management and staff.

For Calendar Year 2015, Madison County 911 answered 84,759 calls:

- 94.8% answered within 6 seconds
- 99.4% answered within 12 seconds
- 99.7% answered within 18 seconds.

Part 5202 “Minimum Standards Regarding Staffing of Public Safety Answering Points” requires PSAPs to have adequate staffing to answer 90% of all incoming wireless 911 calls within ten seconds of connection²⁷. In Calendar Year 2015 Madison County answered 93.3% of 911 Cellular calls within 6 seconds.

During interviews with the telecommunicators they discussed:

- Challenges getting coverage when the primary ambulance in a district was handling an incident and a second call came for that district.
- Variable performance when EMS providers were commanding a multiple patient event.
- No way of directly communicating with Vineall ambulances.
- Inconsistent reporting of available staffing when dispatching a VFD unit.

During the face-to-face interviews with ambulance agencies, some expressed concern that the 911 center did not have enough staff. On some occasions the dispatch radio would not be answered while a call taker was giving pre-arrival instructions or there was a significant police, fire or EMS event going on.

²⁷ New York State Department of Public Service. Title 21. Miscellaneous: Chapter LX. New York State 911 Board: Part 5200. Minimum Standards Regarding Direct Dispatch of All Emergency Services. Accessed June 20, 2016 from <http://www.dhSES.ny.gov/oiec/technical-resources/documents/Title-21-NYS-9-1-1-Board-and-Standards.pdf>

RADIO COMMUNICATIONS

Madison County went to a digital Motorola P25 system in late 2013, part of the Central New York Interoperable Communications Consortium (CNYICC) Network.

Most of the ambulances have access to Madison County 911 through mobile or portable radio. Vineall Ambulance does not have access – all radio communications have to go through the Vineall dispatcher. Vineall serves the City of Oneida, Munnsville Village and Stockbridge.

Vineall accounts for 2,369 of the 9,046 ambulance responses in 2015. Madison County 911 does not track Vineall ambulance activity. There is no calibration of response times between Madison County and Vineall. Consultant cannot perform time-to-task evaluation on Vineall activity.

In addition, the Chenango County based Village of Sherburne EMS ambulance does not have radio access to Madison County. Sherburne covers part of Route 12. There is no calibration of response times between Madison County and Sherburne EMS. Consultant cannot perform time-to-task evaluation on Sherburne EMS.

DIGITAL DATA

The consultant encountered challenges obtaining useable data from the computer aided dispatch system, making evaluation of travel times and workload difficult. The vendor-provided printouts derived from two different databases that were not properly merged. Matching EMS response with the agency supplying the ambulance would require a manual look-up for every incident, exceeding the scope of this study.

Consultant encountered about 2,000 response records where the time-on-task was showing zero or a few seconds – inconsistent when attempting to match incident location with the responding agency and travel time. This seemed to particularly impact the responses from the out-of-county based EMS agencies Sherburne, WAVAC and West Winfield, with no response data for 2015.

Madison County uses a Tiburon dispatch and record management system. TriTech bought Tiburon in February 2015, assuming the support of 350 existing Tiburon public safety accounts.²⁸ Madison County needs to be able to easily generate reports from the 911 data for quality control and system improvement.

The impact of the 2010 Patient Protection and Affordable Care Act includes digital integration of patient records from the EMS caregiver side through hospital discharge. This capability is a cornerstone of Mobile Integrated Healthcare that will shape the future of out-of-hospital care.

²⁸ (2015 Feb 08) TriTech Software Systems Announces Acquisition of Tiburon, Inc. Accessed May 17, 2016 from <http://www.tritech.com/news/press/tritech-software-systems-announces-acquisition-of-tiburon-inc>

EMS WORKLOAD - COUNTYWIDE

Madison County responded to 9,046 requests for EMS service in 2015. The level of service is consistent, averaging 21.5 responses a day.

Figure 4: EMS responses per month

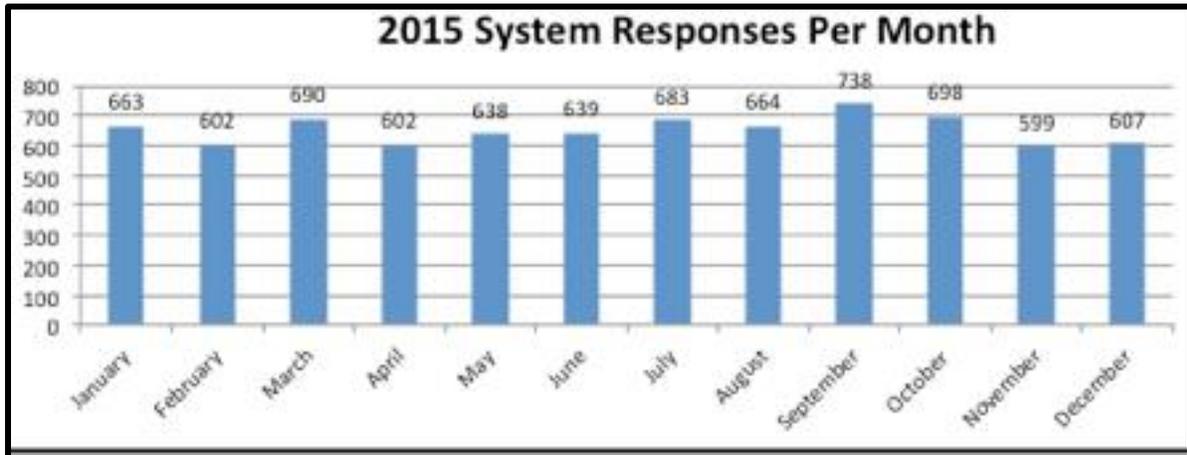


Figure 5: Responses by Day of Week

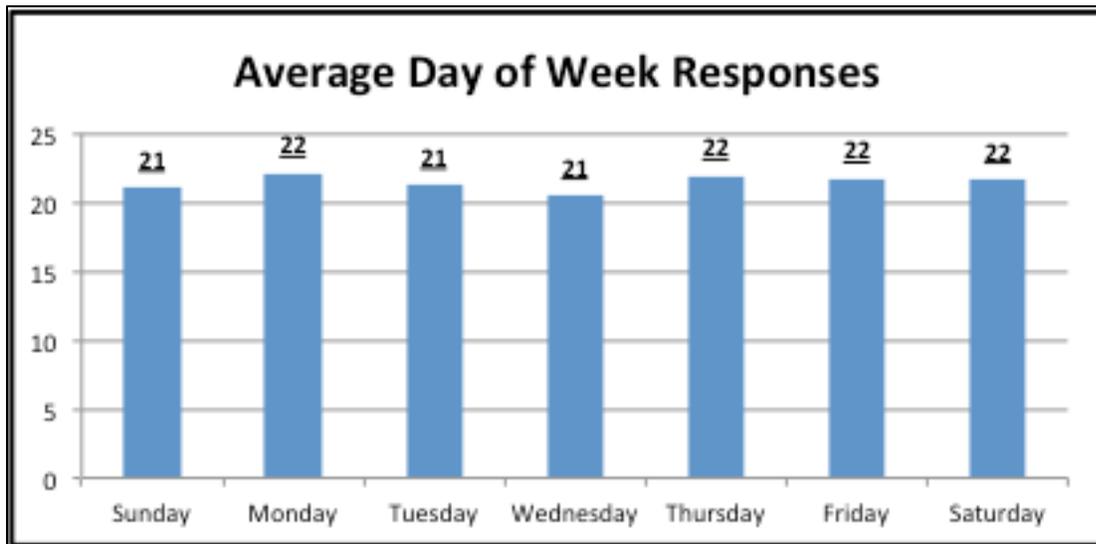
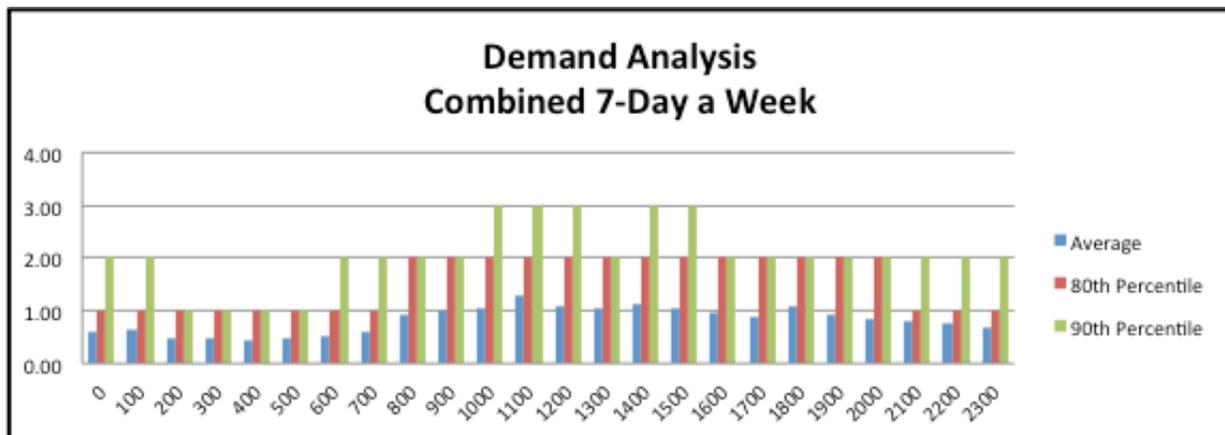


Figure 6: EMS Response by hour of day - combined



One of the challenges mentioned by both the telecommunicators and the emergency responders was the time it takes to handle a second or third simultaneous EMS call within a community. With thin resources, the desire is not to assign a staffed ambulance to a cross-county call if there is a closer staffed unit available.

The process to identify and assign an ambulance to cover a second call is cumbersome and time-consuming. Many systems use a system status method to track the location and availability of staffed response units.

System status provides the 9-1-1 center with real-time picture of what first responder and ambulances are immediately available to respond to an emergency. They instantly know when additional units are staffed and, using the geographic positioning service, can send the nearest staffed unit to an emergency.

An important component of system status is the use of automatic vehicle locators (AVLs) that are attached to every response vehicle. With AVLs the computer aided dispatch system can immediately identify the nearest staffed units available to handle an emergency. No phone calls or over-the-radio discussions on who would be the nearest unit. Time to patient side is significantly reduced, especially for the second or third call in the same community.

Recommendations

1. All EMS services operating in the county should be fully integrated into the 911 radio/dispatch system for activation and measurement of performance.
2. Require TriTech to improve the quality and usability of 911 incident data record reports.
3. Quarterly performance metrics should be reported to the Public Safety Committee of the Board of Supervisors.
4. Working group to discuss feasibility of closest EMS unit should be established.

5. Implement System Status tracking using GPS/AVL.
6. Evaluate the ability to develop an interface from Madison 911 to field units to receive automatic electronic patient care reporting data.

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 with those of the system. Early defibrillation capabilities are available for EMS first responders and in areas of high-density response areas such as airports, 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 MFR.
- 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 play a critical role in mitigating life-threatening emergencies and support the communities' EMS efforts as part of the public safety mission. In the majority of North American cities, this role is funded by local tax dollars as part of the public safety budget.

There is a range of Medical First Response coverage by volunteer fire departments in Madison County. Of the 23 fire departments operating in the county, 22 provide some type of medical first responder service.

There are 11 fire departments that respond to every EMS call in their community:

Brookfield
Earlville

Erieville
Hubbardsville (also covers Leonardsville)
Leonardsville
Munnsville
New Woodstock
North Brookfield
Oneida City
Smithfield
Wampsville

“Priority 1” calls are identified during the dispatcher questioning of the 9-1-1 caller. Certain situations, such as chest pain, heart problem, stroke, breathing problems, cardiac/respiratory arrest, diabetic problem, unconscious and many traumatic injuries almost always incur a Priority 1 classification.

There are 5 fire departments that respond to Priority 1 calls only:

Bridgeport (unless Rural Metro is out of service – then respond to every EMS call)
Cazenovia
Hamilton
Lincoln
Morrisville

There are 3 fire departments that respond only at request of the Ambulance

Eaton
Georgetown
Madison

There are 3 fire departments with special instructions

Canastota – Motor Vehicle Accidents and Full Arrests only
Chittenango – Priority 1 only when Rural Metro is out of service
DeRuyter – Farm Accidents and Motor Vehicle Accidents only

Canastota Fire 1st Assistant Chief Frank McFall, Jr. explains their special response:

“At this time, our department does not run first response EMS, we respond at the request of Greater Lenox or other ambulance, but mostly for lifting or manpower, not for any first response EMS. We are fully stocked with EMS supplies on all vehicles, but currently have only 4 EMT on the roster, and have 2 members in the CFR training course currently.”

Figure 7: First responder response times

Department	2015	Dispatch to Onscene		Dispatch to Inservice	
	Total Calls	Average	90th Percentile	Average	90th Percentile
Bridgeport Fire	788	0:10:22	0:36:05	0:21:51	0:36:05
Bridgewater Fire	12	0:07:28	0:11:10	0:07:28	0:11:10
Brookfield Fire	226	0:08:13	0:14:45	0:25:56	0:48:21
Cazenovia Fire	605	0:06:19	0:11:31	0:16:45	0:29:23
Chittenango Fire	328	0:09:55	0:17:03	0:31:48	0:47:45
Deruyter Fire	30	0:07:58	0:13:29	1:23:47	2:42:47
Earlville Fire	165	0:05:47	0:10:01	0:24:13	0:38:46
Eaton Fire	63	0:11:58	0:16:57	0:45:46	1:07:43
Erieville Fire	108	0:09:34	0:15:53	0:24:05	0:45:45
Georgetown Fire	33	0:09:56	0:16:48	0:40:00	1:17:02
Hamilton Fire	727	0:06:19	0:11:00	0:15:12	0:29:03
Hubbardsville Fire	98	0:09:52	0:16:04	0:27:49	0:43:53
Leonardsville Fire	99	0:14:33	0:29:50	0:29:10	0:56:54
Lincoln Fire	131	0:10:08	0:17:45	0:27:49	0:48:55
Madison Fire	64	0:06:55	0:13:41	0:46:26	1:28:37
Morrisville Fire	395	0:08:26	0:13:28	0:22:11	0:37:08
Munsville Fire	160	0:07:18	0:12:20	0:20:48	0:37:03
New Woodstock Fire	85	0:07:31	0:12:50	0:23:18	0:36:51
North Brookfield Fire	43	0:08:22	0:11:50	0:23:54	0:42:29
North Chittenango Fire	231	0:12:59	0:18:04	0:29:35	1:08:06
Oneida Fire	2157	0:03:47	0:06:17	0:12:49	0:21:46
Smithfield Fire	129	0:07:29	0:12:11	0:21:26	0:36:01
Wampsville Fire	172	0:09:53	0:12:42	0:20:14	0:26:41
All Departments Combine	6849	0:06:16	0:12:08	0:18:17	0:33:24

Most fire departments utilize a small utility vehicle or SUV “rescue truck” to respond to EMS calls. All rescue trucks are equipped with automatic external defibrillators (AEDs) and EMT-level medical equipment. For a second consecutive call, the department may use a pick-up-truck, chief’s vehicle, pumper or a second rescue truck. Fire departments responding to the June follow-up survey report having 3 or more AED’s at their fire station.

Some volunteer medical first responders have caregivers authorized to provide specific treatment to handle critical medical conditions requiring advanced medical intervention. Eight volunteer departments provided information on the June follow-up survey.

The additional treatments included:

- Naloxone spray for heroin overdoses – 8 of 8 reporting departments
- Albuterol for asthma attacks and pulmonary disease – 6 of 8 reporting departments
- Epinephrine for allergic reactions – 3 of 8 reporting departments
- Blood glucose test for diabetic conditions – 3 of 8 reporting departments

Local quality assurance programs are variable. Some review reports for completeness. Others perform a detailed review in response to a complaint or concern. Many conduct an after-action review of major incidents, such as an accident requiring extrication or an EMS call requiring significant care.

CITY OF ONEIDA – PARAMEDIC 1ST RESPONDER

The career fire department provides medical first response within the City of Oneida, the only first responder in Madison County providing both EMT and paramedic services. In 2015, this counted for 65% of the fire department 9-1-1 responses.

Reorganization of Oneida Fire Department EMS service resulted in it receiving the “Excellence in Quality and Safety Award” by Midstate Regional Emergency Medical Services Council in 2015.²⁹

Figure 8: City of Oneida Rescue 295



COMMUNITY VOLUNTEER FIRE DEPARTMENTS: TRAINING, STAFFING AND DISTANCE

On-line surveys were sent to every fire department leader and most departments participated in a face-to-face interview with the consultant at their fire station. Volunteer leadership expressed concern on three issues: EMS training, thin caregiver ranks and travel time.

The leaders who filled out the survey were split on their level of satisfaction with available EMS training. Comments within the on-line survey include:

“Very good training exists in Onondaga County, and eastern Madison County, but our members have to travel a considerable distance and take considerable time to attend.”

“Training. If you work all day, then are expected to drive to a class 30-60 minutes each way for the class plus the length of class is too much to ask VOLUNTEERS”

Face-to-face discussions on EMR/EMT training yielded two themes:

1) Leaders wanted to have training conducted at their fire station or at locations that were closer to their community.

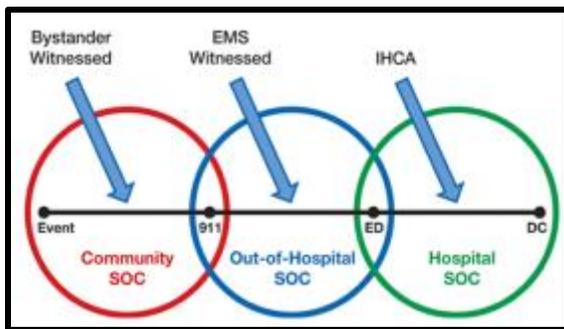
²⁹ Salerno, K. (2016) “2015 Annual Report.” City of Oneida Fire Department

2) Two of the volunteer chiefs expressed frustration that, after members receive initial CFR (Certified First Responder) or EMT (Emergency Medical Technician) credentials, it is difficult to obtain continuing education with few local class opportunities and long travel to Utica or Syracuse. Their CFR/EMT members end up not recertifying.

Some departments described staffing challenges to assure a medical first responder or EMT can respond. They have a handful of credentialed CFR or EMTs and coordinate coverage in their region. For example, if the lone EMT at Company A will be out of town, an EMT from Company B will monitor the radio and respond to assist Company A on EMS 1st responder calls as mutual aid.

About 81% of Madison County residents live in communities with population densities less than 500 people per square mile. The 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” classifies these communities as “Rural” and recommends a response time of 14 minutes with 80% reliability. This time period begins at the time of 9-1-1 dispatch and ends on arrival at the incident.³⁰

Figure 9: AHA System of Care



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 9-1-1 dispatch, with 90% reliability.³¹

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 nearest CPR-trained person, and match patient location with nearest AED.

Recommendations

7. Expand access to initial and continuing emergency medical responder education.

³⁰ 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.

³¹ 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.

8. Increase the number of EMT and paramedic caregivers through use of blended training and broad-band computer access.
9. Assist agencies in analyzing how they can reduce arrival to patient and paddle placement times.

MEDICAL TRANSPORTATION

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 severity of call, and individual response components are measured by using both mean and 80th 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 state. 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.
- Develop and maintain coordinated disaster plans.

Observations and Findings

The 14 providers of ambulance service to Madison County present a wide variety of organizational structures reflecting unique community histories and needs.

A response to a 9-1-1 call in Madison County will get an ambulance that is capable of some level of advanced level of pre-hospital care from a provider credentialed as an advanced EMT, EMT – Critical Care or EMT – Paramedic. This is a significant improvement when compared to a 1992 survey of Madison County where there few ambulance services with ALS providers.³²

EMT-Paramedic is a credential that reflects a national set of Advanced Life Support (ALS) skills and procedures.

EMT-Critical Care is a New York specific provider that is below the skill set of an EMT-Paramedic but is authorized to provide advanced airway management, including intubation, IV fluid administration, cardiac monitoring, cardiac pacing, and both synchronized and unsynchronized cardioversion, and medication usage/administration in adult and pediatric patients.

Advanced EMT has fewer advanced life support skills. Can start an IV, perform cardiac monitoring and administer a limited number of medications to handle the most critical situations.³³

Almost all of the ALS providers in Madison are paid to provide service, either as a full-time employee or per-diem. Per-diems are paid by the hour and receive no benefits. The Madison Volunteer Fire Department coordinates per-diem paramedic staffing for two other ambulance organizations. There are volunteer ALS providers serving in the most rural communities.

CERTIFICATION TRAINING ACCESS AND SUCCESS

Leaders of ambulance services responded to an on-line survey and had an opportunity for a face-to-face interview with the consultant at their ambulance station.

Similar to the first responders, satisfaction with initial/refresher EMT, EMT-Critical Care and Paramedic was split 50-50 from the survey. Comments from the survey included:

“No good classes are offered anywhere near [redacted]”

“The quality of the programs in Onondaga County and eastern Madison County are good. The quality of the programs offered locally are very unsatisfactory.”

“Come north for some programs not all at Morrisville College”

³² Klepeis, P. “The Availability of Ambulance Services in Madison County, NY.” *Middle States Geographer*. 1993, 26. 58-66

³³ New York State Bureau of EMS (2013) Advanced Emergency Medical Technician Instructional Guideline. Accessed March 30, 2016 from:

http://www.health.ny.gov/professionals/ems/national_education_standards_transition/docs/nys_aemt_education_standards.pdf

“Midstate's online based refresher provides a good option.”

The face-to-face interviews at the ambulance stations revealed two certification training issues:

1) Not enough recertification courses available within Madison County.

Ambulance agencies report that 137 EMTs, 30 EMT-Critical Care and 60 EMT-Paramedics will need to complete recertification training by 2019. Comparing the recertification requirements under the 2013 continuing medical education program³⁴ and courses traditionally offered within the county identify an inadequate number of recertification training opportunities.

There are two state-approved sponsors to offer EMS original certification and refresher training in Madison County: Faxton-St. Luke's Healthcare and Madison County Emergency and Rescue Association.

Although authorized to conduct the entire range of EMS certifying courses, Faxton-Luke's has only run two courses in the past three years in Madison County.

Madison County Emergency and Rescue Association is a private not-for-profit business established in 1975 to provide certification training. Some of the state and community leaders interviewed thought that this organization was operated by the county government.

Both training providers mentioned their cost of providing additional classes or training at different locations is not offset by the available state reimbursement. The discussion included pushing out a proposed training schedule 24 months in advance to allow ambulance agencies and caregivers to map out their education plan.

2) Need coordination to improve initial certification success.

Two volunteer fire chiefs shared their frustration when a member that they encouraged to enroll in an initial EMT certification course—representing a significant investment in time and travel—fails out of the course without the chief knowing that the student needs coaching, practice or tutoring. Both departments are struggling to train and retain certified EMS caregivers.

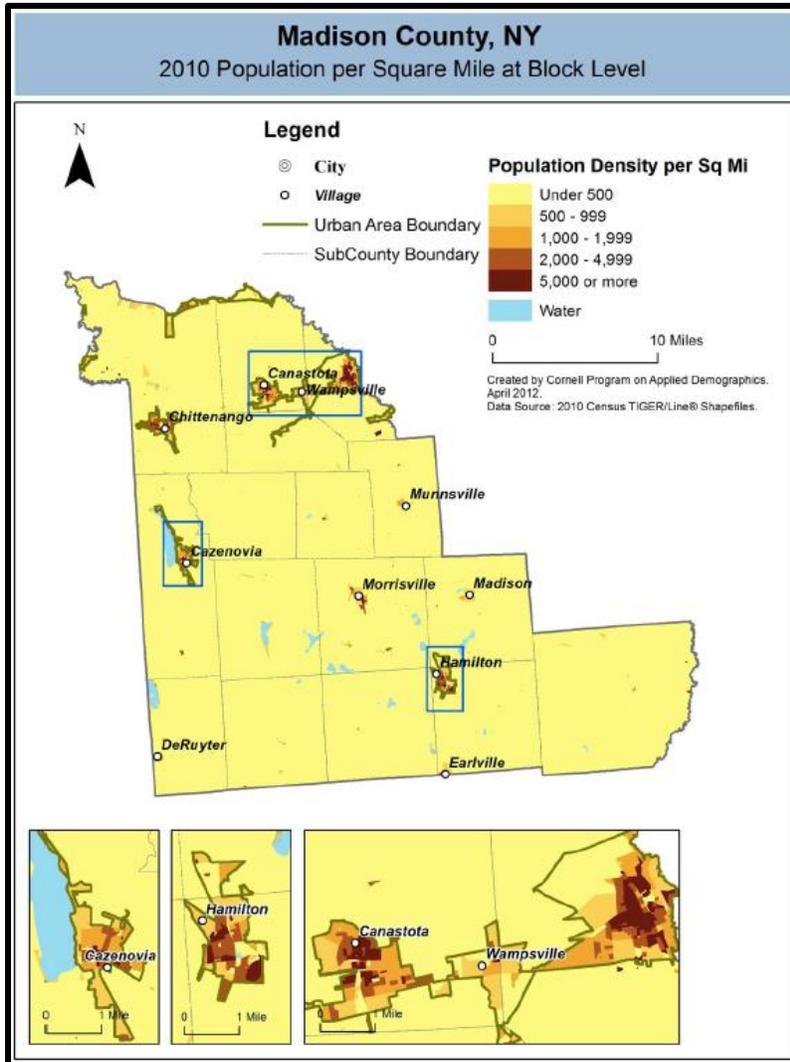
While reviewing this issue with both Madison County Emergency and Rescue Association and Faxton-St. Luke's Healthcare, they determined that there is an existing procedure in place to allow the “employer” to receive student performance updates if the student provides a signed authorization to share academic information with the department.

³⁴ Bureau of Emergency Medical Services (2013) “3 year EMS Continuing Medical Education, (CME) Recertification Program: Administrative Manual.” New York State Department of Health.

DENSITY AND RESPONSE TIMES

Madison County is considered a rural community, with a county-wide density of 112 people per square mile. This 2013 map from the Cornell Program on Applied Demographics shows the urban areas:

Figure 9: Urban areas

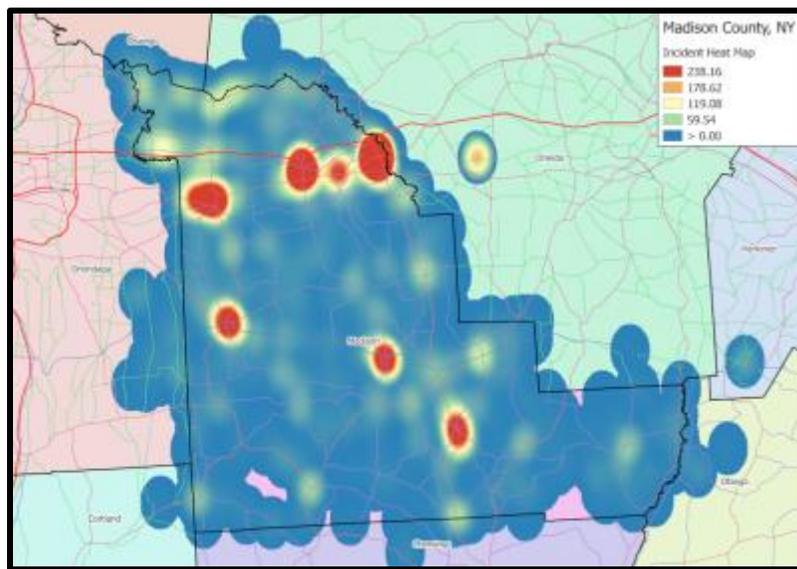


EMS day-to-day workload is driven by population density, age and health; as well as poverty and crime. Occasionally a situation arises that overruns these factors, like the current heroin crisis³⁵.

In Madison County density is a noticeable driver of EMS workload. Figure 12 shows a “heat map³⁶” that identifies the location of EMS calls in Madison County for 2015. A heat map uses colors instead of numbers to represent activity. The location of every EMS call in 2015 was plotted on the map. Instead of a cluster of overlapping dots on a map, a density surface is made using colors to define the level of activity in each geographic cell³⁷.

The numbers in the legend are the density calculations (incidents per size of cell). The red areas show areas with the most calls and correlates to the communities identified in Figure 10 as urban. The dark blue areas show areas with no or very few EMS calls.

Figure 10: 2015 EMS Incident Heat Map



The National Fire Protection Association Standard 1720: “Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations

³⁵ O’Brien, J. (2016 January 31) Deadly painkiller sneaks in to make Syracuse heroin epidemic more lethal. Syracuse.com accessed June 21, 2016 from http://www.syracuse.com/crime/index.ssf/2016/01/police_cny_heroin_epidemic_more_lethal_as_dealers_slip_painkiller_int_o_the_mix.html

³⁶ Dempsey, C. (2014) “What is the Difference Between a Heat Map and a Hot Spot Map?” GISLounge.com. Accessed May 17, 2016 from <https://www.gislounge.com/difference-heat-map-hot-spot-map/>

³⁷ ArcGIS Resources (no date) Extending your map with spatial analysis. Accessed June 20, 2016 from <http://resources.arcgis.com/en/communities/analysis/017200000015000000.htm>

to the Public by Volunteer Fire Departments” classifies initial response time standards based on the density of the community served.³⁸

Figure 11: NFPA 1720 Response Times

Demand Zone ^a	Demographics	Minimum Staff to Respond ^b	Response Time (minutes) ^c	Meets Objective (%)
Urban area	>1000 people/mi ²	15	9	90
Suburban area	500–1000 people/mi ²	10	10	80
Rural area	<500 people/mi ²	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

^aA jurisdiction can have more than one demand zone.
^bMinimum staffing includes members responding from the AHJs department and automatic aid
^cResponse time begins upon completion of the dispatch notification and ends at the time interval shown in the table.

Using the 2010 census survey we found 6 urban communities, representing 13.6% of the residents and 6 suburban communities representing 5% of the residents. Using the NFPA 1720 standard, here are the recommended response times for those communities:

Figure 12: Urban and Suburban communities

	people	sq mi	people square mi	Demand Zone	Response Time	Meets Objective
Chittenango Village	5081	2.40	2117.1	Urban	9 minutes	90%
DeRuyter Village	558	0.30	1860.0	Urban	9 minutes	90%
Cazenovia Village	2835	1.60	1771.9	Urban	9 minutes	90%
Hamilton Village	4239	2.40	1766.3	Urban	9 minutes	90%
Morrisville	1545	1.20	1287.5	Urban	9 minutes	90%
Canastota Village	4084	3.30	1237.6	Urban	9 minutes	90%
Bridgeport*	1490	1.80	827.8	Suburban	10 minutes	80%
Earlville	872	1.10	792.7	Suburban	10 minutes	80%
Madison Village	305	0.50	610.0	Suburban	10 minutes	80%
Wampsville	543	1.00	543.0	Suburban	10 minutes	80%
Munnsville	474	0.90	526.7	Suburban	10 minutes	80%
Oneida City	11262	22.00	511.9	Suburban	10 minutes	80%
*part in Onondaga County						
Madison County	73442	655.00	112.1	Rural	14 minutes	80%

³⁸ 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.

RESPONSE TO SECOND EMS CALL IN TOWN OF SULLIVAN

Located in the densely populated northwest corner of the county, Sullivan has had challenges with ambulance service. In a 1992 survey of ambulance service availability, Colgate University Professor Peter Klepeis made this observation:

The town of Sullivan is in an urban area and yet has the worst total runtime of any other region in the county. It is a private ambulance corps, staffed by paramedics, who are able to give medicines, IV therapy, and in general provide a higher standard of care than basic EMTs. Private ambulance personnel tend to be better trained and have more experience than volunteers. So, despite the fact that the runtimes for Eastern are slow, they may provide a standard of care that is higher than a region in which runtimes are faster but that doesn't have advanced life support personnel readily available.³⁹

Rural/Metro Medical Services, a national EMS provider with a large Syracuse-based service area, contracts with the Town of Sullivan to provide a paramedic ambulance to handle emergency and non-emergency services.

During the ambulance station interviews, representatives of adjacent ambulance providers GLAS and CAVAC shared a perception that once the Sullivan Rural/Metro ambulance transports a patient to Syracuse, there seems to be an excessive time before the Rural/Metro ambulance returns to Sullivan. Many of the 345 GLAS responses outside their Primary Service Area were into Rural/Metro's district.

Some of that delay may be attributable to excessive wall-time at the hospital, where the patient remains on the ambulance stretcher while waiting for an available emergency department bed. EMS leaders responding to the on-line survey shared these comments on the impact hospital "drop" or wait times have on them:

"I feel it has a great impact. Not only are ambulances out of service for long periods but it is taxing the volunteers."

"Most times, we are able to clear the hospital in plenty of time. However, there are times when ambulances will wait at the hospital with a patient on the stretcher for over half an hour before getting a bed."

"Sometimes the hospitals in Syracuse have an extensive wait time."

³⁹ Klepeis, P. "The Availability of Ambulance Services in Madison County, NY." *Middle States Geographer*. 1993, 26. 58-66

The GLAS and CAVAC providers described an expectation that when the Sullivan Rural/Metro ambulance left the county on a transport, a Rural Metro ambulance that is posting in Onondaga County would be moved closer to Sullivan.

That expected shift of Rural/Metro ambulance resources when the Sullivan ambulance is out-of-town is not required in the 2015 contract with the Town of Sullivan. Rural/Metro is to “Maintain one (1) ambulance within the Town of respond to ambulance and emergency medical service calls twenty-four (24) hours a day, seven (7) days a week, subject to the availability, at any given time, of the one (1) ambulance assigned within the Town.”

The town should consider addressing two items in the next contract:

- An apparent excessive period of 3 minute, 49 second time-on-task from receiving a 911 dispatch to marking enroute.
- A formalized procedure to provide ambulance coverage for the second and third simultaneous EMS call in the town.

Description of Each Ambulance Service Providers

Madison County ambulance providers can be subdivided into three general types: commercial, not-for-profit and volunteer fire department affiliated. Each ambulance service was asked to complete an on-line data survey and provided an opportunity to meet with the Consultant at their station. The following descriptions are based on the results of those efforts.

As pointed out in the 911 and Communications section, there were issues with the quality and completeness of the data. Therefore “2015 Responses per EMS Service” does not have data from Sherburne EMS, WAVAC or West Winfield EMS.

Figure 13: 2015 Responses per EMS Service

	2015 Responses Per Agency
Bridgewater Amb	400
CAVAC Amb	1015
Eaton Amb	259
Georgetown Amb	109
GLAS Amb	1436
Madison Amb	407
Rural Metro Amb	1730
SEVAC Amb	545
Smith Amb	100
SOMAC Amb	676
Vineall Amb	2369

The same data quality issues affect the time-on-task calculations, with no data for Vineall, Sherburne EMS, WAVAC or West Winfield EMS,

Figure 14: Time-on-Task by EMS service

	Dispatch to Enroute		Dispatch to Onscene		Time-on-Task	
	Average	90th Percentile	Average	90th Percentile	Average	90th Percentile
Bridgewater Amb	0:03:50	0:07:31	0:19:54	0:29:16	0:51:16	1:49:57
CAVAC Amb	0:02:55	0:04:48	0:09:10	0:15:49	0:36:04	1:33:53
Eaton Amb	0:04:16	0:08:52	0:11:06	0:17:19	0:43:35	1:34:39
Georgetown Amb	0:05:03	0:08:37	0:11:11	0:19:30	0:55:15	1:43:53
GLAS Amb	0:02:55	0:05:56	0:08:05	0:13:45	0:34:01	1:24:43
Madison Amb	0:03:03	0:07:07	0:09:16	0:14:52	0:32:33	1:13:09
Rural Metro Amb	0:03:49	0:05:51	0:11:01	0:16:06	0:55:22	2:08:37
SEVAC Amb	0:05:24	0:09:48	0:10:50	0:15:48	1:00:27	1:52:10
Smith Amb	0:04:34	0:07:44	0:15:58	0:20:49	1:19:48	3:16:44
SOMAC Amb	0:02:18	0:03:58	0:12:40	0:16:30	0:40:43	1:33:26
Vineall Amb	***UTO***	***UTO***	***UTO***	***UTO***	***UTO***	***UTO***
UTO = Unable to obtain						

We include a 14:59 minute travel time map from each ambulance station to show the area covered under the NFPA 1720 rural response standard.

COMMERCIAL AMBULANCES: VINEALL, RURAL/METRO AND SMITH

Two of the 3 commercial ambulances use fully-paid crews.

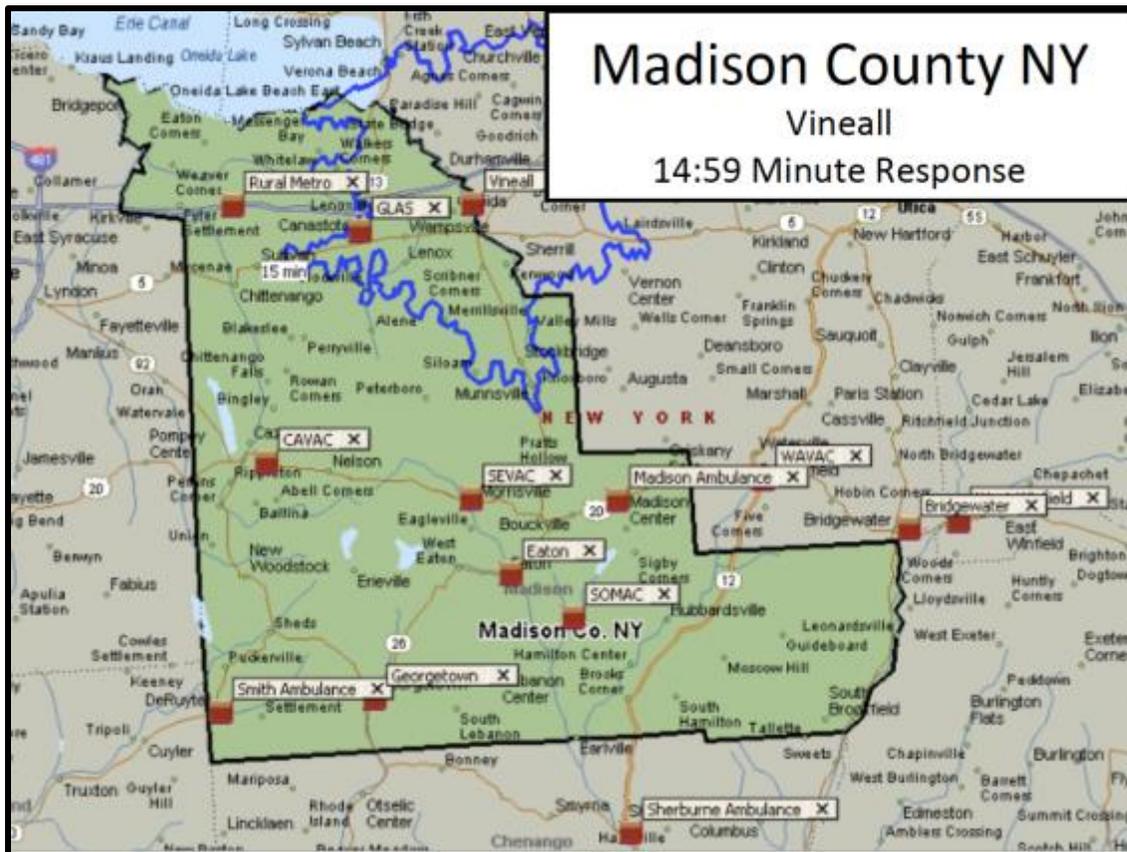
Vineall is based in the City of Oneida in the urban northeast corner of Madison County.

Figure 15: Type II Ambulance - Vineall

- Fully paid crews that handle 9-1-1, interfacility and scheduled transports.
- Operate a fleet of ALS Type II and Type III ambulances in good to excellent condition.
- Did not respond to on-line survey, 2,369 emergency responses to Madison County in calendar year 2015.
- No data on responses within the Primary Service Area (PSA) and outside the PSA.
- No data on 9-1-1 responses where Vineall was unable to respond.
- Charge for transport. Receives no Madison County subsidy.



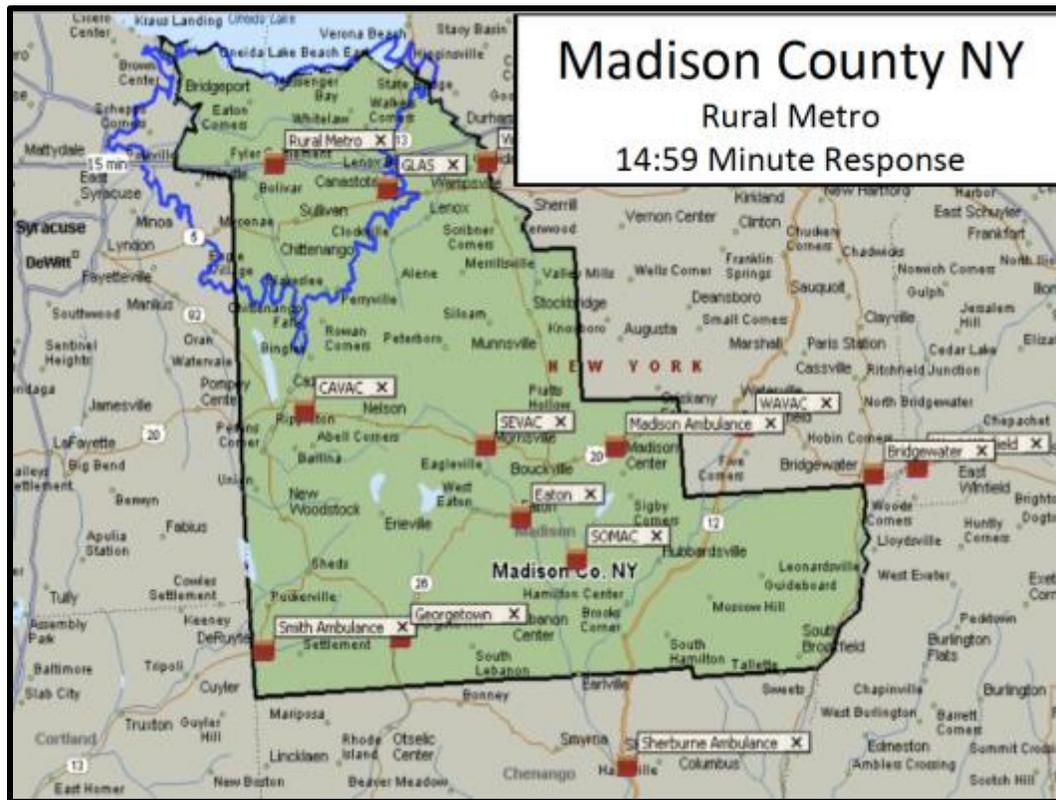
Figure 16: Vineall 14:59 minute travel time map



Rural/Metro is based in North Chittenango in the urban northwest corner of the county.

- Fully paid crew, a unit of the Central New York-based division of a national EMS service provider.
- Operate one ALS Type III ambulance, a 2011 vehicle with 175,000 miles and in acceptable condition.
- Reserve ambulance available from Syracuse fleet.
- Reported 1,730 responses in calendar year 2015.
- There were 1,718 responses within the Primary Service Area (PSA) and 12 outside the PSA.
- Were unable to respond to 214 calls because they were down for maintenance or “other”
- Charge for transport.
- Received \$175,000 from contract with Town of Sullivan for 2016. The town provides a building with garage and crew quarters.

Figure 17: Rural Metro 14:59 minute travel time map

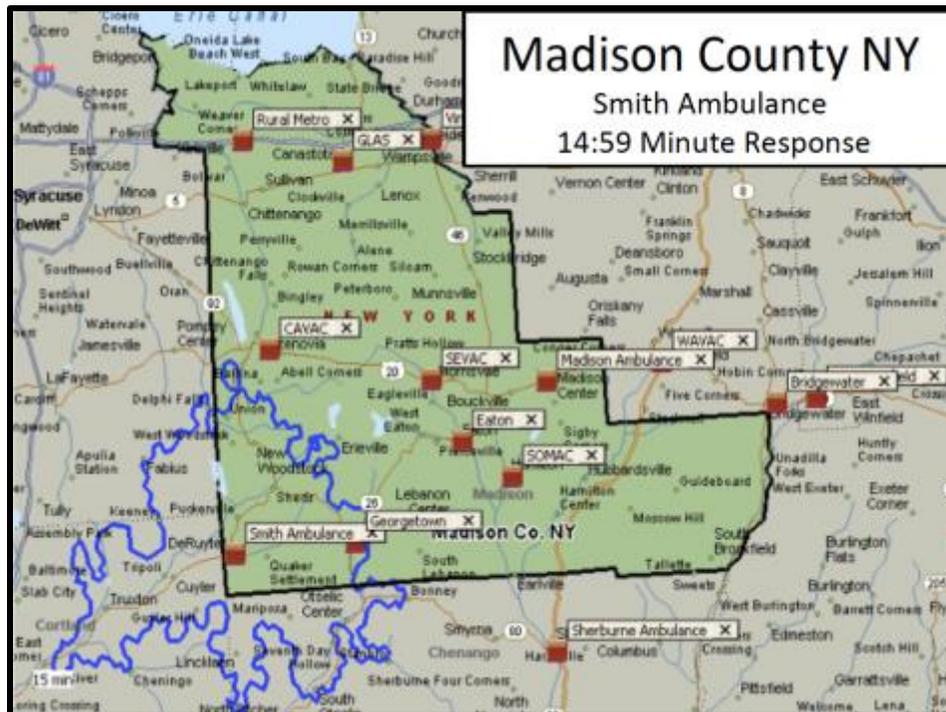


Smith Ambulance is based in DeRuyter in the rural southwest corner of the county.

- Richard and Janet Smith are the owner-operators. Mister Smith has been a paramedic for four decades. Did not share a succession plan with consultant.
- Mix of paid medics and volunteer drivers.
- Provide fully paid crews 8 hours a day on weekdays - 40 hours a week.
- Operate two ALS Type I ambulances, a 2015 vehicle with 1,400 miles and 2011 vehicle with 22,000 miles. Both were built to Mr. Smith’s specifications – no outside cabinets and special flooring. Units are immaculate.
- Reserve ambulance was observed in storage garage.
- There were 100 responses into Madison County in calendar year 2015.
- Reported were 360 responses within the Primary Service Area (PSA) and 25 outside the PSA.
- Were unable to respond to 3 calls because they were on another call.
- Charge for transport.

Smith Ambulance Community Support			
2015 received		2016 anticipated	
Town of DeRuynter	\$19,000	Town of DeRuynter	\$19,000
2015 Total	\$19,000	2016 Total	\$19,000

Figure 18: Smith Ambulance 14:59 minute travel time map



NOT-FOR-PROFIT AMBULANCE SERVICES: SOMAC, SEVAC, WAVAC, CAVAC AND GLAS

Regional not-for-profit ambulance services that generally use a paid ALS provider and a volunteer driver.

Southern Madison County Ambulance Corp (SOMAC) is based in Hamilton and serves the urban communities adjacent to Colgate University in the southeast area of Madison County.

- Paid staff: 8 paramedics, 27 EMTs and 6 drivers. No volunteers.
- Operate 2 Type III ALS ambulances in acceptable to good condition.
- There were 676 responses in calendar year 2015.
- Reported 553 responses within the Primary Service Area (PSA) and 41 outside the PSA.
- Were unable to respond to 10 calls because they were on another call (9) and staff (1).
- Charge for transport.

SOMAC Community Support			
2015 received		2016 anticipated	
Town of Hamilton	\$114,000	Town of Hamilton	\$187,500
		Village of Earlville	\$10,696
		Village of Hamilton	\$84,037
		Town of Lebanon	\$37,865
		Colgate University Donation	\$37,500
2015 Total	\$114,000	2016 Total	\$357,598

Figure 19: SOMAC 14:59 minute travel time map

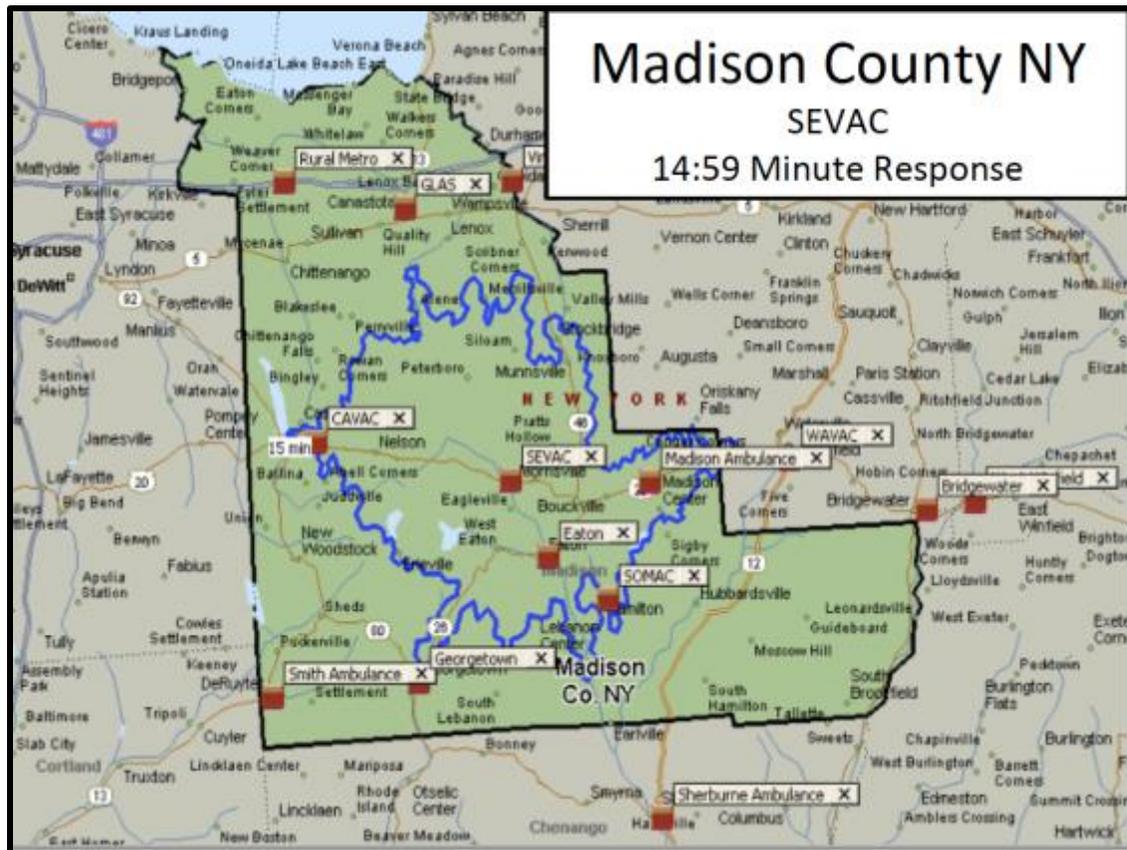


Smithfield-Eaton Volunteer Ambulance Corp (SEVAC) is based in Morrisville and serves Smithfield, Eaton as well as the urban communities adjacent to Morrisville State College in the central area of Madison County.

- Did not participate in the online survey.
- From 7 am to 5 pm weekdays provide paid ALS provider at station with a volunteer driver responding from community. Estimate 30 volunteers.
- Operate one ALS Type III ambulance, a 2006 vehicle in good condition.
- There were 545 responses in 2015.
- No data on responses within the Primary Service Area (PSA) and outside the PSA.
- No data on 9-1-1 responses where SEVAC was unable to respond
- Charge for transport.

SEVAC Community Support			
2015 received		2016 anticipated	
Town of Smithfield	\$3,500	Town of Smithfield	\$3,500
2015 Total	\$3,500	2016 Total	\$3,500

Figure 20: SEVAC 14:59 minute travel time map



Cazenovia Area Volunteer Ambulance Corps (CAVAC) serves the urban Cazenovia district, as well as Fenner and Nelson in the central west area of Madison County.

Figure 21: Type I Ambulance - CAVAC



- Employ 10 paramedics and have 1 volunteer Critical Care EMT, 10 volunteer EMTs and 31 ambulance drivers.
- Operate two ALS Type I ambulances, a 2015 vehicle with 15,060 miles and a 2015 vehicle with 16,600 miles. Both in excellent condition.
- There were 1,015 responses in calendar year 2015.
- No breakdown of responses within the Primary Service Area (PSA) or outside the PSA.
- No data on calls were CAVAC was unable to respond. Charge for transport.

CAVAC Community Support			
2015 received		2016 anticipated	
Town of Cazenovia	\$156,228	Town of Cazenovia	\$150,566
Town of Fenner	\$20,797	Town of Fenner	\$21,000
Town of Nelson	\$29,917	Town of Nelson	\$29,076
2015 Total	\$206,942	2016 Total	\$200,642

Figure 22: CAVAC 14:49 minute travel time map



Greater Lenox Ambulance Service (GLAS) serves the urban Village of Canastota district, as well as Lenox, Lincoln, and Wampsville in the central north area of Madison County.

- Employ 11 paramedics and 3 EMTs. Have 7 volunteer paramedics, 13 volunteer EMTs and 38 non-certified members.
- Provide paid staffing 96 hours a week and in-station volunteer crew 24 hours a week
- Operate two ALS Type III ambulances, a 2015 vehicle with 22,540 miles in excellent condition and a 2009 vehicle with 92,634 miles in very good condition.
- There were 1,436 responses in calendar year 2015. Reported 807 transports.
- Reported 1,091 responses within the Primary Service Area (PSA) and 345 outside the PSA.
- Were unable to respond to 52 calls because they were on another call, unit down for maintenance and crew availability.
- Charge for transport.

Figure 23: Type III Ambulance - GLAS



GLAS Community Support			
2015 received		2016 anticipated	
Town of Lenox	\$41,213	Town of Lenox	\$41,213
Town of Lincoln	\$9,800	Town of Lincoln	\$9,800
Total	\$51,013	2016 Total	\$51,013

Figure 24: GLAS 14:59 minute travel time map



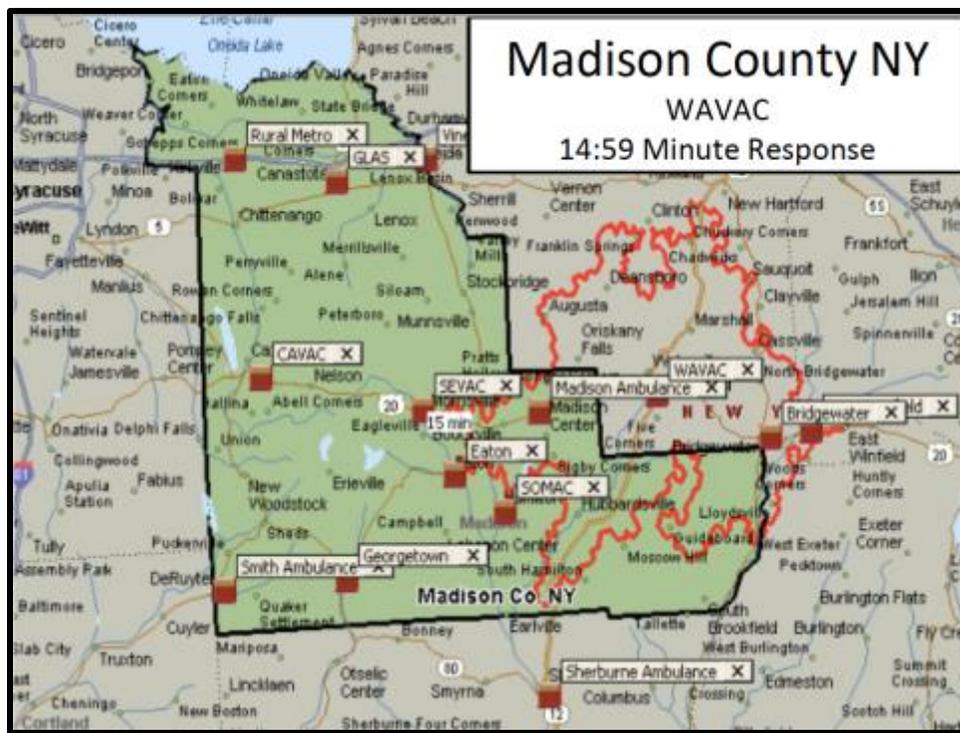
Waterville Area Volunteer Ambulance Corps (WAVAC) is based in Oneida County and covers Route 12, including Hubbardsville and Sigby Corners as well as Lloydsville and Guideboard communities.

- Paid medics and drivers.
- Operate one ALS Type III ambulance, a 2011 vehicle with 60,000 miles. Unit in good condition.
- Reported 380 responses within the Primary Service Area (PSA) and 20 outside the PSA in 2015.
- Were unable to respond to 25 calls because they were on another call.
- Charge for transport.

On April 14, 2016 WAVAC announced efforts to consolidate paramedic ambulance service with Oriskany Falls Volunteer Ambulance Corps (OFVAC) and Central Oneida County Volunteer Ambulance Corps (COCVAC). From a posting on the WAVAC Facebook page:

Our local governments and all three ambulance service agencies are currently reviewing options for a station and ambulance located within our district, managed and operated by COCVAC. This would dovetail in with the excellent First Responder capabilities the fire departments of our area already have, which will continue. It is our hope that this new service will, by the end of this year, seamlessly take over providing a locally based ambulance and serve our communities well for many years into the future⁴⁰.

Figure 25: WAVAC 14:59 minute travel time map



⁴⁰ <https://www.facebook.com/Waterville-Area-Volunteer-Ambulance-Corps-189066457807055/>

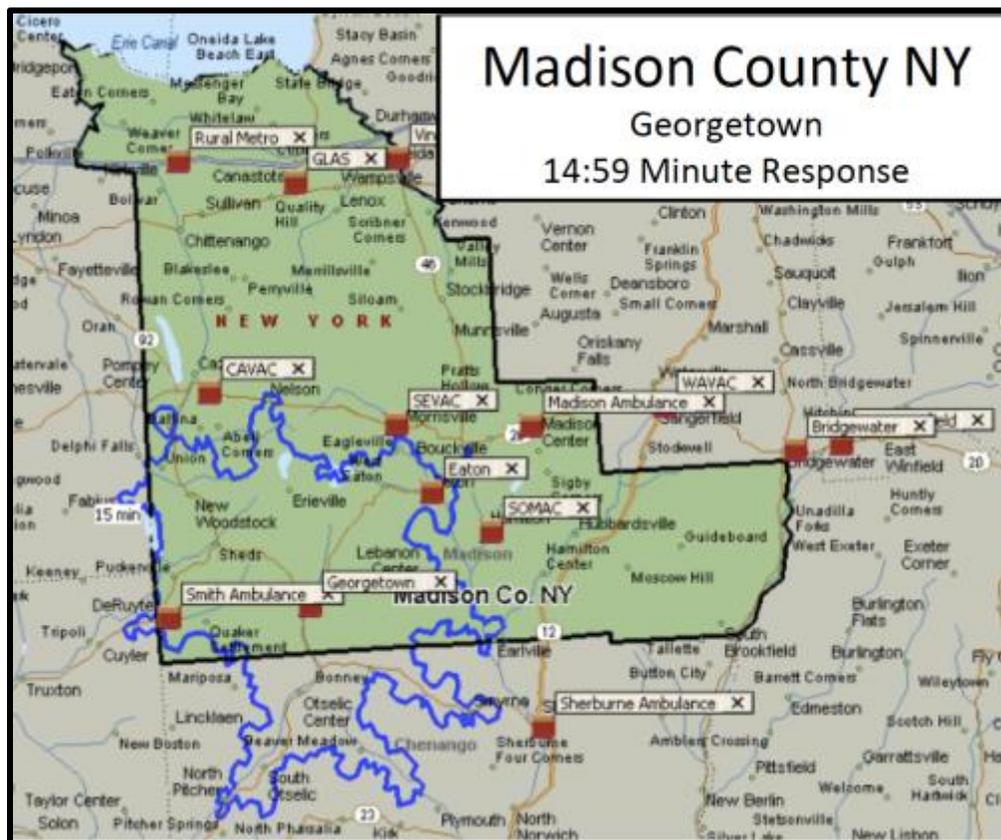
VOLUNTEER FIRE DEPARTMENT AFFILIATED AMBULANCES: GEORGETOWN, EATON, MADISON, BRIDGEWATER, SHERBURNE AND WEST WINFIELD

A unique aspect of ambulances operated by volunteer fire departments in New York is that they cannot charge for services. Fire departments operated by villages need to establish a separate ambulance agency to bill for EMS services. Madison County does not subsidize any ambulance service.

Georgetown EMS is based in the rural southwest of the county, co-located with the volunteer fire department. Georgetown serves the Georgetown and Lebanon communities.

- Volunteer crews, 1 member is paramedic and 2 members are EMTs.
- Operate one ALS Type I ambulance, in good condition.
- Consultant did not receive Georgetown's on-line survey.
- There were 109 responses in calendar year 2015.
- No data on responses within the Primary Service Area (PSA) and outside the PSA.
- No data on 9-1-1 responses where Georgetown was unable to respond.
- Charges for transport.

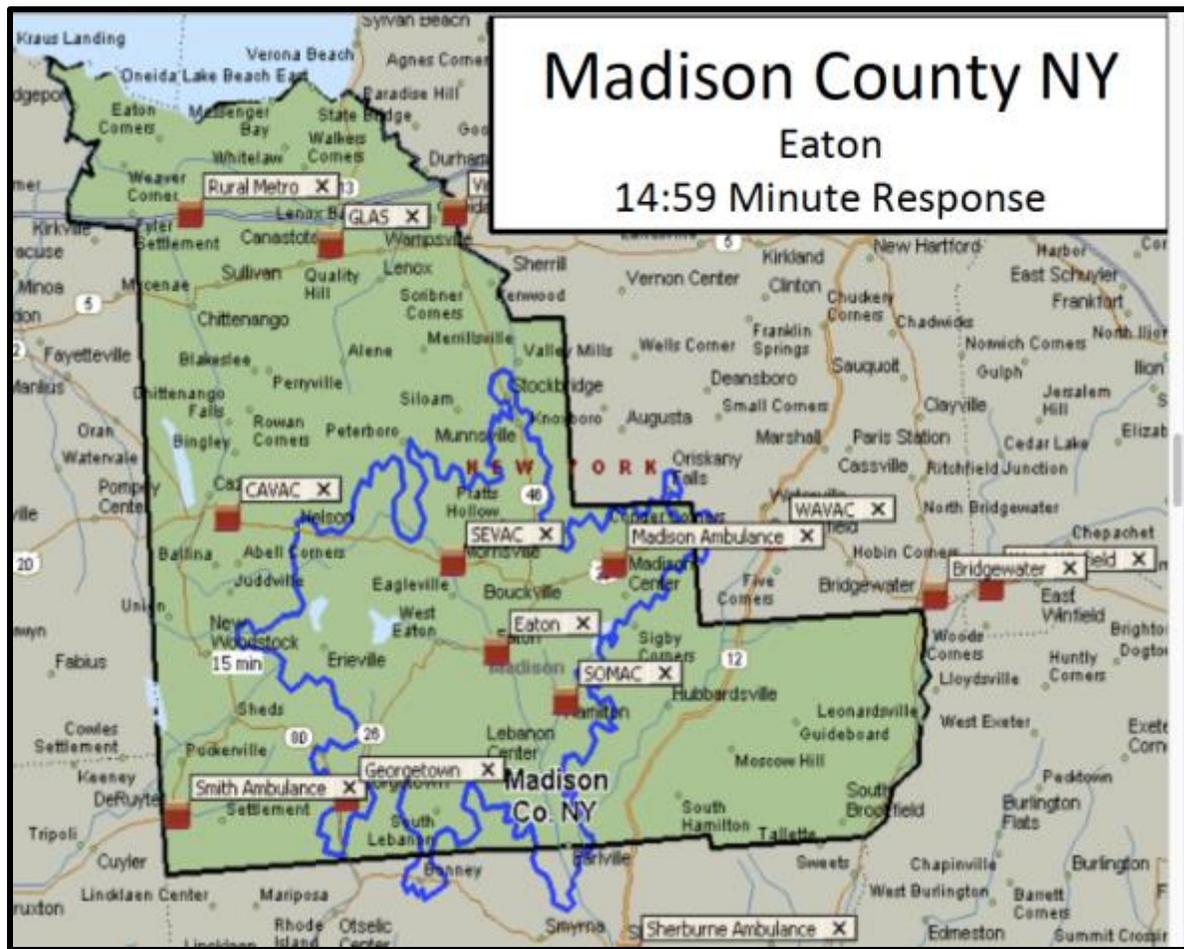
Figure 26: Georgetown EMS 14:59 minute travel time map



Eaton is based in the rural south-center of the county.

- Volunteer crews, 2 members are paramedics, 2 members are EMT-I or Critical Care and 5 EMTs
- Operate one ALS Type III ambulance, a 2014 vehicle with 9,200 miles in excellent condition.
- Did not provide total responses in calendar year 2015.
- There were 259 responses in 2015.
- No data on responses within the Primary Service Area (PSA) and outside the PSA.
- Were unable to respond to 10 calls, 1 due to equipment and 9 due to staffing.
- Does not charge for transport.

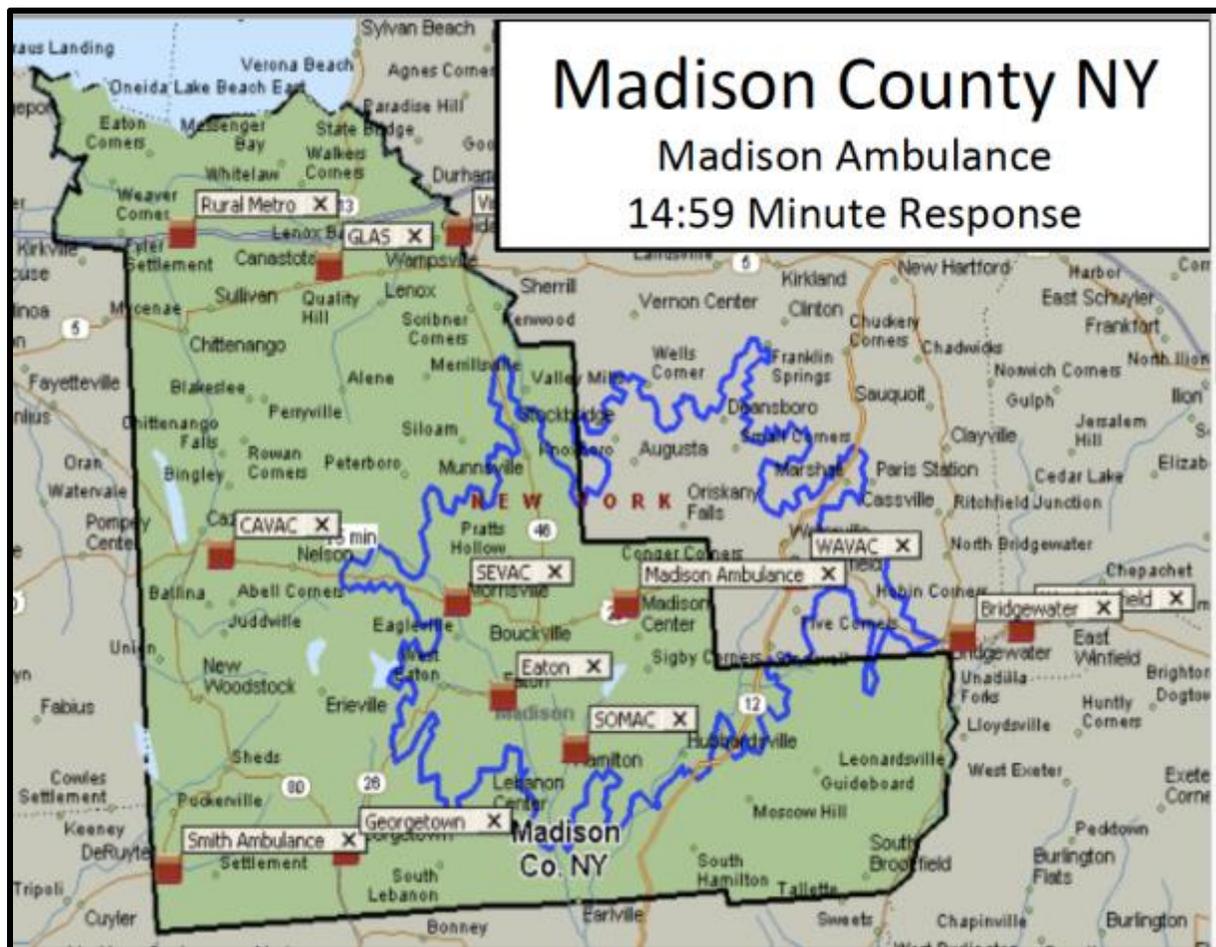
Figure 27: Eaton 14:59 minute travel time map



Madison Ambulance serves the rural mid-east side of the county and is co-located with the volunteer fire department.

- Paid paramedics and drivers.
- Did not participate in the online survey.
- Madison Ambulance schedules per-diem paramedics for two other ambulance agencies.
- Operates one ALS ambulance.
- There were 407 responses in 2015
- No data on responses within the Primary Service Area (PSA) and outside the PSA.
- No data on 9-1-1 responses where Madison was unable to respond.
- Charges for transport.
- Ambulance provided \$60,500 support to Madison Fire in 2015, projected to provide \$80,500 support to Madison Fire in 2016.

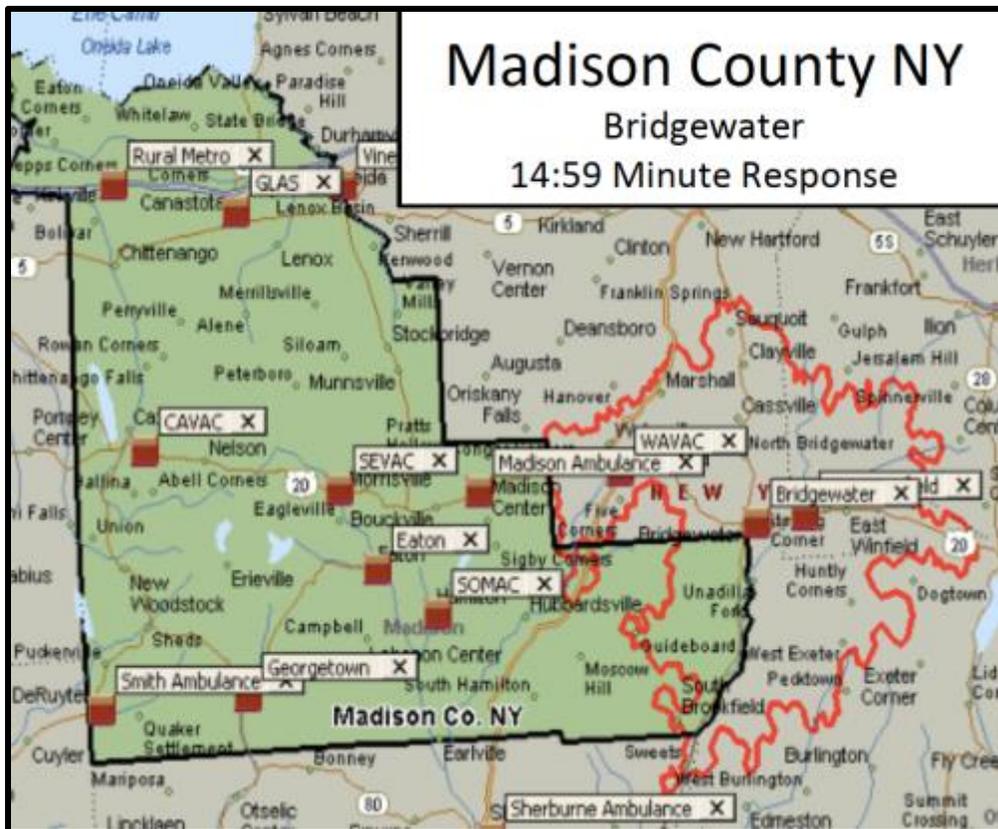
Figure 28: Madison 14:59 minute travel time map



Bridgewater is based in Oneida County. It covers in the rural southeast corner of Madison County including the Brookfield community.

- Volunteer crews, 6 members are paramedics. During in-station interview discussed difficulty in maintaining a cadre of volunteer ALS providers.
- Operate two ALS Type I ambulances, a 2015 vehicle with 12,000 miles and 2008 vehicle with 65,000 miles. Both units in very good condition.
- There were 400 responses into Madison County for calendar year 2015 – their service area includes both Oneida and Madison Counties.
- Reported 365 responses in Primary Service Area (PSA) and 58 outside the PSA.
- Were unable to respond to 5 calls because they were on another call.
- Do not charge for transport.

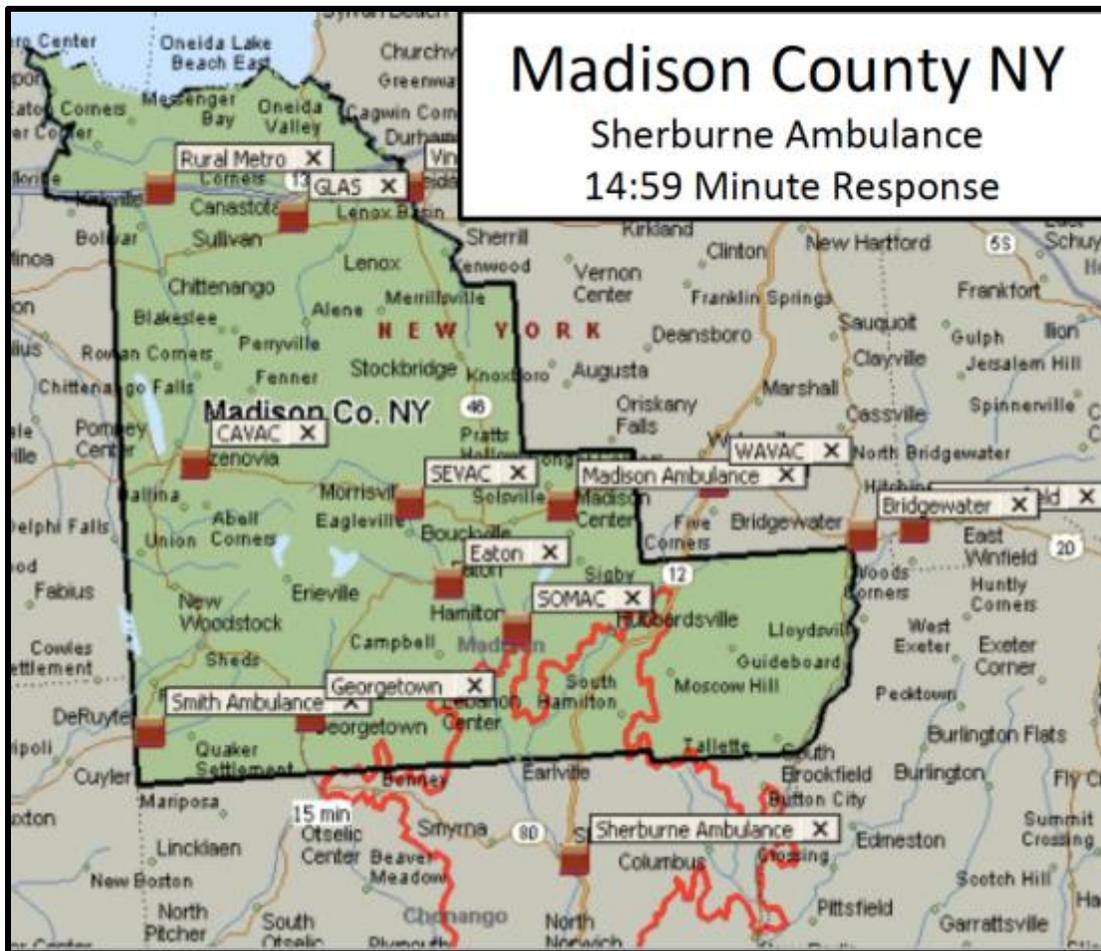
Figure 29: Bridgewater Ambulance 14:59 minute travel time map



Village of Sherburne EMS is based in Chenango County and co-located with the volunteer fire department. Covers a small rural section of Madison County that runs up Route 12.

- Mix of paid and volunteer: 15 paid ALS providers and 4 volunteer ALS providers; 10 paid EMT providers.
- Operate two ALS Type III ambulances, a 2011 with 40,000 miles in good condition and a 2004 vehicle with 52,000 miles in acceptable condition.
- Report 600 ambulance responses and 400 transports in calendar year 2015.
- No data on responses within the Primary Service Area (PSA) or outside the PSA.
- No data on calls they were unable to respond to.
- No data on 9-1-1 responses where Sherburne Emergency Squad was unable to respond.
- Charges for transport.

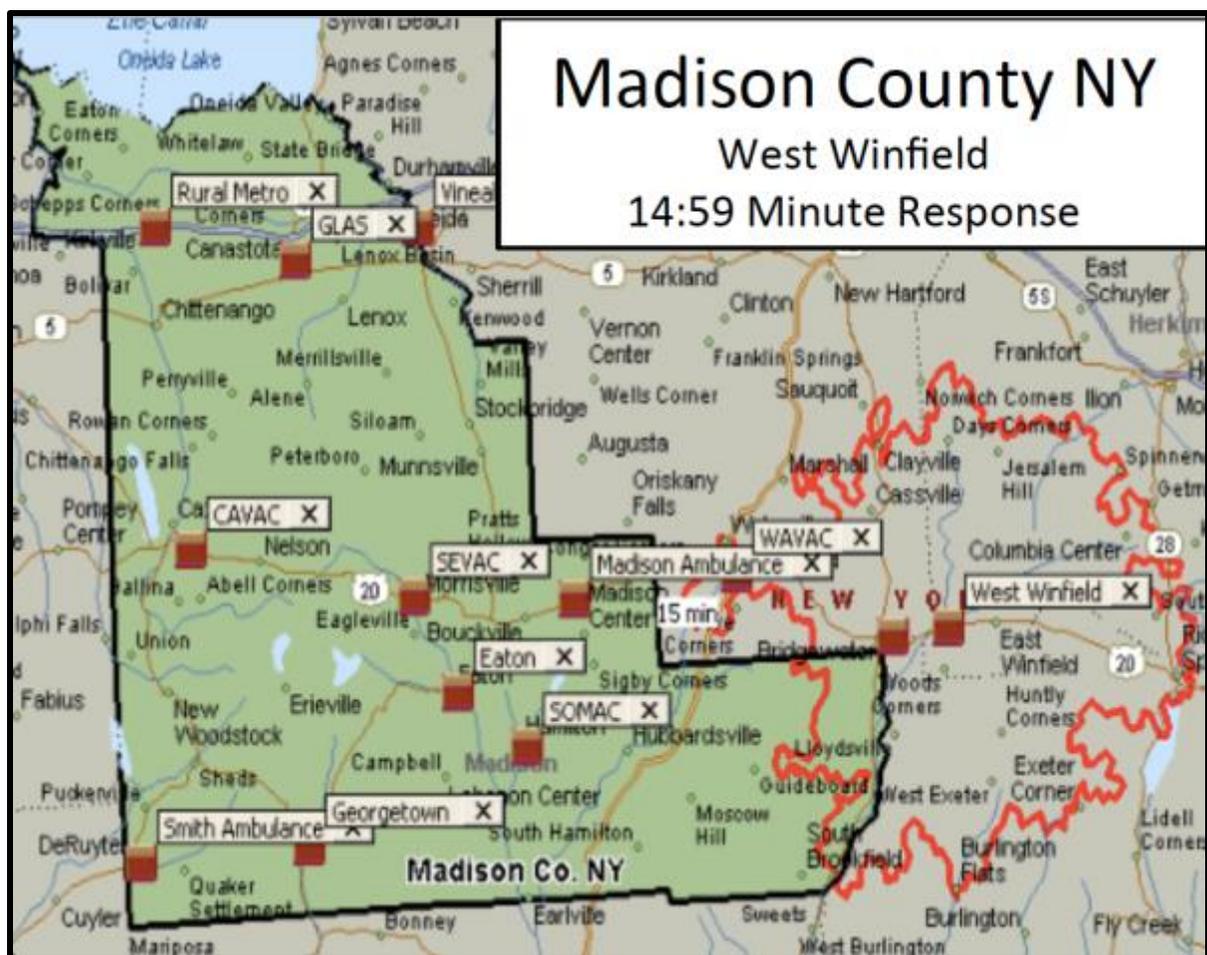
Figure 30: Sherburne Ambulance 14:59 minute travel time map



West Winfield is based in Herkimer County and serves the rural far central southeast corner of Madison County.

- Volunteer crews, 2 are paramedics, 4 are Critical Care EMTs, and 19 are EMTs.
- Operate two ALS Type III ambulances.
- Report 400 ambulance responses in calendar year 2015.
- No data on responses within the Primary Service Area (PSA) or outside the PSA.
- No data on calls they were unable to respond to.
- While the Village of West Winfield charges for ambulance service, a 2011 audit by the Office of the New York State Comptroller identified inconsistencies in determining which entity is issuing ambulance bills.⁴¹

Figure 31: West Winfield 14:59 minute travel time map



⁴¹ Division of Local Government and School Accountability (2012) Village of West Winfield: Internal Controls Over Selected Financial Operations. State of New York Comptroller. Accessed 5/17/2016 from: <http://www.osc.state.ny.us/localgov/audits/villages/2012/westwinfield.pdf>

Mass Casualty Surge Capability

Community Hospital in Hamilton and Oneida Healthcare in Oneida are community hospitals within Madison County.

Oneida Healthcare recently renovated 13 examination rooms in the emergency department and sees 26,000 patients a year. Offers on-call pediatric, surgery, cardiology and OB/GYN coverage. In the event of a mass-casualty event, the hospital could initially handle 2 critical and 3-4 moderate patients. Critical patients will be stabilized and transferred to a trauma, specialty or more comprehensive hospital.

Community Hospital emergency department has 5 examination rooms and 2 critical care rooms. Offers cardiology, orthopedics and respiratory coverage. In the event of a mass casualty event the hospital could initially handle 1 critical and 1 moderate patient. Patients will be stabilized and transferred to a trauma, specialty or more comprehensive hospital.

Through Air Medical Services Clearinghouse⁴², a regional coordination center for helicopter ambulance transport, Madison County has access to four services: LifeNet, Mercy, State Police and Onondaga County Sheriff.

Ambulance surge capacity is a combination of on-duty staffing and available vehicles. Based on 2015 “Dispatch to Enroute” data and interviews, this is the anticipated response to a mass casualty event, such as an overturned bus with dozens of injured passengers.

4 ambulances will be responding within 3 minutes:

CAVAC	SOMAC
GLAS	Vineall (no data, on-duty paid crew)

10 ambulances will be responding within 6 minutes:

Bridgewater	SEVAC
Eaton	Rural/Metro
Madison	Vineall – 2 nd ambulance (no data, on-duty paid crew)
Georgetown	WAVAC (no data, on-duty paid crew)
Smith	Sherburne (no data, on-duty paid crew)

6 additional ambulances will be staffed by crews responding to the station within 20 minutes:

Bridgewater	SOMAC
CAVAC	Vineall - 3 rd ambulance
GLAS	
Smith	

⁴² <http://www.cnyems.org/documents/listings/ams%20emergency%20contact%20information.pdf>

COLLEGE CAMPUS EMS

Three of the isolated urban areas in Madison County include a college or university:

- Cazenovia College in Cazenovia – 1,181 students
- Colgate University in Hamilton - 3,015 students
- Morrisville State College in Morrisville - 3,710 students

The EMS workload generated by a college campus can be offset by encouraging development of a student-staffed EMS service, either affiliated with an existing ambulance agency or as a separate organization.

According to the National Collegiate Emergency Medical Services Foundation there are 247 student-staffed EMS response organizations in the United States.⁴³



Cornell University and Syracuse University are the closest examples of a student-staffed emergency medical service.^{44 45}

LOW AIRMEDICAL UTILIZATION

Both Mercy Flight and LifeNet reported a decline in medivac utilization in recent years. With only two helicopter transports from Madison County requested through Air Medical Services Clearinghouse in 2015 they feel their services are underutilized.

⁴³ National Collegiate EMS Foundation. "EMS Organization Database" Accessed March 30, 2016 from:

<https://www.ncemsf.org/resources/ems-organization-database/groups-listed-by-region>

⁴⁴ Cornell University Emergency Medical Services. Accessed March 30, 2016 from: <http://cuems.cornell.edu/>

⁴⁵ Syracuse University Ambulance. Accessed March 30, 2016 from <http://sua.syr.edu/>

DETERMINING APPROPRIATE RESPONSE TIMES

The New York Municipal Home Rule Law empowers a city, town or village to manage their affairs. The lingering effects of the 2008-2009 Recession pushed many municipalities to consolidate, regionalize or contract out city, town or village services.

EMS in Madison County is a community of contrasts, with pockets of urban communities adjacent to large rural landscapes. This diversity is reflected in the many different types of organizations providing ambulance service.

The cost of requiring an urban EMS capability in a rural community would be ineffective. Each community needs to determine what is an acceptable EMS response time.

Recommendations –

10. All EMS services should examine response time performance criteria of simultaneous ambulance responses.
11. Provide closer coordination between training provider and response agency to achieve 90% student success on initial EMR/EMT certification and 85% student success on initial paramedic certification.
12. Develop a working group (911, 1st responders, EMS, hospital and citizens) to determine EMT and Paramedic response time standards for each community. This group examines existing data and determines future response times goal.
13. Establish EMR and EMT recertification course schedule 24 months in advance, reflecting anticipated enrollment based on expiration dates of Madison County providers.
14. Establish working group to see how three colleges can enhance EMS response on campus.
15. Retrospective analysis of medivac transports in last three years.

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

Each first responder and ambulance service has a physician medical director. New York uses Regional Medical Advisory Committees (REMAC) that allow for local medical direction and guidance in the development of regional EMS systems. Madison, Oneida and Herkimer counties are served by Midstate REMAC.

Midstate REMAC is a committee of the Regional EMS Council. REMAC has five or more physicians and representatives from the council, hospitals and basic and advanced life support providers. They have the authority to develop policies, procedures, and triage, treatment and transportation protocols which are consistent with the state regulations, and which address specific local conditions.

There appears to be a custodial relationship between the physician medical directors and EMS agencies, one physician stating “I know I am a medical director but I am not sure which agencies I cover.”

Outside of Rural/Metro, it appears that physician review of out-of-hospital EMS care is episodic and driven by complaints or high-profile events. This is how REMAC processes issues.

In 2007 the New York State Emergency Medical Services Council provided a new direction for a more comprehensive QA/QI program at the ambulance service level that complies with Article 30, Section 3006 requirement as well as Part 800.21 (q) (r) of the Rules and Regulations of New York State⁴⁶. A workbook was issued to assist ambulance service level providers develop their quality improvement process⁴⁷.

Ambulance agencies receive limited feedback or outcome information from patients transported to a STEMI, stroke or trauma center.

Both Emergency Department and EMS caregivers mentioned communication difficulties when service or procedure changes are made at the community emergency departments at Community and Oneida Health.

Recently, Madison County changed how the countywide EMS CQI meetings are held, changing to an education focused session.

⁴⁶ https://www.health.ny.gov/professionals/ems/quality_improvement/

⁴⁷ New York State Emergency Medical Services Council (March 2007) [Quality Improvement for Prehospital Providers: Workbook and Guidance Document for Service Level and Regional Level Quality Improvement Activities](#). Accessed June 22, 2016 from http://www.health.ny.gov/professionals/ems/pdf/quality_improvement_for_prehospital_providers.pdf

Recommendations

16. Establish a work group involving agency medical directors, ambulance services, first responders, 911, hospital and council to create a state of the art Quality Improvement (QA/QI) program for each and every service.
17. Establish a continuing pre-hospital education program that is built from the local QI process and reflects national best practices in pre-hospital care.
18. Increase participation by Community (Hamilton) and Oneida Healthcare (Oneida) hospitals and EMS providers in continuing education, quality improvement.
19. Increase participation by regional STEMI, Stroke and Trauma centers and EMS community in continuing education and quality improvement.

CUSTOMER AND COMMUNITY ACCOUNTABILITY

Customer/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 of system performance are utilized.
- Internal customer issues are routinely addressed.

Observations and Findings

All ambulance providers and Oneida Fire are properly authorized to provide advanced life support service in Madison County.

The ambulance crews have a professional appearance and the vehicles are clean and in good condition. The volunteer first responders and emergency medical technicians often respond from home or work and will not be in uniform. Many systems require that caregivers have a photo ID that identifies their affiliation and level of medical certification.

There does not appear to be a formal local mechanism to address patient and community concerns. There is no independent measurement or reporting of system performance.

Recommendations

20. Provide internal monthly report of first responder, ambulance and paramedic response times to all system participants and municipalities.
21. Ensure the system has a formal mechanism to address patient and community concerns.

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 EMS system does not report the number of hours of public education, prevention or public awareness programs accomplished by participants in the system. Community education and awareness activities are conducted by individual agencies, but these are not coordinated in a systemic fashion.

There are significant opportunities for system participants to become more tightly linked with the broader community through education programs directly and through allied organizations such as the Community Health Improvement Plan, Red Cross and American Heart Association.

Ambulance and fire departments typically offer a wide variety of public education activities as a mechanism to maintain community connectivity. These programs range from on demand car seat inspections to free home injury prevention inspections for families with toddlers or seniors. Junior Paramedic programs, Mass CPR training events, like the “Hands-Only” training at Oneida High School⁴⁸, and Scouting Explorer Posts are meaningful ways the service can engage their respective community. Partnering with other community organizations increases community awareness in EMS and could result in additional volunteer caregivers. These can be designed and implemented with little investment and are limited only by the creativity of the individual services’ leadership.

Attracting, retaining and developing staff is increasingly becoming a priority for emergency medical system operations. Expanded recruitment and retention efforts are central to volunteer participation in central New York. A wide variety of strategies are utilized in other communities as outlined at below.

⁴⁸ (2015, November 25) “Oneida High School Trains Entire Student Body in Hands-Only CPR” Madison County Courier. Accessed March 30, 2016 from <http://madisoncountycourier.com/?p=64774>

Examples of System Recruitment Efforts:

Interactive

- Action displays.
- Open houses.
- Public venues.
- Word of mouth.
- TV & Radio interviews.
- Membership drives.
- Person to person.

Media

- Web pages and email.
- Media (radio, print, TV).
- Signs, brochures, and flyers.
- Bill boards.
- Volunteer telethon

Networks & Other Sources

- Pre EMS classes.
- Youth and School Volunteer recruitment by teaching in local schools
- Employer supported volunteerism development programs through the Chamber of Commerce.
- Placement of volunteer recruiting materials in utilities, tax bills, etc.
- Local tax credits or incentives for volunteers

In addition to general community education programs and efforts to recruit volunteers, the Madison County Department of Health should integrate EMS in its educational programming to reach at risk populations. If the County wished to expand the public education to include “at risk” populations that may directly impact clinical outcomes, it should consider reviewing the call types commonly requested and do an analysis of specific at risk groups within the service area.

Community Health Improvement Plan (CHIP) is a long-term, systematic effort to address public health problems based on the results of community health assessment activities and the community health improvement process⁴⁹.

Communities in other areas have identified elderly (falls), diabetics, asthmatics and heart failure patients as key “at risk” groups. Redirecting outreach efforts to those patients, as an attempt to

⁴⁹ <https://www.cdc.gov/stltpublichealth/cha/plan.html>

prospectively reduce their probability of requiring EMS service at a measurably significant rate, would be very beneficial.

EMS is involved in CHIP usually includes providing CPR training, installation of car seats, health fair assessments and blood pressure checks at the ambulance station.

Some EMS systems are expanding their participation in response to the changes in health insurance reimbursement from the Affordable Care Act. Williamson County EMS, (Texas) is involved two CHIP initiatives:

- Part of group developing electronic patient referral protocols among the Delivery System Reform Incentive Payment providers. (Part of reimbursement changes due to the Affordable Care Act).
- Part of Mental Health Task Force – move to a medical home model instead of EMS and ED for episodic care⁵⁰.

COMMUNITY BASED CARE TRANSITION PROGRAMS

Paramedics are participating in community based care transition intervention (CTI) programs⁵¹ that are designed to assist high-risk patients recently discharged from hospital to avoid a hospital re-admission.⁵² This process starts with a scheduled visit by the paramedic at the patient's home one to two days after discharge. The paramedic reviews the discharge instructions with the patient and determines if all of the medications were obtained and follow-up appointments were scheduled. Depending on the patient's recovery plan, there may be additional home visits made by the paramedic.

Recommendations

22. Provide local tax credits or incentives for volunteers
23. Develop a program and identify resources to improve community awareness of the EMS system and promote involvement in the volunteer agencies.
24. Identify how EMS can be a larger participant in the current Community Health Improvement Plan.
25. Explore opportunities for community outreach, such as the Care Transition Intervention (CTI) ED-to-home program.

⁵⁰ http://assets.thehcn.net/content/sites/wcchd/WilCo_CHIP_04_10_14_20140410070710.pdf

⁵¹ North Carolina Quality Center. "Care Transitions Collaborative Reduces Readmissions and Engages Patients in their Health" accessed May 13, 2016 from <https://www.ncqualitycenter.org/care-transitions-collaborative-reduces-readmissions-and-engages-patients-in-their-health/>

⁵² NY Department of Health. (2016 January) "Improving the Discharge Process in New York State" accessed March 30, 2016 from https://www.health.ny.gov/press/reports/docs/discharge_plan_brief.pdf/

26. Prepare and distribute an annual report to community describing the accomplishments of the EMS system.

ORGANIZATIONAL STRUCTURE AND LEADERSHIP

Organizational Structure and Leadership Benchmarks

- A local lead 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 process.
- A structured performance/quality improvement (QI) system exists, addressing administrative as well as clinical issues.

Observations and Findings

Emergency Medical Services is a state-regulated activity that is delegated to regional councils and then to individual EMS agencies.

Mid State is the regional EMS council that covers Oneida, Herkimer and Madison Counties. The issues that resulted in this study cover the issues that affect Madison County residents that are larger than an individual EMS agency and smaller than the regional council.

HUMAN RESOURCES

Who will replace legacy volunteer medics?

Since the 1990's a dedicated cadre of Madison County residents expanded ALS ambulance coverage to all communities. During the face-to-face visits determined that ambulance agencies serving rural communities are dependent on a single ALS provider with decades of service. There is no successor identified to take over when the legacy medic steps down.

Eroding EMS Volunteers

Volunteer fire chiefs mentioned a continuing reduction in the number of new members who obtain EMS provider credentials.

Doubtful surge capacity

A little more than half of ALS providers work as per-diem medics, paid an hourly wage without benefits. Some work as a career medic or firefighter outside of Madison County. In the event of a flu outbreak or major disaster there will not be a lot of off-duty medics available to staff additional ambulances.

Developing supervisor, manager and administrator skills

EMS does an inadequate job in preparing caregivers to progress into supervisor, manager or administrator positions. A good caregiver is expected to be a good manager by “learning on the job.” The complexities and requirements of this heavily regulated industry require additional skill sets. The National EMS Management Association provides a description of the needed competencies.⁵³

BUSINESS PLANNING AND MEASUREMENT

Once the community working group determines acceptable response time standards (Recommendation 12), each ambulance agency needs to develop a business plan with measurable processes. That plan should be matched with an organizational quality improvement process.

Organizational Quality Improvement Processes

Sustaining high quality service is a difficult task. Ambulance service leaders are encouraged to integrate continuous quality improvement practices into their operations and administrative practices to the extent that those practices become an essential and seamless part of normal EMS routines.

The QI goals, approach, methodology, critical success factors and indicators should be clearly defined in the plan. Indicators should be monitored until improvement has occurred and the threshold or benchmark is achieved in a timely manner. Responsibility and accountability for the QI plan should be clearly defined. The ambulance service medical director should also be actively involved in developing the plan and receive regular reports. The plan should be reviewed and updated on an annual basis.

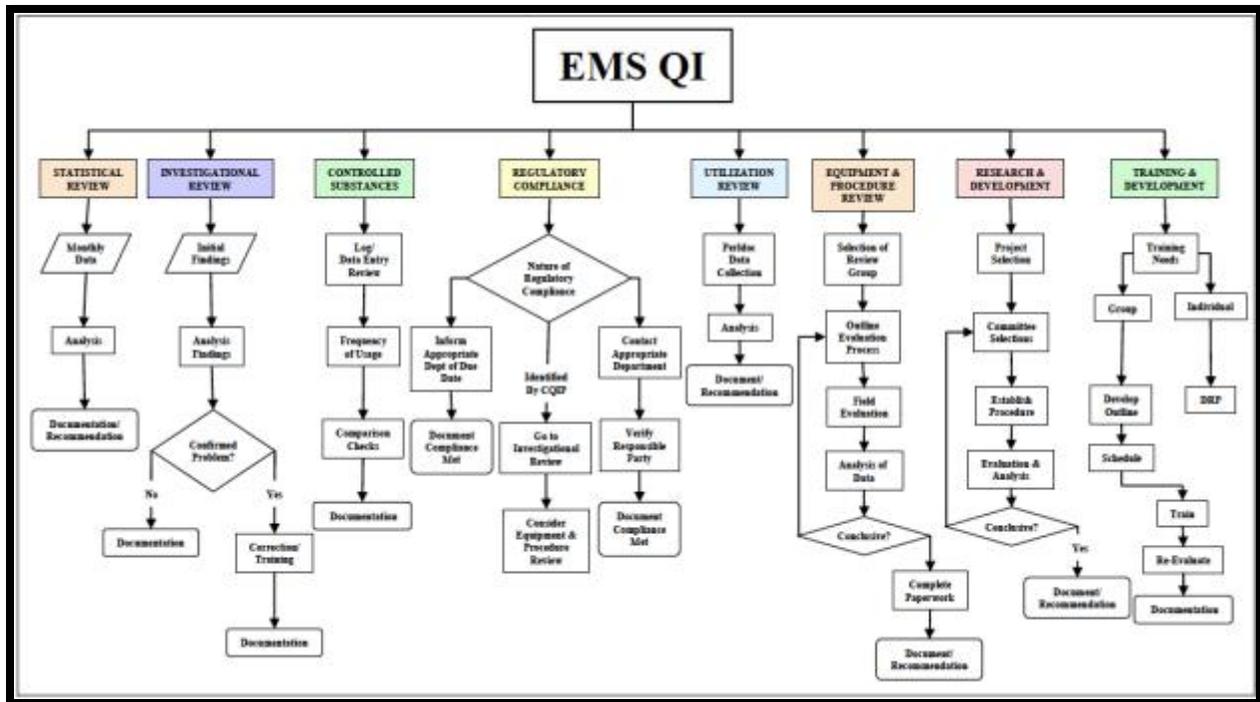
The local QI plan should include statistical indicators to be monitored monthly, including:

- Fractile Response Times
- Unit Hour Utilization (UhU)
- Productivity
- Call Load
- Scene Times
- Customer Satisfaction
- Vehicle Maintenance
- Deviation from Medical Protocols
- High Risk Procedures
- Regulatory Compliance
- Others the service or hospitals deem necessary

⁵³ National EMS Management Association. “The Seven Pillars of National EMS Officer Competencies”. Accessed May 13, 2016 from <https://www.nemsma.org/index.php/competencies/the-seven-pillars-of-national-ems-officer-competencies>.

Other QI measures such as Refusal Forms Compliance, Vehicle Readiness, Skills Maintenance, Billing Compliance and Utilization Review should be monitored until improvement has occurred, the benchmark achieved and an evaluation of the implemented changes occurs after a certain time period. Monitoring various patient outcomes and customer satisfaction should be included in the QI plan.

Figure 32: Proposed Retrospective QI process



Recommendations

27. Provide training for all personnel holding front-line and administrative supervisory positions within the EMS system; assure that each officer has the knowledge, skills and aptitudes to be an effective supervisor, manager or administrator.
28. Assist ambulance and first responder agencies in developing short and long term operational plans.

ENSURING OPTIMAL SYSTEM VALUE

Organizational Structure and Leadership 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

Quality processes that support the determination of the efficacy of 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 empirically document the benefits of pre-hospital service. Pain relief and customer satisfaction are not measured within the EMS system.

A key for Madison County ambulance agencies to show value is to build short and long term operational plans (Recommendation 26) that are tied to their Quality Improvement plan (Recommendation 16) that is referenced to the community's response time standards (Recommendation 12).

This is especially important when looking at the cost of providing ambulance coverage to that community. The goal is to provide appropriate and cost-effective service that meets the community's expectations.

There are some challenges:

1. Volunteer fire departments that provide ambulance transportation are not allowed to bill for services.
2. Adoption of the National Educational Standards by the Department of Health increases required training hours.⁵⁴
3. Need to develop report templates to provide usable data from Madison 911 CAD to determine chute times, Unit Hour Utilization and related time-on-task activities.

Recommendations

29. Develop an EMS 2020 plan to establish system resiliency and caregiver succession.
30. Put in place a mechanism to re-evaluate EMS delivery in 3 years.

⁵⁴ Department of Health. Transitioning to the National Educational Standards. Accessed May 13, 2016 from http://www.health.ny.gov/professionals/ems/national_education_standards_transition/

STATE TRENDS

State-promoted consolidation of municipal services

At the start of this year Governor Andrew Cuomo called for municipalities to explore consolidate of services. The Commission on Local Government Modernization (Consensus) issued a report advocating the merger of City of Syracuse and Onondaga County governmental functions

Within their analysis of EMS in Syracuse and Onondaga County, they note that Rural/Metro handles 60% of the Syracuse/Onondaga calls, with three large non-profit ambulance companies handling another 20%. There is substantial paid staff in all four organizations and 90% of the transports were billed.

The Consensus preferred EMS model for Syracuse-Onondaga would be: “A countywide system in which there are fewer providers seeking large territories. The future agencies would preferably be independent nonprofit agencies, private commercial agencies (under contract with specific performance criteria) or a combination.”⁵⁵

The Syracuse-Onondaga community responds to 200 calls a day with a total of 17 different EMS providers. Four providers handle 80% of the transports. The region is 794 square miles with 467,026 residents.

Madison County responds to 20 calls a day with a total of 14 different EMS providers. Three providers handle about 83% of the transports: Vineall, Rural/Metro, GLAS – all along the Route 5 corridor. Madison County is 661 square miles with 71,849 residents. South of the Route 20 corridor, the cost of providing rural EMS coverage is higher than the transport reimbursement.

Trends in New York EMS Regulations

The biggest impact for community caregivers is the adoption of the National Educational Standards for original (initial), transition and recertification. In many cases it has increased the number of hours required to complete or maintain an EMS credential.

Ambulance transportation to an alternate facility has not changed since the January 11, 2006, Policy Statement #06-01 on Emergency Patient Destinations and Hospital Diversions:

⁵⁵ Consensus (2016) Options Report & Preliminary Committee Recommendations: Public Safety – Emergency Medical Services. Page 34 Accessed May 18, 2016 from <https://www.cgr.org/consensusny/>

“Based on the mechanism of injury, assessment findings, treatment, state and local protocol, a patient, in need of emergency medical care must be taken to the nearest appropriate health care facility capable of treating the illness, disability or injury of the patient.

Ambulance services are under no obligation to transport patients to medical facilities not licensed under Article 28 of the Public Health Law. It is expected that the EMS provider will consult with a medical control physician, should there be questions of protocol, policies, procedures and transport destinations.”⁵⁶

The description of hospitals in Article 28 does not include Freestanding Emergency Departments or Urgent Care clinics. A 2013 background document noted that a Freestanding Emergency Department “may or may not receive patients by ambulance.”⁵⁷

Rural agencies expressed a concern that the 2015 requirements to comply with the Rules and Regulations of Controlled Substances – requiring a safe with two separate locks – will make it difficult in agencies with a single ALS caregiver in the agency.

⁵⁶ Bureau of EMS (2006 January 11) Emergency Patient Destinations and Hospital Diversion. Accessed May 18, 2016 from <http://www.health.ny.gov/professionals/ems/policy/06-01.htm>

⁵⁷ New York State Department of Health (2013 September 13) Free Standing Emergency Departments. Accessed May 18, 2016 from https://www.health.ny.gov/facilities/public_health_and_health_planning_council/meetings/2013-09-13/docs/feds_backgr_ound.pdf

EMS SERVICE OPTIONS

OPTION ZERO – STATUS QUO

If the community elects to make no changes, the consultant anticipates:

- Loss of paramedic service to the most rural communities as the single community-based ALS provider retires.
- Loss of one of the volunteer fire-based ambulance services. They are prohibited from charging for ambulance transportation and the cost of maintaining an ambulance service is unsustainable.
- Potential loss of WAVAC with the impending consolidation of three ambulance services in Oneida County.
- Erosion of credentialed EMS caregivers as they cannot obtain training in a timely fashion.
- Continued decline of active community volunteers as attrition exceeds arrival of new members.
- Increased financial need by not-for-profit and commercial ems agencies as the level of reimbursement declines while the cost of providing ambulance transportation increases.⁵⁸

OPTION ONE – COUNTY ALS AMBULANCE SERVICE

If Madison County wished to provide ALS ambulance service in place of existing providers it would cost \$3.97 million a year to operate and require an initial outlay of \$1.23 million in capital purchases.

It will cost \$661,773 a year in labor, vehicle expenses and supplies to run one ALS ambulance 24 hours a day, seven days a week.

Ambulance is staffed with a paramedic paid at \$20/hour and an EMT paid at \$15/hour with 28% in fringe benefits. Need 8,760 hours to staff a position 24 hours a day.

Labor expense - one 24 hour ALS ambulance	
1 EMT @ \$15/hour	\$ 167,731
1 Paramedic @ \$20/hour	\$ 223,642
	\$ 391,373

Non-labor costs for each ambulance include fuel, maintenance, vehicle repair, garage rent, uniform/protective gear replacement, medical equipment maintenance, medical equipment repair and unreimbursed medical supplies.

⁵⁸ Brumbaugh, J (2016 May 11) "EMS companies hope to unite to combat issues" The Tribune-Democrat. Accessed May 18, 2016 from http://www.tribdem.com/news/ems-companies-hope-to-unite-to-combat-issues/article_b838a1a4-17f1-11e6-a086-1b28d0438fa9.html

Ambulances in rural areas accumulate higher mileage than urban rigs, increasing fuel and vehicle maintenance. A similar sized rural regional ems agency in the northeast United States expends \$5,200 a week in these expenses.

Each 24-hour ambulance will cost \$391,373 in labor and \$270,400 in operating costs totaling \$661,773 of expenditures each year.

To meet both the workload in the urban communities and the NFPA 1720 response time in the rural areas the Madison County would need to staff six ALS ambulances. Specific deployment analysis of these units exceeds the scope of this study.

A Type II ambulance with a complete ALS package, including a 12-lead cardiac monitor and motorized stretcher, will cost \$175,000. To support a front-line fleet of six, the county should purchase seven ambulances to maintain coverage while a vehicle is getting repaired

Using the available data from 2015, we estimate 72% of the patients contacted by EMS are transported to a hospital, representing 5,040 transports. Based on similar communities, each transport bill should generate a \$750 charge.

Anticipating a 52% collection rate, the county would generate \$1,965,000 in cash available from user fees, leaving \$2,005,398 in unreimbursed annual expenses. CAVAC has reported a significantly higher collection rate. The 52% collection rate estimate is calculated from other northeast rural/suburban EMS agencies that are Fitch & Associate clients.

As a comparison, in 2016 Madison County taxpayers provided \$3,013,000 in support to the 22 volunteer fire departments in the County. This does not include Oneida City fire department at \$3,475,000.

OPTION TWO – COMMUNITY BASED EMERGENCY CAREGIVERS AND PARAMEDIC FLY CARS

Two patient outcome focus areas in Madison County is time-to-paddle for cardiac arrest patients and initial recognition and ALS intervention for bronchospasm, severe respiratory distress, ST-segment elevation myocardial infarction, persistent seizures and stroke.

Community-Based Emergency Caregivers (CBEC) is the evolution of bystander CPR training. When a critical call is processed, the ambulance is dispatched along with a smartphone alert to nearby CBECs of the emergency and the location of the nearest automatic external defibrillator.⁵⁹



This type of service has expanded in Jersey City to include the citizen responder receiving emergency medical responder training to expand the types of critical incidents that can be handled.⁶⁰

Using the PulsePoint vendor as an example, they can interface with either a TriTech or Tiburon CAD system. There is a start-up cost of \$10,000 and an annual license fee of \$8,000 a year.

Year 1: \$18,000.

Years 2 – 5: \$8,000 a year

This system can reduce the time-to-paddle segment by adding a resident that is closer to the emergency than the fire department or ambulance service. This service depends on an installed base of available public-access defibrillators and Bystander CPR trained residents with a smart-phone.

The costs do not include replacement of defibrillator pads. Fitch & Associates LLC has no financial relationship with PulsePoint. The Seattle Fire Department and Medic One Foundation adopted PulsePoint on June 1st⁶¹.

Paramedic Fly Cars are a single ALS caregiver in an SUV or small utility vehicle responding to EMS calls in addition to the fire department first responder and ambulance.

The paramedic fly car will have three roles in Madison County:

⁵⁹ <http://www.pulsepoint.org/implementation/>

⁶⁰ Luckritz, R. (2015 Dec 23) "Citizen Responder Program in N.J. Sends Laypersons to Emergencies." jems.com. Accessed May 18, 2016 from <http://www.jems.com/articles/print/volume-41/issue-1/features/citizen-responder-program-in-n-j-sends-laypersons-to-emergencies.html>

⁶¹ <http://www.businesswire.com/news/home/20160601005544/en/Medic-Foundation-Seattle-Fire-Urge-Citizens-Download>

- Assure advanced life support care is always available in the rural communities below Route 20.
- Provide back-up when simultaneous ambulance calls occur in the Route 5 corridor.
- Additional paramedic resource on multiple-patient events.

If the rural-based ambulance does not have a paramedic, and the patient requires advanced life support, the fly car paramedic will continue to provide care and ride in the ambulance to the hospital.

Recommend placing a 24-hour fly car in the rural community and a weekday fly car for Route 5. It will cost the county \$454,090 a year to provide this service.

Labor expense - One 24 hour & one 40 hour fly car	
1 Paramedic @ \$20/hour for 24/7	\$ 223,642
1 Paramedic @ \$20/hour weekday	\$ 53,248
	\$ 276,890

The capital cost of a response 4WD SUV with 12-lead cardiac monitor and appropriate ALS equipment, similar to the equipment carried by the City of Oneida Fire Department Rescue Truck will be \$96,000.

Non-labor costs for each fly car include fuel, maintenance, vehicle repair, garage rent, uniform/protective gear replacement, medical equipment maintenance, medical equipment repair and unreimbursed medical supplies.

A similar sized rural regional EMS agency expends \$135,200/year per 24-hour SUV in annual non-labor costs, and \$42,000/year per weekday SUV in annual non-labor costs.

Reimbursement may be available if the fly car paramedic is the sole provider of ALS care. It will require agreements between the ambulance agencies and the county to define the process.

OPTION THREE – REINFORCE EXISTING PROVIDERS THROUGH REGIONAL SUPPORT

Madison County could reduce cost of EMS operations, assure county-wide ALS coverage and increase the number of volunteer EMS caregivers through:

- Group purchases
- Locally provided original and refresher EMS certification training.
- Accelerated volunteer recruitment and training
- Coordinated regional coverage

The county could establish group specification and purchasing of equipment, ambulances, insurance coverage, billing services and benefits on a county-wide basis.

Providing additional locally provided caregiver original and recertification training seems to be an obstacle under the state reimbursement plan. Madison should consider funding training programs to meet the gap identified in this study.

Accelerate the process for a person to go from interested neighbor to qualified caregiver, building upon the existing CAVAC Student Corp⁶² program. Access into original certification courses should be accelerated and student success should be tracked.

Consider regional coverage for EMS providers. This means that a caregiver from Company C may cover a position for a Company D ambulance. The City of Virginia Beach Department of Emergency Medical Services coordinates staffing for 10 volunteer rescue squads and the city career providers to provide 8 ambulances, 3 ALS zone car/quick response vehicle, field supervisor, and shift commander.⁶³

OPTION FOUR – COUNTY-WIDE CONTRACTING OF EMS SERVICES

Madison County could establish a county-wide EMS Certificate of Need and contracting with qualified providers. The providers selected could include existing ambulance services.

The county could utilize the community-developed EMT and Paramedic response times for their community (Recommendation 12) in a performance-based contract for ambulance services. They can match paramedic coverage with workload needs and reduce the wait time when there are two or more simultaneous EMS calls in one community.

Option Four meets the spirit of the state-wide initiative to consolidate municipal services and expand public-private partnerships. Option Four also provided an opportunity for EMS to participate as an element of an Accountable Care Organization (ACO). ACOs are groups of doctors, hospitals, and other health care providers, who come together voluntarily to give coordinated high quality care to their Medicare patients.

The goal of coordinated care is to ensure that patients, especially the chronically ill, get the right care at the right time, while avoiding unnecessary duplication of services and preventing medical errors.⁶⁴

⁶² CAVAC Student Corps. Accessed May 18, 2016 from <http://cavacambulance.org/student/>

⁶³ Virginia Beach Department of Emergency Medical Services (2013 December 3) Operations: EMS Duty Policy. Accessed May 18, 2016 from http://www.vbems.com/deputychief/documents/Policies_PDF/103.01.01.EMS_Duty_Policy.pdf

⁶⁴ Centers for Medicare and Medicaid Services. Accountable Care Organizations (ACO). Accessed June 22, 2016 from <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/ACO/index.html?redirect=/Aco/>

SUMMARY: BUILDING MADISON COUNTY EMS 3.0

Healthcare reform is disrupting the way we have provided Emergency Medical Services for the past 40 years. The Institute of Healthcare Improvement's (IHI) Triple Aim is to:

- Improve the patient experience of care, including quality and satisfaction
- Improve the health of populations
- Reduce the per capita cost of health care.

Emergency Medical Services can provide an integrated menu of emergency and preventative services that meet the particular need of their communities.

The value EMS brings to the transforming health care system includes:

- EMS is fully mobile and able to address patient needs 24 hours a day, seven days a week, and 365 days a year.
- EMS is an expected, respected, and welcomed source of medical assessment and care in people's homes and elsewhere in the community.
- EMS provides highly reliable patient assessment and intervention during calls to 9-1-1 and in response to emergency, urgent or unscheduled episodes of illness or injury.⁶⁵

The high priority recommendations in this report address the immediate needs to improve day-to-day service as well as start the framework for a data-driven, quality focused collaboration to take advantage of service opportunities that are imminent.

⁶⁵ McGinnis, K. "EMS 3.0: Realizing the Value of EMS in Our Nation's Health Transformation" presented April 5, 2016 at the National Association of State EMS Officials Spring 2016 Meeting in Bethesda, Maryland. Accessed May 13, 2016 from: <https://www.nasemso.org/Meetings/MidYear/documents/NAEMSO-EMS-3.0-McGinnis-05Apr2016.pdf>

RECOMMENDATION SUMMARY

Recommendations are made understanding the concerns of Home Rule and New York Local Government Efficiency initiative.

H – High, do within 6 months

M – Medium do within 6 to 18 months

L – Low do when time/resources available

9-1-1 and COMMUNICATIONS

1. All EMS services operating in the county should be fully integrated into the 911 radio/dispatch system for activation and measurement of performance. **H**
2. Require TriTech to improve the quality and usability of 911 incident data record reports. **H**
3. Quarterly performance metrics should be reported to the Public Safety Committee of the Board of Supervisors. **H**
4. Working group to discuss feasibility of closest EMS unit should be established. **M**
5. Implement System Status tracking using GPS/AVL. **M**
6. Evaluate the ability to develop an interface from Madison 911 to field units to receive automatic electronic patient care reporting data. **L**

MEDICAL FIRST RESPONSE

7. Expand access to initial and continuing emergency medical responder education. **H**
8. Increase the number of EMT and paramedic caregivers through use of blended training and broad-band computer access. **M**
9. Assist agencies in analyzing how they can reduce arrival to patient and paddle placement times. **M**

MEDICAL TRANSPORTATION

10. All EMS services should examine response time performance criteria of simultaneous ambulance responses. **H**
11. Provide closer coordination between training provider and response agency to achieve 90% student success on initial EMR/EMT certification and 85% student success on initial paramedic certification. **H**
12. Develop a working group (911, 1st responders, EMS, hospital and citizens) to determine EMT and Paramedic response time standards for each community. This group examines existing data and determines future response times goal. **H**

13. Establish EMR and EMT recertification course schedule 24 months in advance, reflecting anticipated enrollment based on expiration dates of Madison County providers. **M**
14. Establish working group to see how three colleges can enhance EMS response on campus. **M**
15. Retrospective analysis of medivac transports in last three years. **L**

MEDICAL ACCOUNTABILITY

16. Establish a work group involving agency medical directors, ambulance services, first responders, 911, hospital and council to create a state of the art Quality Improvement (QA/QI) program for each and every service. **H**
17. Establish a continuing pre-hospital education program that is built from the local QI process and reflects national best practices in pre-hospital care. **H**
18. Increase participation by Community (Hamilton) and Oneida Healthcare (Oneida) hospitals and EMS providers in continuing education, quality improvement. **H**
19. Increase participation by regional STEMI, Stroke and Trauma centers and EMS community in continuing education and quality improvement. **M**

CUSTOMER AND COMMUNITY ACCOUNTABILITY

20. Provide internal monthly report of first responder, ambulance and paramedic response times to all system participants and municipalities. **H**
21. Ensure each service has a formal mechanism to address patient and community concerns. **M**

PREVENTION AND COMMUNITY EDUCATION

22. Provide local tax credits or incentives for volunteers. **H**
23. Develop a program and identify resources to improve community awareness of the EMS system and promote involvement in the volunteer agencies. **H**
24. Identify how EMS can be a larger participant in the current Community Health Improvement Plan. **M**
25. Explore opportunities for community outreach, such as the Care Transition Intervention (CTI) ED-to-home program. **M**
26. Prepare and distribute an annual report to community describing the accomplishments of the EMS system. **L**

ORGANIZATIONAL STRUCTURE AND LEADERSHIP

27. Provide training for all personnel holding front-line and administrative supervisory positions within the EMS system; assure that each officer has the knowledge, skills and aptitudes to be an effective supervisor, manager or administrator. **M**
28. Assist ambulance and first responder agencies in developing short and long term operational plans. **M**

ENSURING OPTIMAL SYSTEM VALUE

29. Develop an EMS 2020 plan to establish system resiliency and caregiver succession. **M**
30. Put in place a mechanism to re-evaluate EMS delivery in 3 years. **L**

GLOSSARY OF TERMS

accountable care organizations (ACOs) Combinations of hospitals, primary care physicians, and possibly specialists associated with a defined population of patients accountable for the total Medicare spending of that patient population.

advanced life support (ALS): Advanced life support (ALS) Enhanced assessment, invasive life support techniques provided by EMT-Paramedics who have completed a 1,000- to 1,500-hour vocational/technical certification course.

arrival to patient time: The interval from the time the communications center receives enough information to initiate the response to the time the first EMS caregiver arrives at the patient's side.

ambulance: A vehicle (automotive, airborne, or waterborne) used for transporting medical personnel and equipment to the location of a sick or injured person, and for transporting sick or injured individuals to a location where further care can be provided.

automatic aid: An agreement between an emergency response agency and neighboring jurisdictions to have the outside agency requested along with the host agency on the initial dispatch.

automatic vehicle location (AVL): Automatic vehicle location (AVL) System that makes use of the GPS to enable an ambulance service (or other agency) to remotely track the location of its vehicle fleet. AVL systems combine GPS technology, cellular or radio frequency communications, street mapping, and computer software to connect the pieces to a computer where vehicle location is displayed.

basic life support (BLS): Basic life support (BLS) Basic assessment and noninvasive clinical techniques provided by basic level EMTs who have completed a 110- to 200-hour vocational/technical certification course.

benchmark: A standard against which something is measured. In most cases, there is a reference point or organization that has been identified as "best in class."

benchmarking: Using known results of similar data measurements or tests as an impetus for achieving or surpassing a desired goal for improvement.

best practices: Using the best-known results of similar data measurements of similar tests for similar systems or operations as an impetus for achieving or surpassing a desired goal for improvement.

community paramedicine: A model of care whereby paramedics apply their training and skill, in community-based environments (outside the usual emergency response/transport model). The

community paramedic may practice within an expanded scope (applying specialized skills/protocols beyond that which he was originally trained for), or an expanded role (working in nontraditional roles using existing skills).

computer-aided dispatch (CAD) system A suite of software used to initiate public safety calls for service, dispatch, and maintain the status of responding resources in the field. CAD systems consist of multiple modules including call input, dispatching, vehicle status maintenance, field unit status and tracking, and call disposition. CAD systems often include interfaces that permit the software to provide services to dispatchers, call takers, and field personnel.

deployment: The procedures by which ambulances are distributed throughout the service area, including the locations at which the ambulances are placed

emergency medical dispatch (EMD): The science of dispatching emergency vehicles utilizing protocols, including priority-dispatch functions, pre-arrival instructions, and other response-management functions.

emergency medical services (EMS): The provision of medical care by specially trained and authorized personnel to the suddenly ill or injured prior to, and in the absence of, a hospital setting.

Enhanced 9-1-1 (E 9-1-1): A class of 9-1-1 service that delivers both the location and number of the calling party.

first responders: Medically trained individuals who respond to EMS calls in advance of transporting ambulances. In communities where ambulances are dynamically deployed, first responders are sometimes called co-responders because ambulances sometimes arrive first. Typically, first responders are firefighters, police officers, lifeguards, park rangers.

geospatial demand: Occurs in a particular location in a service district such as a city or county.

global positioning system (GPS): Satellite-based navigation system that allows users to determine their exact location, velocity, and time 24 hours per day, in all weather conditions, anywhere in the world. GPS is used to support a broad range of military, commercial, and consumer applications.

mass casualty incident (MCI): An event resulting from human-made or natural causes that results in illness and/or injuries that exceed the EMS capabilities of a hospital, locality, jurisdiction, and/or region.

medical program director (MPD): A physician who provides guidance, leadership, oversight, and quality assurance for the practice of local EMS providers within a predefined area. In the United States, MPDs are typically board certified in emergency medicine and responsible for the creation of

protocols for treatment by paramedics and providing leadership to the group of physicians who assist with the provision of medical oversight.

Medicare: A federal system of health insurance for people over age sixty-five and for certain other people. Federal legislation established ambulance transportation as a covered beneficiary service. In so doing the federal government had established a long-term funding mechanism for EMS and medical transportation.

memorandum of understanding (MOU): An agreement between agencies of a single governmental entity or between governmental entities that delineates the actions and establishes control, financial considerations, and legal protections of the signatory parties.

mobile data computers (MDC): Mounted in or used in vehicles, typically as the remote end of the CAD system data stream, as well as for storage, manipulation, and input of incident and response data.

mutual aid agreement (MAA): Similar to MOUs, but generally involve county, regional, or tribal groups of like resources.

out-of-chute time: The interval between the time the ambulance is notified of the request for service to the time the ambulance responds to the assignment. For emergency requests, an out-of-chute standard of 30 seconds is optimal.

paddle placement time: The interval from the time the communications center receives enough information to initiate the response to the time the defibrillation pads or paddles are placed on the patient's chest. Also identified as the call receipt-to-defibrillation interval..

patient: A person in need of medical care or medical monitoring during transportation.

patient care report (PCR): Document that is currently evolving from its traditional, written format, which has existed for more than a generation, to the electronic format of the future.

PCR narrative: A free-form, paragraph-style aspect of the PCR that often serves as the primary summary and explanation of the events of the patient encounter.

performance improvement: A method of bettering productivity (human or business) by establishing metrics and then providing feedback based on those metrics.

public safety answering point (PSAP): A central location where calls for emergency help are received and transferred to telecommunicators who dispatch the appropriate emergency resources to callers' locations.

quality: Subjective term for which each person has his own definition. In technical usage, quality can have two meanings: (1) the characteristics of a product or service that bear on its ability to satisfy stated or implied needs and (2) a product or service free of deficiencies.

quality assurance system: All of the planned and systematic activities and related results to comply with planned arrangements and whether these arrangements are implemented effectively and are appropriate to achieve the objectives.

quality improvement (QI): The formal approach to the analysis of performance and systematic efforts to improve it.

quality improvement system: A formalized system that documents the structure, process, and responsibilities required to achieve effective customer satisfaction or the delivery of quality products and services to the patient or the public.

response time: The interval from the time the communications center receives enough information to initiate the response to the time a properly equipped and staffed ambulance arrives on the scene.

scope of practice: The defined medical procedures authorized by state regulatory authorities to be administered by EMTs and Paramedics.

standing orders: The policies or protocols issued by a medical director that allow EMS providers to perform certain procedures without first seeking permission from medical control.

system status management (SSM) The fluid deployment of ambulances based on the hour-of-the-day and day-of-the-week in order to match supply, defined as unit hours of utilization (UHU), with expected demand, expressed as calls for service, in the attempt to provide faster response by locating ambulances at “posts” nearer their next calls.

Telecommunicators: Communications professionals in dispatch centers who interact with response units in the field by radio, telephone, and other means.

unit hour: Measurement based on an hour when an ambulance is staffed and on duty.

unit hour utilization (UHU): The ratio of the number of transports per period divided by the total number of hours staffed per period.

wall time. The amount of time EMS units are held at hospital for whatever reason. Time starts from the time the ambulance arrives at the facility and ends when the patient is transferred to a hospital stretcher or bed.

Attachment A

Ambulance Benchmark Summary

SYSTEM COMPONENTS BENCHMARKS OVERVIEW

KEY: D=Documented, ND=Not Documented PD= Partially Documented

Communications Benchmarks		Comments
Public access through a single number, preferably enhanced 911	D	
Coordinated PSAPs exist for the system	D	
Certified personnel provide pre-arrival instructions and priority dispatching (EMD) and this function is fully medically supervised	D	
Data collection which allows for key service elements to be analyzed	PD	<i>Current CAD has limited reporting capabilities</i>
Technology supports interface between 911, dispatching & administrative processes	PD	<i>No automatic interface between 911 and electronic patient care records</i>
Radio linkages between dispatch, field units & medical facilities provide adequate coverage and facilitate communications	PD	<i>No radio communication with Vineall, no AVL on any EMS or Fire units</i>

Medical First Response Benchmarks		Comments
First responders are part of a coordinated response system and medically supervised by a single system medical director	PD	<i>Each municipality sets its own mutual aid plan. No direct physician oversight</i>
Defined response time standards exist for first responders	ND	<i>None of the 1st Responder departments have response time standards</i>
First response agencies report/meet fractile response times.	ND	<i>None of the 1st Responder departments report their response times</i>
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	<i>No response time standard exists</i>
Agency reports/meets fractile response times	ND	<i>No reporting provide</i>
Units meet staffing and equipment requirements	D	<i>Comply with NY EMS regulations</i>
Resources are efficiently and effectively deployed	PD	
There is a smooth integration of first response, air, ground and hospital services	D	<i>Air transport reports a decline in requested services in recent years and no recent training sessions with ambulance and fire providers.</i>
Develop/maintain coordinated disaster plans	D	<i>No surge capacity</i>

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Medical Accountability Benchmarks		Comments
Single point of physician medical direction for entire system	PD	<i>Patient care protocols provided through Regional Medical Advisory Committee (REMAC). Each agency has a medical director, one physician interviewed was not sure which agencies she/he covered.</i>
Written agreement (job description) for medical direction exists	PD	
Specialized medical director training/certification	ND	
Physician is effective in establishing local care standards that reflect current national standards of practice	ND	
Proactive, interactive and retroactive medical direction is facilitated by the activities of the medical director	ND	
PCR/QI data transparency for MD review	PD	<i>Individual agencies provide physician with chart data.</i>
Clinical Education/Development Effectiveness	ND	
Clinical Education Efficiency	ND	

Customer/Community Accountability Benchmarks		Comments
Legislative authority to provide service and written service agreements are in place	D	.
Units and crews have a professional appearance	D	
Formal mechanisms exist to address patient and community concerns	PD	<i>Differs with each organization</i>
Independent measurement and reporting of system performance are utilized	ND	
Internal customer issues are routinely addressed	PD	<i>Episodic and complaint based, no tracking</i>

Prevention & Community Education Benchmarks		Comments
System personnel provide positive role models	D	<i>Positive community support</i>
Programs are targeted to "at risk" populations	ND	
Formal and effective programs with defined goals exist	ND	
Targeted objectives are measured and met	ND	

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Ensuring Optimal System Value Benchmarks		Comments
Clinical outcomes are enhanced by the system	PD	
Amb Response Utilization and transport Utilization (UHU) is measured and hours are deployed in a manner to achieve efficiency and effectiveness	ND	
Ambulance cost per unit hour & transport document good value	ND	<i>Most 9-1-1 ambulance responses by volunteer agencies</i>
Service agreements represent good value	ND	
Non-emergency ambulance effective & efficient	D	<i>Non-Emergency calls are handled by several private companies</i>
Non-Ambulance but medically necessary (MAV) services are effective and efficient	D	<i>Madison Transit System</i> http://www.ridemts.org/
System facilitates appropriate medical access	D	
Financial systems accurately reflect system revenues and both direct and indirect costs	ND	
Revenues are collected professionally and in compliance with regulations	ND	
Tax subsidies when required are minimized	PD	

Organizational Structure & Leadership Benchmarks		Comments
A lead agency is identified and coordinates system activities	PD	
Organizational structure and relationships are well defined	PD	<i>Madison County is one of three counties in a state organized regional structure. Available staff, time and distance to meetings has impacted county participation</i>
Human resources are developed and otherwise valued	PD	
Business planning and measurement processes are defined and utilized	PD	<i>Some of the ambulance and fire agencies use business planning and measurement.</i>
Operational and clinical data informs/guides the decision process	ND	
A structured and effective performance based quality improvement (QI) system exists	PD	<i>Current QI process undergoing revision</i>

Attachment B

**Recommendations
Ranked by Priority**

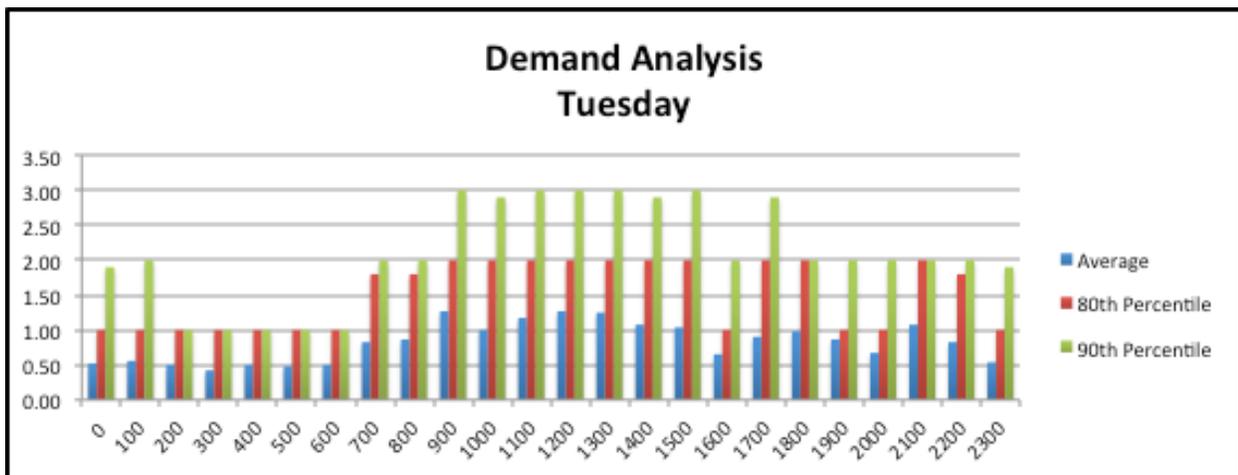
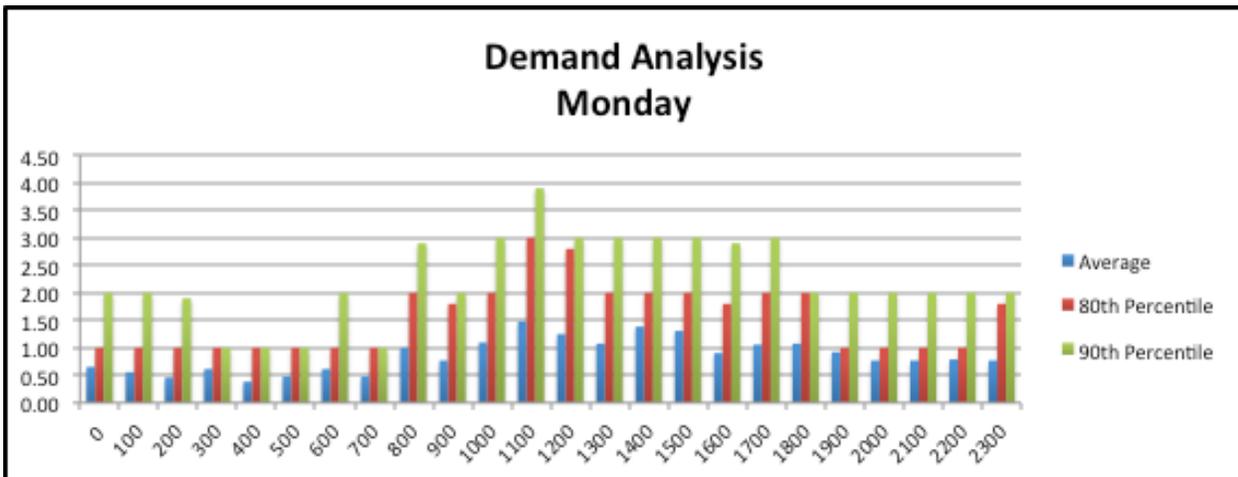
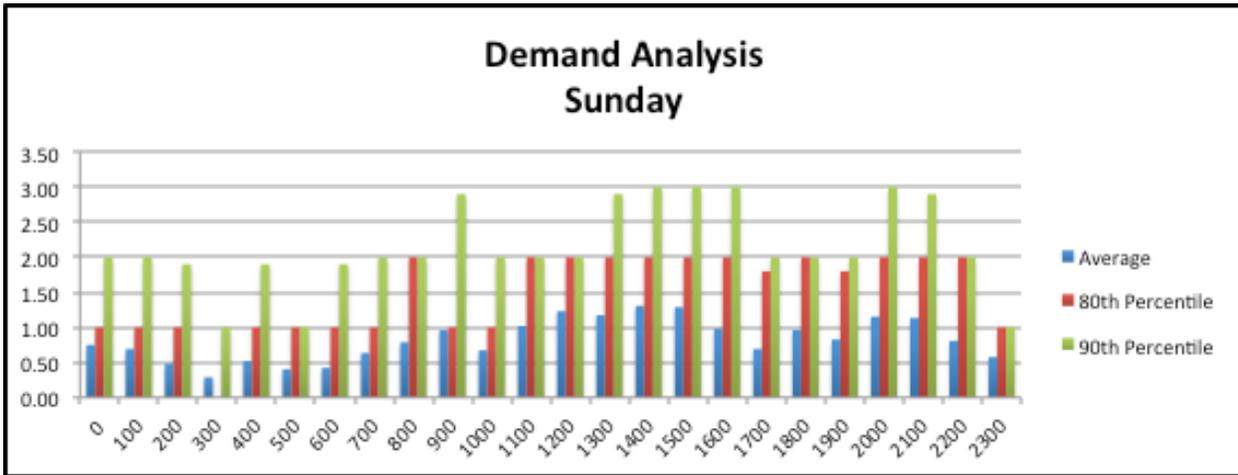
Madison County Recommendations Ranked by priority

#	Recommendation	High	Medium	Low
9-1-1 and COMMUNICATIONS				
1	All EMS services should be operating on the county radio system.	X		
2	Require TriTech to improve the quality and usability of 911 incident data records	X		
3	Quarterly performance metrics should be reported to the Public Safety Committee of the Board of Supervisors	X		
4	Establish working group to discuss feasibility of sending closest EMS unit		X	
5	Implement System Status tracking using GPS/AVL		X	
6	Evaluate the ability to develop an interface from Madison 911 to field units to receive automatic electronic patient care reporting data			X
MEDICAL FIRST RESPONSE				
7	Expand access to initial and continuing emergency medical responder education	X		
8	Increase the number of EMT and paramedic caregivers through use of blended training and broad-band computer access.		X	
9	Assist agencies in analyzing how they can reduce arrival to patient and paddle placement times.		X	
MEDICAL TRANSPORTATION				
10	All EMS services should examine response time performance criteria of simultaneous ambulance responses.	X		
11	Provide closer coordination between training provider and response agency to achieve 90% student success on initial EMR/EMT certification and 85% student success on initial paramedic certification	X		
12	Develop working group to determine EMT and Paramedic response times for each community	X		
13	Establish EMR and EMT recertification course schedule 24 months in advance, based on need		X	
14	Enhance on-campus ems response through working group		X	
15	Retrospective analysis of medivac transports in last three years			X
MEDICAL ACCOUNTABILITY				
16	Establish a work group involving agency medical directors, ambulance services, first responders, 911, hospital and council to create a state of the art Quality Improvement (QA/QI) program for each and every service	X		
17	Establish a continuing pre-hospital education program that is built from the local QI process and reflects national best practices in pre-hospital care.	X		
18	Increase participation by Community (Hamilton) and Oneida Healthcare (Oneida) hospitals and EMS providers in continuing education, quality improvement.	X		
19	Increase STEMI, Stroke and Trauma center participation in quality improvement/education		X	
CUSTOMER AND COMMUNITY ACCOUNTABILITY				
20	Provide internal monthly report of first responder, ambulance and paramedic response times to all system participants and municipalities	X		
21	Ensure each service has a formal mechanism to address patient and community concerns		X	
PREVENTION AND COMMUNITY EDUCATION				
22	Provide local tax credits or incentives for volunteers	X		
23	Develop a program and identify resources to improve community awareness of the EMS system and promote involvement in the volunteer agencies	X		
24	Identify how EMS can be a larger participant in the current Community Health Improvement Plan		X	
25	Explore opportunities for community outreach, such as the Care Transition Intervention (CTI) ED-to-home program.		X	
26	Prepare and distribute an annual report to community describing the accomplishments of the EMS system			X
ORGANIZATIONAL STRUCTURE AND LEADERSHIP				
27	Provide training for all personnel holding front-line and administrative supervisory positions within the EMS system; assure that each officer has the knowledge, skills and aptitudes to be an effective supervisor, manager or administrator		X	
28	Assist ambulance and first responder agencies in developing short and long term operational plans.		X	
ENSURING OPTIMAL SYSTEM VALUE				
29	Develop an EMS 2020 plan to establish system resiliency and caregiver succession.		X	
30	Put in place a mechanism to re-evaluate EMS delivery in 3 years.			X

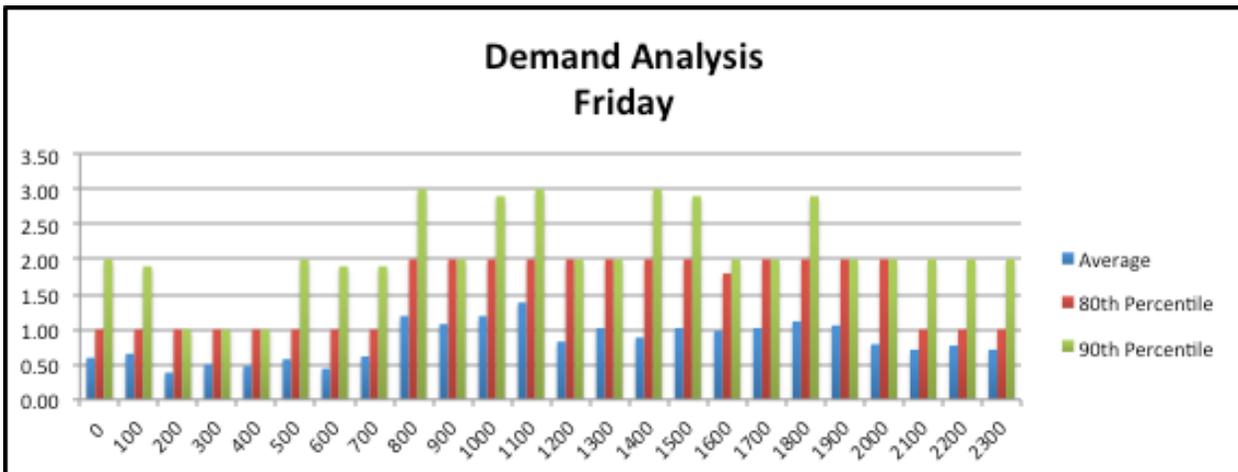
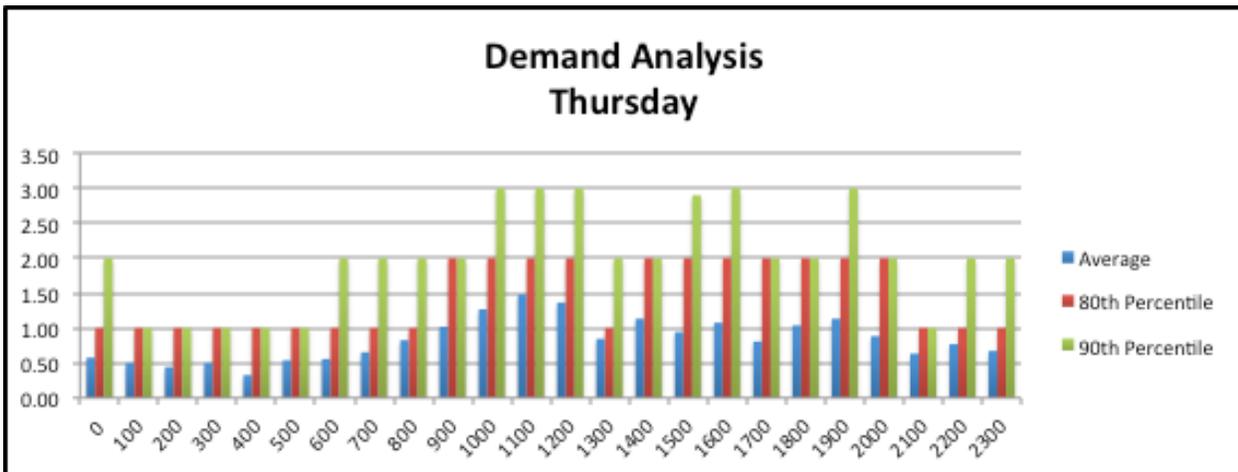
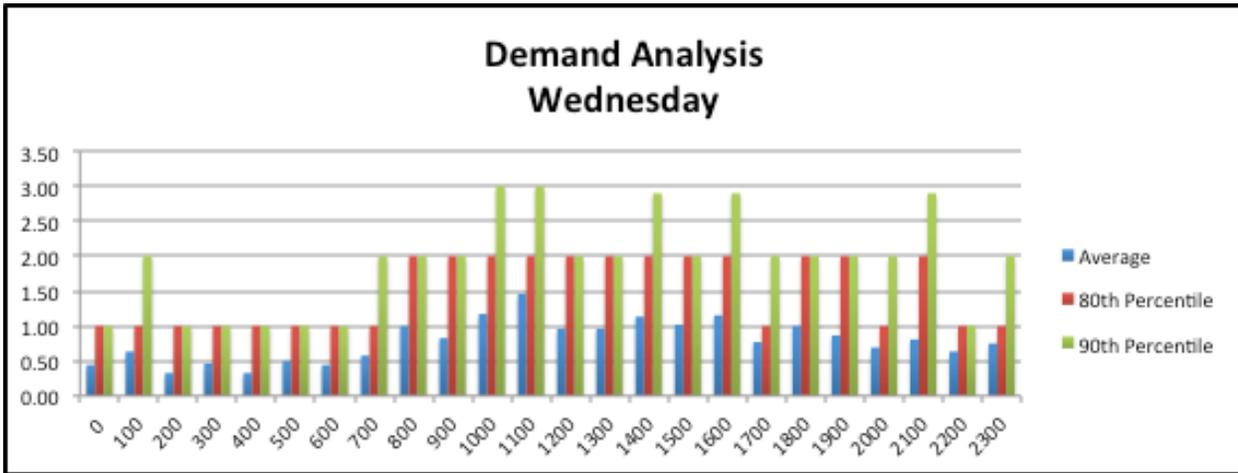
Attachment C

Response Workload by Day

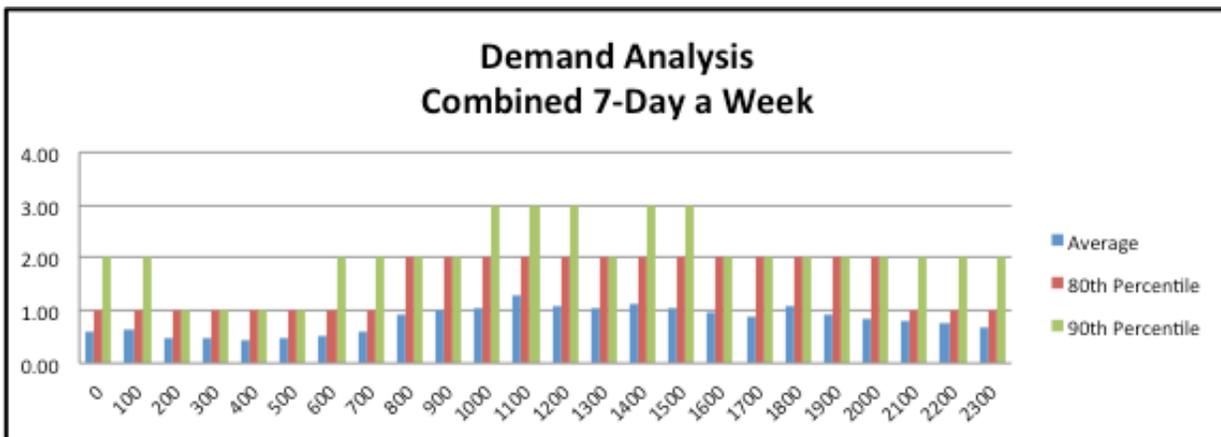
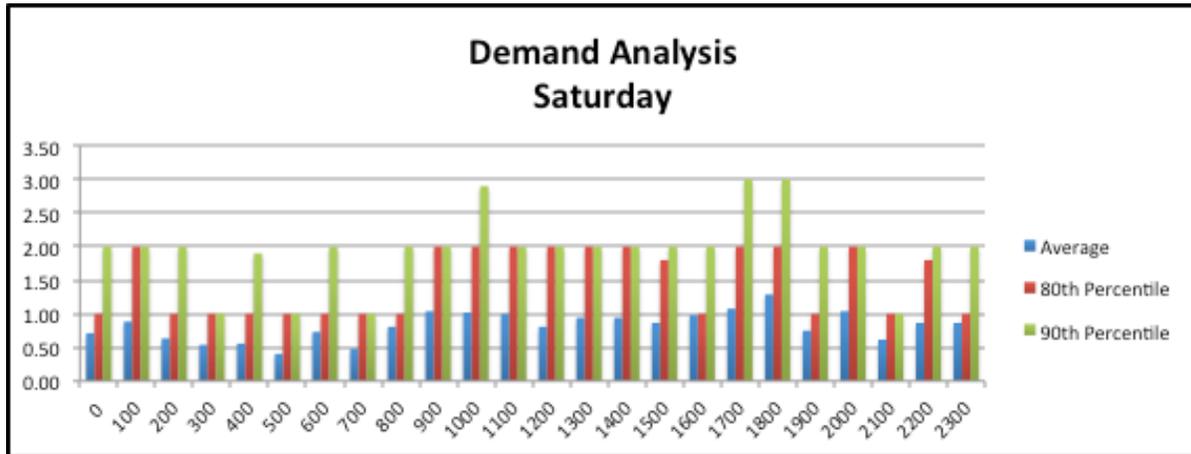
Response Workload by Day



Response Workload by Day



Response Workload by Day





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