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PRE-HOSPITAL EMERGENCY CARE ENHANCEMENT STUDY



**Northeast Connecticut Council of Governments (NECCOG)
Dayville, Connecticut**

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CONSULTANT REPORT

Northeast Connecticut Council of Governments (NECCOG) Pre-hospital Emergency Care Enhancement Study

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EXECUTIVE SUMMARY

The Northeastern Connecticut Council of Governments (NECCOG) is the principal regional planning organization for northeastern Connecticut. The organization coordinates activities by multiple municipalities, promotes regional problem solving and obtains grants or other funding to meet its mission.

NECCOG subsidizes QV Medic 1, a single paramedic ALS intercept that provides service to nine of the 16 towns within the NECCOG region.

Fitch and Associates (*FITCH*) was engaged to objectively examine current system issues and performance and enhancement opportunities. NECCOG wished to quantify the impacts of a variety of system configurations to determine implementable solutions to the areas growing and changing service dynamics.

The ranges of options are to include: administrative collaboration, joint working relationships, and other functional collaborations at operational and/or administrative levels, as well as evaluating full regional consolidation.

Specifically, the *FITCH* study found:

- 40 volunteer emergency medical responder (EMR) and ambulance (EMT) organizations, each with its own Primary Service Area (PSA) and mutual aid plan.
- No formal regulatory requirement for physician oversight at the EMR or EMT level.
- Dispatch center unable to locate/track all available and or responding vehicles is required.
- Technical limitations of the Computer Aided Dispatch system's configuration and reporting capabilities, require manual preparation of activity/performance reports.
- State Department of Public Health is proposing changes to the EMS regulations, Local EMS Plans and management of the Primary Service Areas.
- Conflict between existing paramedic provider and community ambulance that obtained R-5 paramedic license in 2014. Confusion exists when dispatching paramedics when KB Medic 561 is closer than QV Medic 1.
- More than one-fourth of the citizens and visitors to the largest town waited over 12 minutes for a paramedic.
- No coordinated performance reporting or quality improvement program exists.

KEY RECOMMENDATIONS INCLUDE:

- Maintain up-to-date list of medical first responder and ambulance agencies, their leadership and their level of equipment. Meet with agencies quarterly.
- Promote the use of Automatic Vehicle Locators in all response vehicles.
- Encourage each municipality to establish first responder and ambulance response times as part of the Local EMS Plan.
- Establish a regional medical director, quality improvement program and regional clinical protocols.
- Publish and share response times monthly with elected officials and stakeholders.
- Require response time performance in ALS Intercept contract.
- NECCOG to develop a contract that provides for paramedic level coverage with the best outcome.
- Explore regional or consolidated ambulance transportation coverage based on time of day and volunteer availability.

NECCOG should have information on the existing system performance and patient outcomes before undertaking major system changes. Re-purposing the funds for the ALS intercept subsidy into a regional medical director, quality improvement program or community CPR/AED may yield a stronger impact on the community than other system improvements.

METHODOLOGY

Northeastern Connecticut Council of Governments (NECCOG) retained Fitch & Associates (*FITCH*) to conduct a Pre-Hospital Emergency Care Enhancement Study for their service area. The effort was undertaken with the region's pre-hospital care community to evaluate the current system and make recommendations (as warranted) to enhance patient care.

FITCH participated in a kick-off event at NECCOG's office on June 30, 2015 with members of the pre-hospital community that would participate in the study. *FITCH* visited the QVEC dispatch center and met with the leadership of the pre-hospital committee. NECCOG provided a contact list of pre-hospital community members that would participate in an on-line survey.

It took a while to update the contact list for the survey. The first survey was deployed August 21, 2015, receiving 12 responses from the 59 pre-hospital community members.

Obtaining dispatch data from the CAD vendor to document the system's performance was problematic and required multiple efforts to get the vendor to respond. Data was delivered by the vendor on November 5, 2015.

FITCH returned to the region in October 2015, following-up face-to-face meetings with NECCOG, QVEC, American Ambulance, Voluntown Fire Department, Scotland Fire Department, and K-B Ambulance, as well as telephone and email communications with other pre-hospital community stakeholders.

The pre-hospital provider contact list was again updated and the survey was re-issued, eventually getting responses from 30 of the 50 pre-hospital stakeholders contacted. *FITCH* held a teleconference with QVEC on November 11, 2015 to review the CAD vendor's data.

A preliminary version of the report was reviewed by the ALS Steering Committee at the December 4, 2015 work session held at NECCOG. Feedback and additional information was provided by the steering committee to *FITCH*. Working with the medical directors, a third effort was made to have ambulance transportation organizations complete their surveys by December 22, 2015.

INTRODUCTION

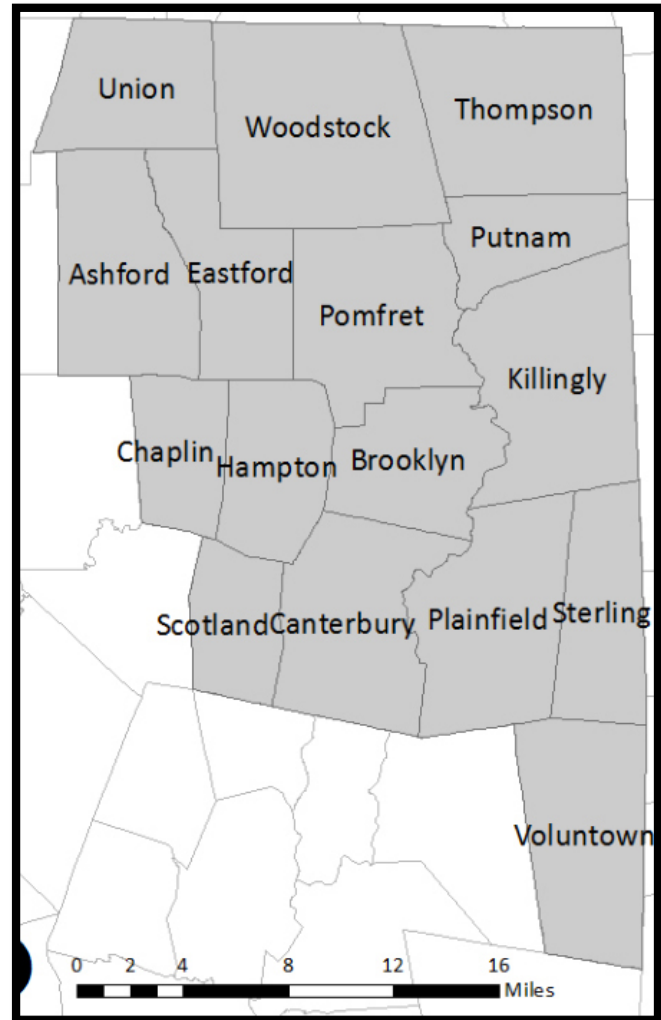
THE REGION

The Northeastern Connecticut Council of Governments (NECCOG) is a 16-town regional council of governments which was founded in 1987. The rural landscape is characterized by rolling hills, forests and farms. The region covers 562.8 square miles with a 2012 population of 95,971 making the region one of the least populated regions in Connecticut.

Areas with denser populations are villages that were developed in the 19th and 20th centuries in association with water-powered manufacturing.

NECCOG's member towns are Ashford, Brooklyn, Canterbury, Chaplin, Eastford, Hampton, Killingly, Plainfield, Pomfret, Putnam, Scotland, Sterling, Thompson, Union, Voluntown and Woodstock. The largest population is found in Killingly (17,265).¹

Figure 1: NECCOG region



CONNECTICUT APPROACH TO PRE-HOSPITAL CARE

The Office of Emergency Medical Services (OEMS) resides within the Department of Public Health and is the lead agency for EMS in Connecticut. The Office of Emergency Medical Services is tasked by statute with:

¹ NECCOG (2013). "regional profile." Retrieved 11/6/2015, from <http://neccog.org/about/regional-profile/>.

- Providing public education and information programs;
- Administering the EMS equipment and local system development grant program;
- System planning;
- Regional council oversight, training;
- Providing staff support to the Advisory Board.

The OEMS is further tasked by regulation with:

- Providing regional EMS coordinators;
- Assigning Primary Service Area Responders (PSAR's) for each service area of the state;
- Oversight of licensure and certification of EMS providers;
- Establishing EMS vehicle standards;
- Rate setting for EMS services.

EMS regulations are promulgated which further define these duties and EMS roles throughout the system, recently a revised set of draft regulations have been developed, which will modernize the current regulations.

The practice of issuing primary service areas (PSA's) to multiple agencies for different aspects of EMS care within each of the 169 local jurisdictions is complex. EMS regions are established and recognized but there is a failure to actualize the full potential of EMS regionalization. The lack of County government in the state is also a factor.

The practice of rate setting, certificate of need requirements (CON), and issuance of PSAR's for EMS organizations are dated, and law and regulation are silent on many contemporary EMS system issues.²

Assignment of Primary Service Area Responders (PSAR)

The concept of Primary Service Areas (PSA) was introduced in Connecticut in 1974. A PSA is a specific geographic area that is served exclusively by an emergency medical services (EMS) provider. The State of Connecticut Department of Public Health (DPH) designates this provider. Only the Primary Service Area Responder (PSAR) designated by the State may answer emergency calls in the specified geographic area. These geographic areas may include or be

² Mullen, J., W. H. Furniss, J. A. Reynolds (2015). Emergency Medical Services Plan: 2015 - 2020. Hartford, CT, Department of Public Health.

within the boundaries of a municipality, tax district, tribal entity or other specifically identified areas.

There are four PSAR levels of EMS recognized and regulated by the State:

- First Responder
- Intermediate
- Basic Ambulance
- Paramedic

The levels differ in the time required for training and skills performed by personnel, as well as equipment required. Each geographic area should have at least one PSAR designated for each level of service.

The DPH is required to assign a PSAR for each level of service for every municipality in the state. Public Health regulations establish the factors that are to be considered when designating an EMS provider as a PSAR. A single PSAR may be certified or licensed to provide one or more of these levels of service.³

Local EMS Plan

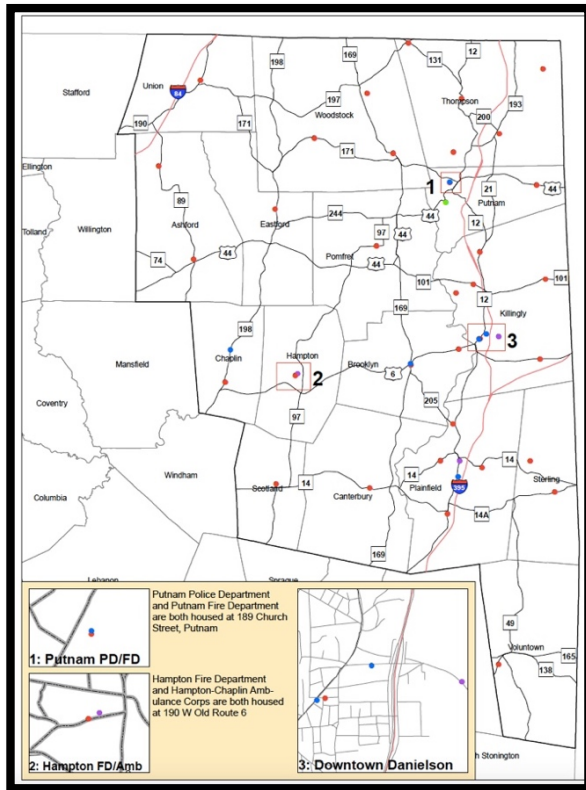
In 2014, Public Act 14-217 was passed which gave municipalities more control over who provides Emergency Medical Services in their town. The public act also reinforced development of a Local EMS Plan (LEMSP).

These plans are an important component of overall town planning and promote healthy business relationships between a municipality and the EMS organizations at all levels, which provide emergency care to the residents and visitors of the town. OEMS developed a toolkit as a "best practices" approach to building an LEMSP. OEMS is working with each town, on a five-year cycle, to provide guidance in the planning and development of the LEMSP.

³ Connecticut Emergency Medical Services Primary Service Area Task Force (2014). Final Report: Connecticut Emergency Medical Services Primary Service Area Task Force, Department of Health.

PRE-HOSPITAL CARE IN NECCOG

Figure 2: Pre-Hospital Resources



Through the survey process, *FITCH* identified that the NECCOG pre-hospital service area includes:

- 32 Fire Company 1st Responders
- 12 Ambulance providers, many based with fire companies.
- 5 Paramedic providers
- 3 Hospitals:
 - Day Kimball Healthcare – Putnam
 - Backus Hospital – Norwich
 - Windam Hospital – Willimantic

PARAMEDIC

American Ambulance is the designated Primary Service Area (PSA) paramedic provider. Since 1999 NECCOG has contracted with a paramedic provider to provide a 24-hour single-paramedic ALS Intercept vehicle, “QV Medic 1,” for the towns of Brooklyn, Eastford, Killingly, Pomfret, Putnam, Sterling, Thompson, Woodstock and a portion of Plainfield (north of Route 14)



QV Medic 1 posts at Day Kimball Hospital in Putnam, and averages 2,500 intercepts a year. An American Ambulance paramedic asset is posted at Plainfield and responds into the NECCOG service area if QV Medic 1 is unavailable.

The towns of Hampton, Scotland and Chaplin receive ALS coverage from paramedics employed by Windham Hospital who staff Medic 31. The town of Union receives ALS coverage from Johnson Memorial Hospital paramedics with the Ambulance Service of Manchester.

American Medical Response provides interfacility and critical care transport under contract with Day Kimball Hospital in Putnam and occasionally provide a paramedic response into the NECCOG region if no other paramedic resource is available.

K-B Ambulance Corps in Killingly received their R-5 paramedic license from the state Department of Health in August 2014. Paramedic service began October 1, 2014. They are not assigned a paramedic Primary Service Area (PSA), but Medic 561 responds to ALS level calls within the Town of Killingly.

The Town of Killingly and K-B Ambulance petitioned the Department of Public Health in 2015 to replace American with K-B Ambulance as their designated paramedic provider. The state rejected Killingly's petition to change their assigned paramedic provider.⁴

AMBULANCE

There are 12 community-based emergency ambulance providers within the NECCOG region, some independent and some affiliated with a fire company. Minimum staffing is an Emergency Medical Responder (EMR) and Emergency Medical Technician (EMT). Some EMTs have received selected advanced clinical skills (CPAP, Epinephrine Auto injector, Glucometer, Narcan, and Aspirin)

The ALS Committee asked *FITCH* to look at the impact of different staffing or deployment models to address some of the challenges community-based providers are confronting.

⁴ Penney, J. (2015 October 06). Killingly appeals state rejection of paramedic service change. [The Bulletin](#). Norwich, CT, Gatehouse Media.

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 highways⁵ and provide out-of-hospital cardiac care⁶. 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 and offers insight to communities considering EMS changes.

- **Insufficient Coordination**
- **Disparities in Response Time**
- **Uncertain Quality of Care**
- **Lack of Disaster Readiness**
- **Divided Professional Identity**
- **Limited Evidence Base⁷**

Rural-based Emergency Medical Services has specific 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.**

⁵ National Research Council. (1966). *Accidental Death and Disability: The Neglected Disease of Modern Society*. Washington DC, National Academies of Science.

⁶ Pantridge, JF and JS Geddes. (1967). "A mobile intensive-care unit in the management of myocardial infarction." *Lancet*(2): 271.

⁷ 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.

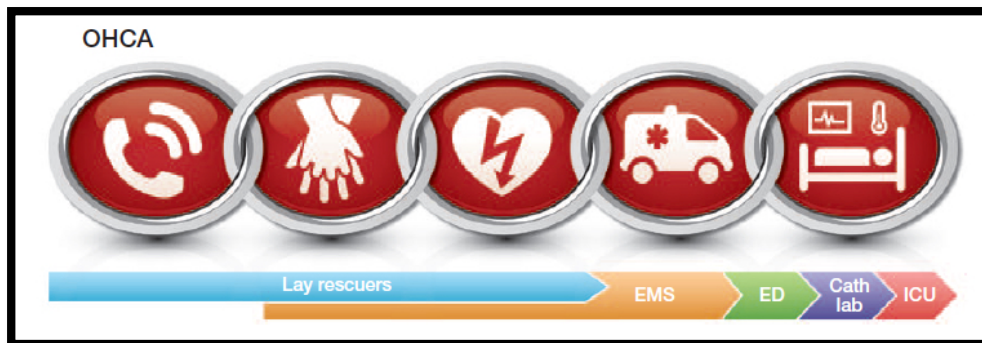
- Large geographic areas with secondary roadways are often difficult to navigate and hinder response time.^{8 9}

These issues are problematic in NECCOG to a greater or lesser degree.

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 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 emphasizes rapid identification of potential cardiac arrest, followed by immediate delivery of high quality CPR and early defibrillation with an AED.



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.

⁸ Thompson Fire Advisory Committee. (2013 December). Local Emergency Medical Services Plan: The Town of Thompson, Connecticut. December 1, 2013 - November 30, 2018. Thompson, CT, Town of Thompson.

⁹ Simon, L. (2015). Rural EMS faces its own emergency. *American City and County*. New York City, Penton.

The response time of emergency caregivers is based on the type of community. Population density within northeast Connecticut falls under the “Rural” and “Remote” classifications by the National Fire Protection Association Standard 1720.¹⁰

The arrival of an ambulance and paramedic intercept should be within 15 minutes in the mill villages, reflecting 90 seconds to process the 9-1-1 call and 14 minutes to travel to the incident location.

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.

In many areas of the country, 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.

¹⁰ 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.

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 systems
- “EMS Clinical Practice and Systems Oversight” developed by the National Association of EMS Physicians as core curriculum for American Board of Emergency Medicine certification in EMS
- “Evidence-Based Performance Measures for Emergency Medical Services Systems: A Model for Expanded EMS Benchmarking.” Position statement by the 2007 Consortium of U.S. Metropolitan Municipalities’ EMS Medical Directors
- “EMS Agenda for the Future,” developed by the US Department of Transportation
- “EMS at the Crossroads,” developed by the National Academies of Sciences’ Institute of Medicine 2007
- “The 7 Pillars of EMS Officer Competency” by the National EMS Management Association.
- “EMS In Critical Condition: Meeting the Challenge,” produced by The International City/County Management Association
- “Community Guide to Ensure High Performance Emergency Ambulance Service,” published by the American Ambulance Association
- International Academies of Emergency Dispatch
- Commission on the Accreditation of Ambulance Services
- National Fire Protection Association

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

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 NECCOG’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.

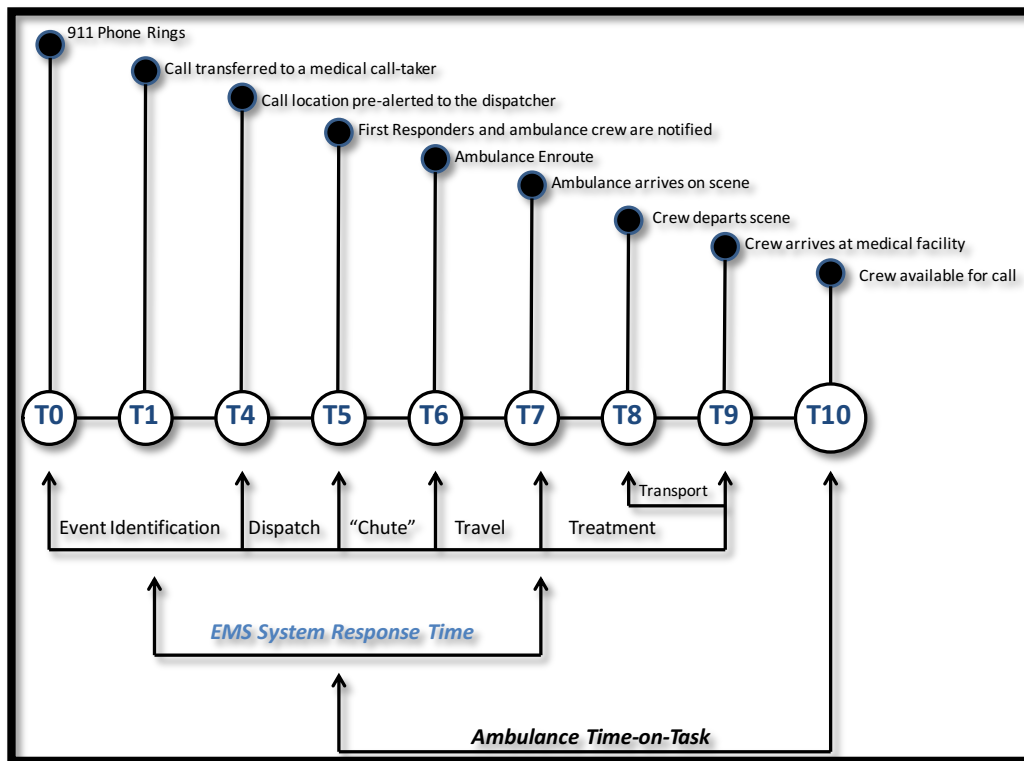
9-1-1 and COMMUNICATIONS

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 National Academies of Emergency Dispatch (NAED) [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.

Communications Benchmarks

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

Observations and Findings

PUBLIC ACCESS TO EMS

Public access to emergency medical services is through Quinebaug Valley Emergency Communications, Inc. (QVEC), which is a privately operated (501-C-3 not for profit cooperating) that is state authorized. The communication center is the primary PSAP for the region that handles EMS and Fire emergencies only. Police calls received are sent to either one of the two local PSAPs or to the Connecticut State Police. QVEC dispatches 38 Fire and EMS organizations and each community has their own PSA and sets the mutual aid plan. In Putnam Township there is a secondary PSAP that QVEC coordinates with and one button transfers emergencies. Staffing levels are a minimum of two and the center can staff up to 5 positions. The staffing ratio is approximately 70% part-time to full-time.

Emergency medical dispatch (EMD) procedures are recommended by the International Academies of Emergency Dispatch (IAED). QVEC personnel are certified EMD as they are trained by PowerPhone, which is an integrated into the New World CAD for digital access to systematically question callers. PowerPhone is utilized for call prioritization and type of response in coordination with the Operating Medical Director (OMD) Dr. Wexler. Within the PowerPhone suite there is a QA/QI module to give feedback to QVEC management and staff.

- QVEC has a computerized “PowerPhone” version that is automated software attached to the CAD that allows for EMD of medical 911 calls.
- Incoming calls are classified according to priority codes through the PowerPhone software; and, pre-arrival instructions are given on a regular basis.
- Life-threatening and non-life-threatening emergency calls are correctly differentiated, giving an emergent or non-emergent response code.
- Statistics show few non-emergency 9-1-1 responses by volunteer agencies.
- The PSAP is overseen by an OMD that helps coordinate medical dispatching and response as well as an internal QA/QI process.

The dispatching center uses New World as their Computer Aided Dispatch (CAD) vendor. This system was originally put in place in 2006 with multiple updates. The current version of the CAD has limited data reporting capabilities and unable to track units with GPS. Within the next year QVEC is looking to upgrade to a new E-CAD from New World, which will allow for improved capabilities and reporting. The dispatch center environment has two virtualized machines running parallel on separate servers giving redundancy and backup. Data is backed up at an offsite facility using Symantec and Enterprise.

- The current CAD has limitations in configuration and reporting capabilities. QVEC is planning to update to an improved E-CAD platform within 12 to 24 months.

- In case of a server malfunction there is built in redundancy and offsite data storage giving stability to the 911 center.
- There is an emergency operation plan in place.
- The current call processing was determined to follow a consolidated outline. QVEC is the Primary PSAP that will take the initial 911 call. If the call was deemed medical they will utilize the PowerPhone to determine medical priority and initial treatment procedures. In order to dispatch units QVEC has a complex matrix to dispatch stations or specific units depending on the location, contracts, townships, and paramedic PSA area.
- QVEC also coordinates with a PSAP in Putnam Township via one-button transfers for Fire, EMS, and Police. If deemed fire they will process and dispatch accordingly. For police emergencies QVEC will take the initial call and one button transfer to either the local police agencies or the Connecticut State Police.
- To ensure there is a standardized performance for call processing times, IAED has recommended call-processing times for when the call is received to the time dispatched. Dispatch centers should document and report individual performances to ensure standards are met and there is a platform for improvement.
- The current New World CAD provides limited reporting capabilities to QVEC and the NECCOG region. There are few reports that can be created without requiring manual manipulation.
- American Ambulance is the only ALS unit is equipped with a fleet tracking Global Positioning System/Automatic Vehicle Locator (GPS/AVL) system. American Ambulance has given their FleetEyes account to QVEC so it can track their units. No other units in the NECCOG area have GPS/AVL capability.
- Currently, there is confusion when dispatching ALS units in the region as American Ambulance has the contract but at times is not the closest ALS unit to the incident. QVEC feels they are in the middle of American Ambulance and KB Ambulance when trying to dispatch the closest unit to a call but when they try to make what is felt as the “right call for the patient.”
- QVEC has to dispatch to stations or specific paging groups as units do not mark in-service when they become available. This makes it difficult for units to be tracked for dispatching the proper or closest resource. Difficulties are experienced with CAD procedures and data documentation as the processes become cumbersome and unorganized for data collection.
- Field units are using electronic patient care reports for documentation but QVEC has not been asked for an interface that would allow for calls to automatically be transferred to their patient care reports. Current process is handled by each department having read-only access to their call data and the data is manually transferred to electronic patient care reports or the firehouse reporting software

RADIO COMMUNICATIONS

QVEC utilizes two high-powered UHF radio frequency systems, each with 6 repeated sites. Units are dispatched and assigned radio channels via QVEC on initial dispatch. Due to this setup there is redundancy built into the system in case of unforeseen failures. The VHF radios also allows

communications on the statewide interoperability channels during state deployment. QVEC assigns med channel for field to hospital communications for Day Kimball and Backus hospitals.

Recommendations

1. Continue to pursue and update the current New World CAD and ensure there is an improved data suite.
2. Clarify process to handle second-out ALS calls
3. All response units should be GPS/AVL capable for appropriate unit dispatching, with QVEC able to monitor positions to determine nearest available responder.
4. Performance metrics should be established for call taking times and measured monthly.
5. Evaluate the ability to develop an interface from QVEC to field units to receive automatic electronic patient care reporting data.
6. Chiefs need to take BLS transport out of service when unstaffed.
7. Evaluate the ability to reduce the decision-making process when dispatching a secondary paramedic unit or mutual aid ambulance.

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 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.

MFR services are provided by volunteer fire departments throughout the NECCOG service area. NECCOG does not have a complete or up-to-date list of volunteer fire companies' leadership within the region.

NECCOG MFRs are not equipped with Automatic Vehicle Locators (AVL) and the Quinebaug Valley Emergency Communications center does not have an ability to geographically track responding vehicles.



Anecdotal instances of staffing challenges providing a first responder were shared in the survey or described in newspaper articles.

Medical director involvement with first responder agencies, and the engagement of first responders in a system-wide QI process, is a must. The state Department of Public Health requires agencies that provide care above the EMT-Basic level are required to have a signed agreement with a sponsor hospital.

There is no reported medical director involvement with MFRs. The DPH Emergency Medical Services Plan: 2015 – 2020 includes this goal: “The OEMS should ensure that revised regulations require all levels of EMS and EMD providers to have at least indirect medical oversight from an EMS Medical Director.”

There is no defined response time for MFR PSAR in the Regulations of Connecticut State Agencies Section 19a-179-11: “Availability of response services” beyond the requirement to respond to all emergency calls 24 hours a day, 7 days a week. There is no description of how long it will take for the PSAR to start wheels rolling to a 9-1-1 dispatch.

The state Office of EMS anticipates that municipalities that establish a Local Emergency Medical Services Plan as required in Public Act 00-151 “An Act Concerning Emergency Medical Services Data Collection and Emergency Medical Dispatch.” (Effective July 1, 2000) could establish

measurable, achievable, and objective performance standards.¹¹

Recommendations

8. Maintain up-to-date list of medical first responder agencies, including information on current fire chief or point of contact (name, email and phone number).
9. Work with each municipality to establish measurable response times and coverage protocols as part of updating their Local Emergency Medical Services Plan.
10. Establish consortium of medical directors to assure quality for all aspects of pre-hospital care system

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.

¹¹ Connecticut Emergency Medical Services Primary Service Area Task Force (2014). Final Report Connecticut Emergency Medical Services Primary Service Area Task Force, Department of Health.

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

PARAMEDIC DEPLOYMENT

Most of the 563 square mile region is covered by “QV Medic 1” - a 1-person paramedic intercept vehicle subsidized by a NECCOG contract since 1999. QV Medic 1 is staffed every hour of every day and generally posts around the Day Kimball Hospital.

In calendar year 2014 QV Medic 1 handled 79.6% of the paramedic-level (ALS) dispatches in the NECCOG contract area with an average response time of 12 minutes and 32 seconds.

Figure 4: QV Medic 1 2014 responses

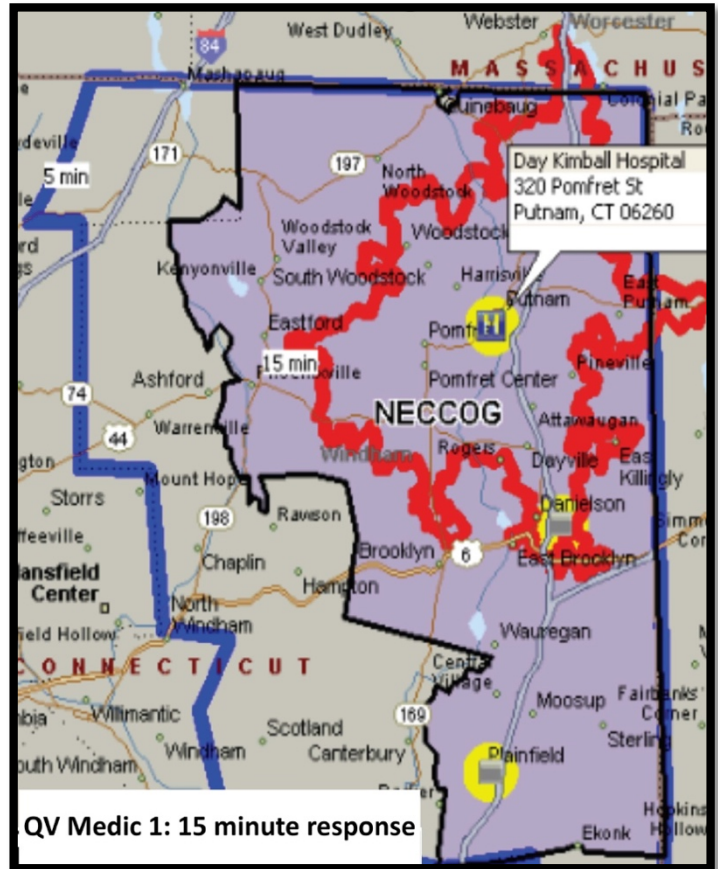
2014		
Total Medic Calls in NECCOG service area	Scratches	Percent either missed or handled by other agency
3242	661	20.39%

2014	Medic Calls	% per town	QV Medic 1	other ALS
Brooklyn	370	10.4%	286	43
Eastford	52	1.5%	41	6
Killingly	1125	31.5%	889	108
Plainfield*	899	25.2%	411	285
Pomfret	81	2.3%	67	6
Putnam	448	12.5%	355	47
Sterling	107	3.0%	46	26
Thompson	276	7.7%	227	19
Woodstock	216	6.0%	171	22
	3574		2493	562

*Plainfield data includes medic calls in the portion of the town not covered in the NECCOG/QV Medic 1 service area.

QV Medic 1 Response Performance		
Average	80th Percentile	90th Percentile
12:32	17:01	20:12

Figure 5: QV Medic 1 - 15 minute travel time



Darker area of map: QV Medic 1 PSA area

The data from QVEC shows a “chute time” – time from dispatch to vehicle moving - for QV Medic 1 averages 2 minutes and 52 seconds, rising to 5 minutes and 16 seconds for the 90th percentile. Nationally, the average chute time is under 60 seconds. The apparent average QV Medic 1 chute time of 172 seconds significantly extends response time and may be a contributing factor when community ambulances decide to cancel a paramedic intercept and transport a critically ill patient to a hospital without the benefit of paramedic care.

Paramedic Coverage in Killingly

K-B Ambulance Corps in Killingly received their R-5 paramedic license from the state Department of Health in August 2014. Paramedic service began October 1, 2014. They are not assigned a paramedic Primary Service Areas (PSA), but Medic 561 responds to ALS level calls within the Town of Killingly on a mutual aid basis.



In early 2015 the Town of Killingly and K-B Ambulance petitioned the Department of Public Health to replace American with K-B Ambulance as their designated paramedic provider.

Inadequate paramedic response times were one of the reasons for this request.

Dispatch-to-at-scene data for ALS calls in Killingly from January 1 to June 30, 2015:

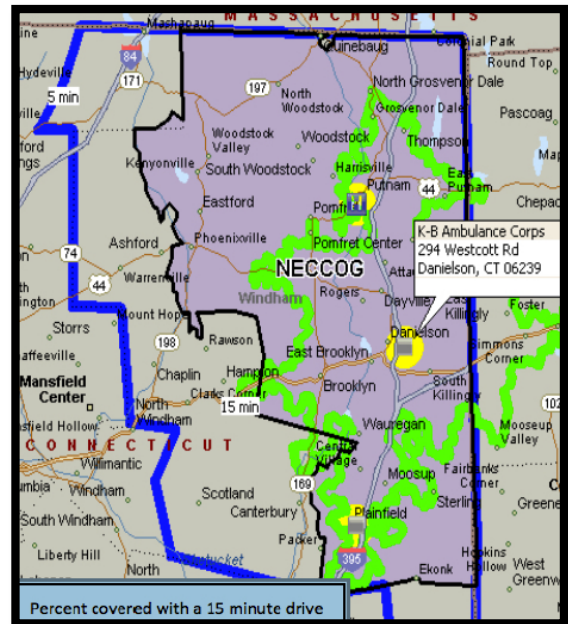
Average Response (min:sec)	QV Medic 1		AASI (Plainfield)		Medic 561 (K-B)		AMR	
	#	%	#	%	#	%	#	%
Less than 4:00	27	6.8%	1	3.8%	18	25.7%	2	11.8%
4:00 - 6:00	54	13.6%	2	7.7%	12	17.1%	2	11.8%
6:00 - 8:00	57	14.4%	2	7.7%	18	25.7%	4	23.5%
8:00 - 10:00	69	17.4%	9	34.6%	11	15.7%	6	35.3%
10:00 - 12:00	80	20.2%	1	3.8%	5	7.1%	1	5.9%
over 12:00	109	27.5%	11	42.3%	6	8.6%	2	11.8%
	396		26		70		17	

Note that 26% of those requesting a paramedic waited over 12 minutes.

One of the responders serving a portion of the 50 square miles of Killingly stated in the survey that they have cancelled the paramedics and started BLS emergency transport of ALS patients due to the delay in arrival of the paramedic.

Figure 6 shows the QV Medic 1 service area (dark purple) and the green line shows 15-minute travel time for KB Medic 516.

Figure 6: KB Medic - 15 minute travel time



Impact of multiple ALS providers within the NECCOG contract area

In looking at workload and location, KB Medic 561 and QV Medic 1 provide complementary coverage within the NECCOG service area. Figure 8 shows the combined travel time for QV Medic 1, KB Medic 561 and the American Ambulance paramedic unit posted in Plainfield.

Figure 7: All medic calls in one year

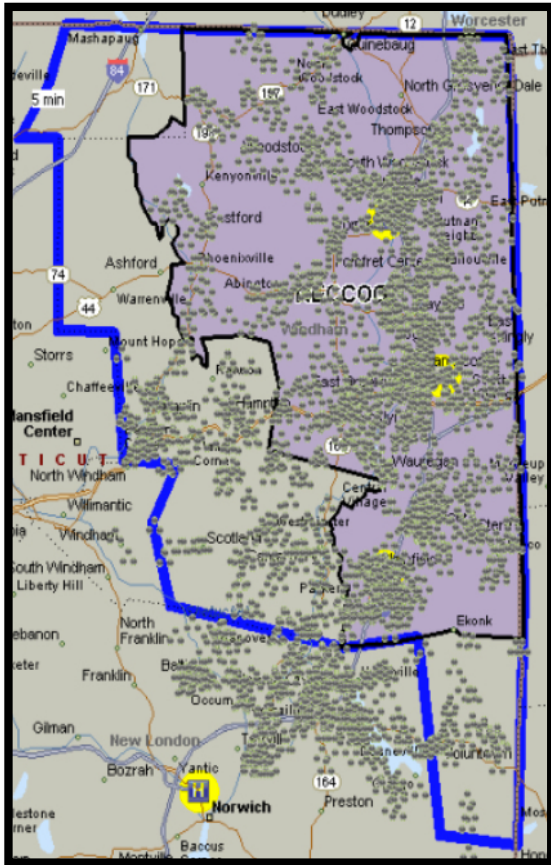
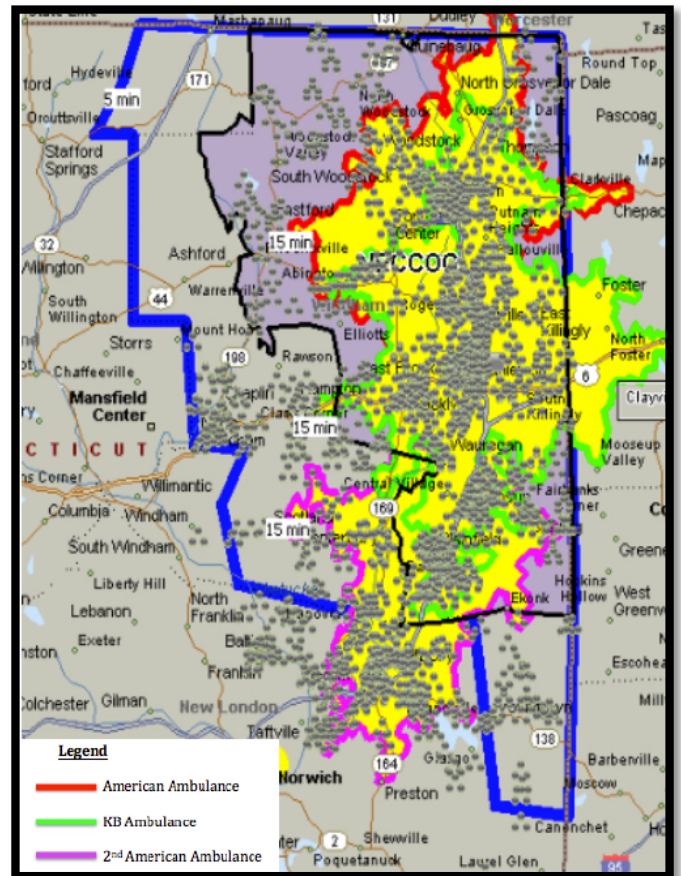


Figure 8: All paramedic units - 15 minute response time



Recommendations - Paramedic

11. Monitor and provide paramedic response times to all towns covered in the NECCOG contract every month.
12. Address the “chute time” to determine if the 2 minute, 52 second average time is accurate. If so, this should be reduced to less than 60 seconds.
13. In the next contract (2016-2017) require that the paramedic provider arrive within 14:59 minutes in the mill villages with more than 5,000 residents with 90% reliability. This covers Killingly, Putnam, Thompson, Woodstock and Plainfield area covered by NECCOG.
14. Have NECCOG develop a contract that provides for paramedic level coverage with the best outcome.
15. Once all ALS provider units are equipped with AVL and QVEC has access to the data, send the nearest paramedic asset to an emergency.

AMBULANCE DEPLOYMENT

The Consultant identified 12 community-based emergency ambulance providers in the NECCOG district:

Stand-alone:

Putnam
 Moosup-Plainfield
 Killingly-Brooklyn
 Hampton-Chaplin
 American Legion

Part of Fire Department:

Voluntown
 Scotland
 Woodstock
 Mortlake
 Community

Canterbury
 Ashford

In addition, American Medical Response and American Ambulance provided 9-1-1 ambulance coverage through mutual aid.

The Department of Public Health has only one response time metric – that a designated PSAR responds to at least 80% of all first call responses.

A review of a Local EMS Plan mutual aid agreement describes a “system overload” when the request for assistance exceeds the resources of a specific provider of a segment of an EMS system. An example is an ambulance provider with two ambulances and three simultaneous requests for service.



There is no requirement to track or report response times. This information is useful when analyzing ambulance performance. There is no reporting of occasions when system overload required a 2nd call-out and delayed response.

The state provides a minimum equipment list and inspects ambulances annually. Minimum ambulance staffing is one Emergency Medical Technician (EMT) and one Emergency Medical Responder (EMR). There is no requirement for emergency vehicle operator training.

Within the NECCOG area, none of the ambulances are equipped with Automatic Vehicle Locators (AVL) and QVEC is unable to geographically track ambulances.

Ambulance Staffing is a Challenge

Many NECCOG ambulance responders shared their challenges in recruiting and retaining volunteer EMTs. Some of the volunteer ambulance providers are hiring EMTs to maintain weekday service, either directly or through VinTech Management Services.

One town voted to subcontract out ambulance transportation, including a provision for the contractor to function as a first responder if no volunteers are available.¹²

One of the respondents to the survey provided this observation:

“Recruitment and Retention programs to get new members is an ongoing problem. Grant opportunities to purchase EMS equipment is at a minimum. Grant opportunities for education and training of new and older members is at a minimum.”

Another respondent addressed staffing and reimbursement:

“There are many small towns in our area that rely upon a volunteer system for coverage 24/7. It has become harder to attract and retain new members due to increased training and meetings required. Most small towns do not have the budget in place to afford paid staffing and with cuts to insurance reimbursements and higher call volumes people are feeling burnt out.”

¹² Penny, J. (2014 August 22). Pomfret will subcontract ambulance transport. [The Bulletin](#). Norwich, CT, Gatehouse Media.

Supply and Demand: Calendar Year 2014

Figure 9: Ambulance Supply and Demand CY2014

Transport Provider	Q4(a). Total Responses	Q4(b). Total Responses (PSA)	Q4(c). Total Responses Other Zones/Areas	Q.5 Total Emerg Tx	Q6. Total; Non-Emerg Tx	Q7. % Mutual Aid Used
American Ambulance	34710	5954	28756	2717	2004	2%
American Legion	2900	1920	8	2093	0	18%
AMR						
Ashford	400	375	25	311	0	1%
Canterbury	299	280	19	265	0	2%
Community	698					
Hampton/Chaplin	395	353	42	88	174	2%
KB Ambulance	2923	2803	120	2536	0	0.50%
Moosup-Plainfield						
Mortlake	949	869	80	850		5%
Putnam	1,124	1032	60	1092		2.90%
Scotland	153	133	20	105	0	20%
Voluntown						
Woodstock	537	497	40	59	310	70%

Cost of Providing Ambulance Transportation

There were multiple efforts to get financial data from the 14 organizations that provide ambulance transportation. Financial data was obtained from 5 of the 14 providers. Payer mix information was obtained from one of the three hospitals.

There is not enough data to provide an accurate picture, but here is our impression:

There are 9,636 BLS responses a year in the region with a 72% transport rate. That equals 6,970 billable transports.

The incomplete data indicates a 52% collection rate for ambulance transport bills, with each bill around \$750.

There may be \$5,227,201 in billable dollars at a collection rate of 52%, which equals \$2,721,115 in cash available from user fees.

The communities pay out \$312,147 in subsidy payments. Adding the subsidy (\$312,147) to the cash available (\$2,721,115) will result in \$433.21 cash for each of the 6,970 transports.

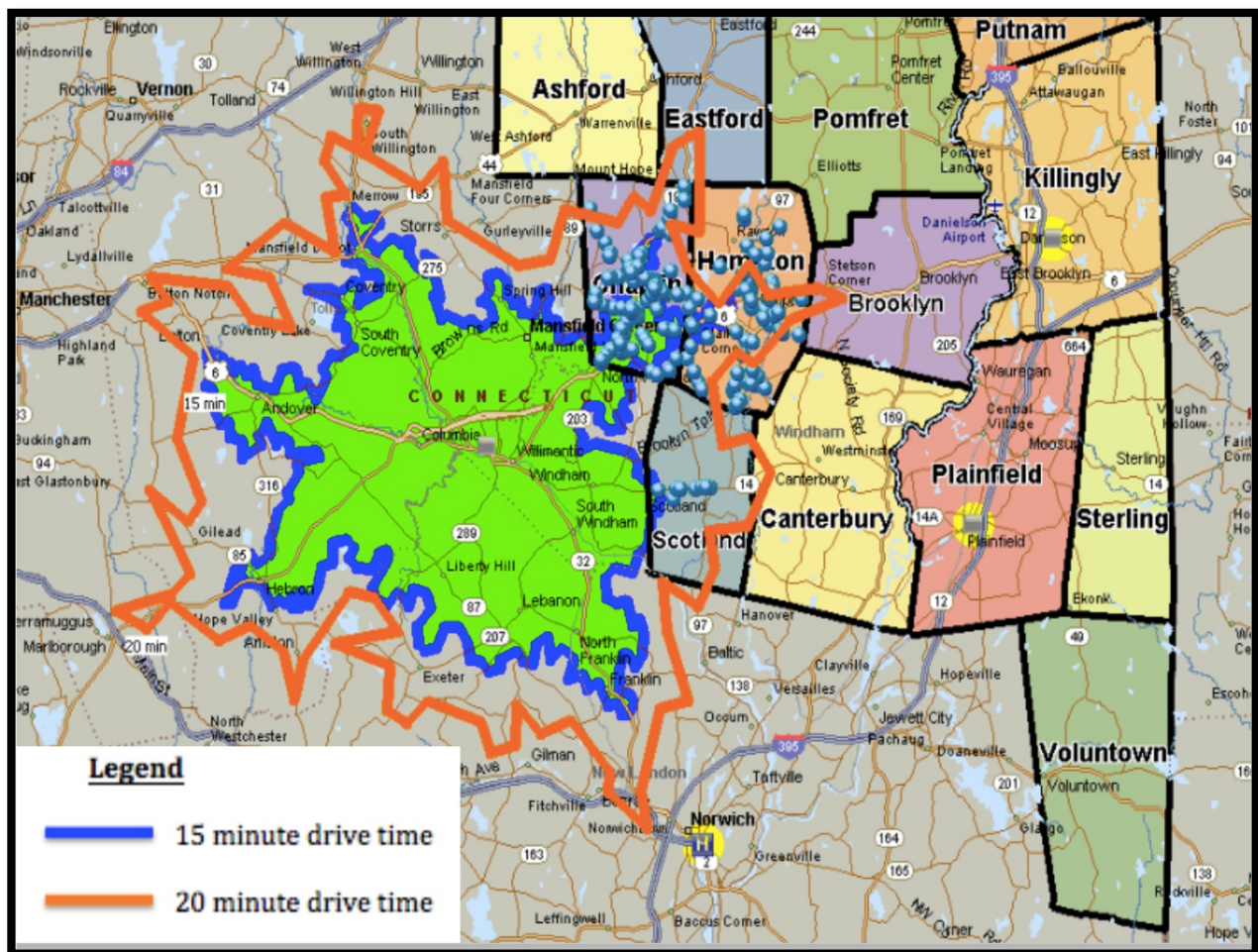
Figure 10: Estimated NECCOG Payer Mix (incomplete data)

Payer Mix	MCARE	MCAID	Insurance	Self Pay
Average	38%	33%	21%	8%

Alternative Ambulance Deployment example – Hampton, Chaplin and Scotland

Within the Hampton, Chaplin and Scotland areas there are low call volumes for ambulances where the cost-per-call is high. We looked at the impact of having an ambulance based at Windham hospital.

Figure 11: Response from Windham Hospital to Hampton-Chaplin-Scotland



There were 548 responses with 367 transports from these communities. About 80% of the 9-1-1 calls occur within a 20-minute drive time from Windham Hospital.

This example would re-assign the BLS PSA to Windham Hospital who will provide a good and reliable response time while reducing community costs. The fire departments can redirect their resources to providing MFR instead of the lengthy and costly BLS transport.

Recommendations - Ambulance

16. Maintain up-to-date list of ambulance providers, including information on current chief/captain or point of contact (name, email and phone number).
17. Monitor and provide ambulance response times to all NECCOG member towns.
18. Work with each municipality to establish measurable ambulance response times and automatic aid coverage protocols as part of their Local Emergency Medical Services Plan.
19. Work with the ambulance transporters to obtain accurate cost and revenue data.
20. Explore the deployment and staffing impact of regional or consolidated ambulance coverage based on workload and volunteer availability.
21. Schedule quarterly meetings with the ambulance providers to review response times, address issues, and look for collaborative opportunities.
22. Initiate an Emergency Vehicle Operator training program.

DISASTER PREPAREDNESS

EMS systems should have an all-hazards preparedness approach, combined with knowledge of the unique risk factors faced by the communities they serve. By weighing *likely* and *less likely* risks, it's possible to strike a balance in preparedness efforts. Clearly, EMS systems must maintain focus on day-to-day operations, while considering system enhancement for the far more frequent events they encounter.

In lieu of county government, the regional council of governments are an important piece of Connecticut's planning framework because they provide a forum for regional and inter-municipal decision making, service coordination, and project planning. The "2015 Northeastern Connecticut Council of Governments Regional Hazard Mitigation Plan"¹³ provides a comprehensive, all hazards plan.

¹³ NECCOG (2015). Northeastern Connecticut Council of Governments Regional Hazard Mitigation Plan. Dayville, CT, Northeastern Connecticut Council Governments.

Interagency training is of utmost importance. Recent after-action reports noted that the Incident Command System (ICS) procedures failed after a multi-jurisdictional operation. Analysis identified that the lack of practice made ICS cumbersome and awkward. Our experience indicates that the success of a large-scale event is predicated upon policies, activities and practices that are used daily.

The unique integration aspects of EMS and the larger system merit a separate evaluation of how to better integrate planning, exercise, risk mitigation and staffing those functions within the larger healthcare delivery system. Such an evaluation was beyond the scope of this study.

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

The state Department of Public Health notes limited medical oversight of EMS. Only paramedics¹⁴, emergency medical dispatchers and emergency medical technicians who are trained in advanced skills¹⁵ are required to have medical direction.

Day Kimball and Backus hospital offer medical oversight to medical first responders and emergency medical technicians, but it is not a regular or mandated activity. One of the hospital respondents to the survey provided this observation and recommendation:

¹⁴ Mullen, J., W. H. Furniss, J. A. Reynolds (2015). Emergency Medical Services Plan: 2015 - 2020. Hartford, CT, Department of Public Health.

¹⁵ Thompson Fire Advisory Committee. (2013 December). Local Emergency Medical Services Plan: The Town of Thompson, Connecticut. December 1, 2013 - November 30, 2018. Thompson, CT, Town of Thompson.

“Regional EMS plan with Windham, Day Kimball and Backus Hospitals working together with regional ALS/BLS guidelines and care standards would be beneficial. Ideally with as few different EMS organizations as possible to improve consistency.”

Recommendations

23. Establish regional clinical guidelines for medical first responders, emergency medical technicians and paramedics.
24. Physicians involved in consortium should have emergency medicine credentials.
25. Establish a regional Quality Assurance/Quality Improvement (QA/QI) process with chart reviews and patient outcome follow-ups.
26. Establish a continuing pre-hospital education program that is built from the local QI process and reflects national best practices in pre-hospital care.

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

The creation and maintenance of a Local Emergency Medical Services Plan by each municipality requires written service agreements and descriptions of the role and responsibility for each pre-hospital care provider.¹⁶ NECCOG should be an active partner with every municipality in determining appropriate response times, handling of scarce resources and collaborative problem solving.

The LEMSP requires milestones at the 1, 3 and 5-year mark and a review/resubmission of the LEMSP every five years. This provides a powerful tool for development of an effective regional EMS system in northeastern Connecticut.

¹⁶ Office of Emergency Medical Services (updated 2015 July). Local Emergency Medical Services Plan Toolkit for Municipalities. Department of Public Health.

The paid paramedics and emergency medical technicians have a professional appearance and the vehicles are clean and in good condition. The volunteer medical first responders and emergency medical technicians often respond from home or work and will not be in uniform.

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. In the survey and face-to-face interviews, some of the caregivers felt that their issues were not adequately addressed by NECCOG.

Recommendations

27. Publish monthly reports of emergency medical responder, ambulance, and paramedic fracture response times to all system participants and NECCOG member municipalities.
28. Establish a formal local mechanism to address patient and community concerns
29. Establish a procedure to routinely address internal customer issues, including a documentation and feedback system.

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 Northeast District Department of Health, 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 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 northeast Connecticut. While retention is tightly related to the manner in which the individual agencies operate, recruitment efforts can be supported by NECCOG and should be a legitimate role added to the mission of supporting EMS. A wide variety of strategies are utilized in other communities as outlined at below.

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 Northeast District 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.

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

Recommendations

30. Develop a program and identify resources to improve community awareness of the EMS system.
31. Identify and support priority projects for community health improvement, utilizing EMS as a primary focus. This should specifically include but not be limited to volunteer recruitment efforts.
32. Prepare and distribute an annual report to elected officials and community stakeholders 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

NECCOG has provided a soft coordination function and has informally fulfilled many of the “local lead agency” functions, either by funding QV Medic 1 or through participation in a variety of regional committees. Local healthcare facilities are supportive. Town and village leaders need to recognize the potential impact this important program has on the lives of local constituents.

The state Department of Public Health is revising the way they regulate Emergency Medical Services through vigorous use of the Local EMS Plan to plan and develop community best practices in providing pre-hospital emergency care services through a multi-tiered and multi-agency delivery system. This includes proposed changes in regulations, including administration of the primary service areas (PSA).

NECCOG leadership must create a future-oriented EMS plan that incorporates the municipal Local EMS Plans, and involves the pre-hospital providers and the medical community in an open and collaborative manner to the maximum extent possible.

Human Resources

Management must lead the organization in a manner that facilitates delivering the best value to clients and simultaneously developing a climate in which system participants feel valued. A number of decisions (e.g. improved response times, scratch reduction, ALS dispatch) will be difficult to implement within the current organizational climate. To positively change the behaviors and culture of this system will require ongoing and consistent effort over time. Leadership efforts within EMS must be supported by municipal officials, healthcare administrators, paramedics and volunteer first responders and EMTs to be successful.

Quality Improvement Processes

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

NECCOG should work with the member municipalities to develop an annual Quality Improvement Plan. This could be accomplished through an expansion of the Pre-Hospital Emergency Care Advisory Committee with increased staff support.

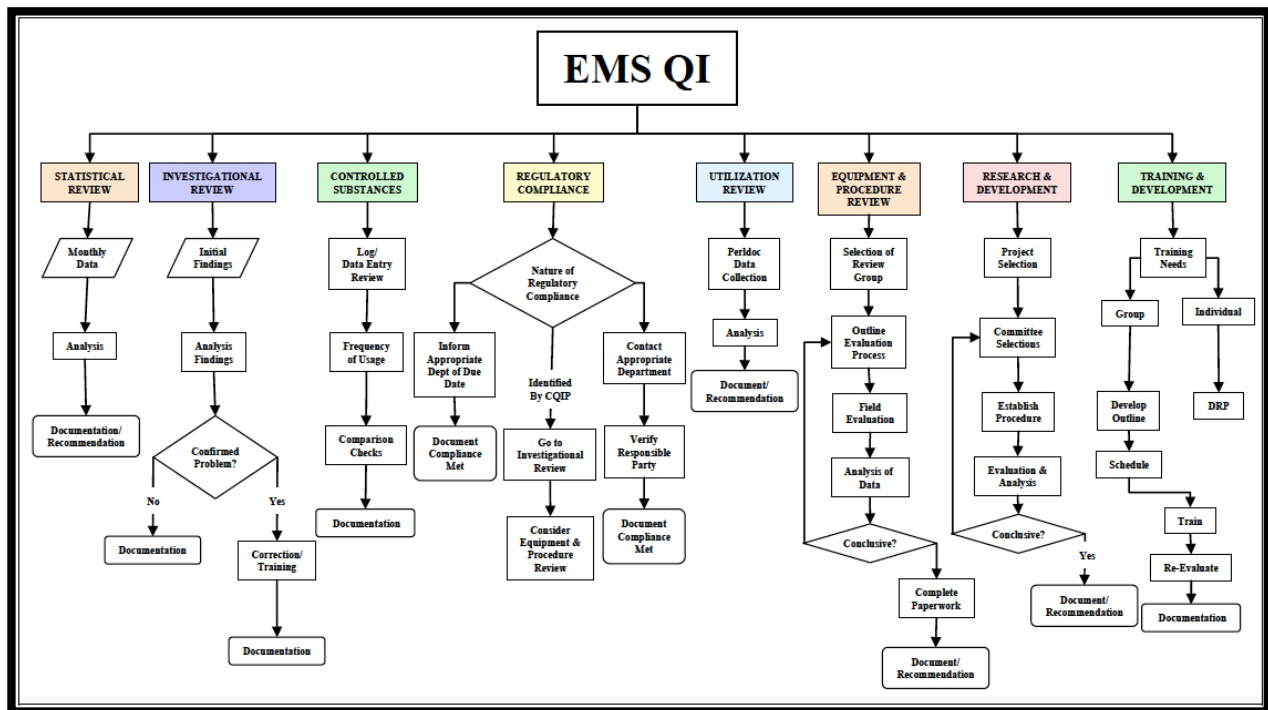
The QI goals, approach, methodology, critical success factors and indicators should be clearly defined in the plan. Indicators should be monitored until improvement has occurred and the threshold or benchmark is achieved in a timely manner. Responsibility and accountability for the QI plan should be clearly defined. The regional medical director should also be actively involved in developing the plan and receive monthly 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

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 12: Proposed Retrospective QI process



Recommendations

33. Establish physician supervised, NECCOG coordinated QI process involving communications, first responders, paramedics, medical transportation and administrative components of the system.

34. Provide training (line and administrative) for all personnel holding supervisory positions within the EMS system; assure that each supervisor has the knowledge, skills and aptitudes to be an effective supervisor.
35. Develop a detailed work plan with specific timelines for service enhancement.

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.

The inherently fragmented EMS system in Connecticut¹⁷ challenges the ability of NECCOG to make the best impact on patient outcomes with the available resources. Consideration should be given to supporting citizen involvement in assisting at medical emergencies, including 9-1-1 provided instruction, Compression-only CPR, community AEDs and Civilian Emergency Response Teams (CERT).

¹⁷ Bordonaro, G. (2013). CT's ambulance services fragmented, consolidated. Hartford Business Journal. Hartford, CT, New England Business Media.

Recommendations

36. Develop a process to expand information that accurately portrays the impact of EMS service on patient outcomes and community well-being.
37. Identify the area of out-of-hospital care that NECCOG's resources can have the most significant impact on patient outcome.
38. Improve the community's ability to identify a life-threatening medical condition and actions a community member can do to make a difference.

SUMMARY: THOUGHTFUL APPLICATION OF RESOURCES

NECCOG is the principal regional planning organization for northeastern Connecticut. The organization coordinates activities by multiple municipalities, promotes regional problem solving, and obtains grants or other funding to meet its mission.

When no paramedic service was available to a large portion of the community, NECCOG established an ALS Intercept contract to provide this essential service in 1999. NECCOG has subsidized paramedic intercept service for 16 years.

Before awarding the 2016-2017 ALS Intercept contract, NECCOG should consider what enhancements in patient outcomes \$286,000 a year can provide:

- Fund physician consortium to assure quality for all aspects of pre-hospital system.
- Establish regional clinical protocols.
- Provide Automatic Vehicle Locators for all ambulance and ems first responder rigs.
- Fund volunteer recruitment drive for the ambulances and fire departments.
- Staff weekday regional ambulance in communities unable to provide service.
- Provide high-performance community CPR training.
- Improve paramedic response time.
- Fund data reporting tool for QVEC

To facilitate a thoughtful re-evaluation of ems resources, NECCOG needs to have current pre-hospital response workload and clinical outcome data to make a measurable improvement in community health and survival. To implement any re-organization, NECCOG needs to demonstrate transparent, collaborative decision-making through participation in quarterly meetings with pre-hospital providers and establishing a regional EMS quality improvement program.

RECOMMENDATION SUMMARY

9-1-1 and COMMUNICATIONS

1. Continue to pursue and update the current New World CAD and ensure there is an improved data suite.
2. Clarify process to handle second-out ALS calls.
3. All response units should be GPS/AVL capable for appropriate unit dispatching, with QVEC able to monitor positions to determine nearest available responder.
4. Performance metrics should be established for call taking times and measured monthly.
5. Evaluate the ability to develop an interface from QVEC to field units to receive automatic electronic patient care reporting data.
6. Chiefs need to take BLS transport out of service when unstaffed.
7. Evaluate ability to reduce decision-making process when dispatching a secondary paramedic unit or mutual aid ambulance.

MEDICAL FIRST RESPONSE

8. Maintain up-to-date list of medical first responder agencies, including information on current fire chief or point of contact (name, email and phone number)
9. Work with each municipality to establish measurable response times and coverage protocols as part of updating their Local Emergency Medical Services Plan.
10. Establish consortium of medical directors to assure quality for all aspects of pre-hospital care system.

MEDICAL TRANSPORTATION

11. Monitor and provide paramedic response times to all towns covered in the NECCOG contract every month.
12. Address the “chute time” to determine if the 2 minute, 52 second average time is accurate. If so, this should be reduced to less than 60 seconds.
13. In the next contract (2016-2017) require that the paramedic provider arrive within 14:59 minutes in the mill villages with more than 5,000 residents with 90% reliability. This covers Killingly, Putnam, Thompson, Woodstock and Plainfield area covered by NECCOG.
14. Have NECCOG develop a contract that provides for paramedic level coverage with the best outcome.
15. Once all ALS provider units are equipped with AVL and QVEC has access to the data, send the nearest paramedic asset to an emergency.

16. Maintain up-to-date list of ambulance providers, including information on current chief/captain or point of contact (name, email and phone number)
17. Monitor and provide ambulance response times to all towns covered in the NECCOG contract every month.
18. Work with each municipality to establish measurable ambulance response times and automatic aid coverage protocols as part of their Local Emergency Medical Services Plan.
19. Work with the ambulance transporters to obtain accurate cost and revenue data.
20. Explore deployment and staffing impact of regional or consolidated ambulance coverage based on workload and volunteer availability.
21. Schedule quarterly meetings with the ambulance providers to review response times, address issues and look for collaborative opportunities.
22. Initiate an Emergency Vehicle Operator training program.

MEDICAL ACCOUNTABILITY

23. Establish regional clinical guidelines for medical first responders, emergency medical technicians and paramedics.
24. Physicians involved in consortium should have emergency medicine credentials.
25. Establish a regional Quality Assurance/Quality Improvement (QA/QI) process with chart reviews and patient outcome follow-ups.
26. Establish a continuing pre-hospital education program that is built from the local QI process and reflects national best practices in pre-hospital care.

CUSTOMER AND COMMUNITY ACCOUNTABILITY

27. Publish monthly reports of emergency medical responder, ambulance and paramedic fracture response times to all system participants and NECCOG member municipalities.
28. Establish a formal local mechanism to address patient and community concerns.
29. Establish a procedure to routinely address internal customer issues, including a documentation and feedback system.

PREVENTION AND COMMUNITY EDUCATION

30. Develop a program and identify resources to improve community awareness of the EMS system.
31. Identify and support priority projects for community health improvement, utilizing EMS as a primary focus. This should specifically include but not be limited to volunteer recruitment efforts.

32. Prepare and distribute an annual report to elected officials and community stakeholders describing the accomplishments of the EMS system.

ORGANIZATIONAL STRUCTURE AND LEADERSHIP

33. Establish physician supervised, NECCOG coordinated QI process involving communications, first responders, paramedics, medical transportation and administrative components of the system.
34. Provide training (line and administrative) for all personnel holding supervisory positions within the EMS system; assure that each supervisor has the knowledge, skills and aptitudes to be an effective supervisor.
35. Develop a detailed work plan with specific timelines for service enhancement.

ENSURING OPTIMAL SYSTEM VALUE

36. Develop a process to expand information that accurately portrays the impact of EMS service on patient outcomes and community well-being.
37. Identify the area of out-of-hospital care that NECCOG's resources can have the most significant impact on patient outcome.
38. Improve the community's ability to identify a life-threatening medical condition and actions a community member can do to make a difference.

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	<i>Putnam is a secondary PSAP</i>
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 configuration and reporting capabilities</i>
Technology supports interface between 911, dispatching & administrative processes	PD	<i>No automatic interface between QVEC and electronic patient care</i>
Radio linkages between dispatch, field units & medical facilities provide adequate coverage and facilitate communications	ND	<i>No AVL (except for QV Medic 1), no way of knowing if 1st responder or ambulance resource is available</i>

Medical First Response Benchmarks		Comments
First responders are part of a coordinated response system and medically supervised by a single system medical director	ND	<i>Each municipality sets its own PSA/mutual aid plan. No 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	ND	
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 provided</i>
Units meet staffing and equipment requirements	D	<i>EMT & EMR on ambulance, 1 paramedic on intercept</i>
Resources are efficiently and effectively deployed	ND	<i>Static rather than dynamic paramedic deployment. MFR and ambulance use "system overload" mutual aid agreement</i>
There is a smooth integration of first response, air, ground and hospital services	PD	<i>Did not evaluate air-medical.</i>
Develop/maintain coordinated disaster plans	PD	<i>NECCOG developed plan, no recent exercise of plan</i>

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

Medical Accountability Benchmarks		Comments
Single point of physician medical direction for entire system	ND	<i>Physician direction required for paramedics and EMTs with advanced skills. CPAP, Epinephrine Auto injector, Glucometer, Narcan and Aspirin.</i>
Written agreement (job description) for medical direction exists	ND	
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>Sponsor hospital will review MFR/ambulance charts on request, paramedics under regular review by their operational medical director</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	<i>Component of Public Act 14-217 – Local EMS Plan.</i>
Units and crews have a professional appearance	ND	
Formal mechanisms exist to address patient and community concerns	ND	
Independent measurement and reporting of system performance are utilized	ND	
Internal customer issues are routinely addressed	PD	<i>Occasional NECCOG interaction with pre-hospital community</i>

Prevention & Community Education Benchmarks		Comments
System personnel provide positive role models	ND	
Programs are targeted to “at risk” populations	D	<i>Municipal Local EMS Plan looks at community CPR capability and special populations</i>
Formal and effective programs with defined goals exist	D	<i>Municipal Local EMS Plan establishes 1, 3 and 5 year objectives</i>
Targeted objectives are measured and met	ND	<i>Part of the five-year renewal of Local EMS Plan</i>

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

Ensuring Optimal System Value Benchmarks		Comments
Clinical outcomes are enhanced by the system	D	
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	PD	<i>Required in municipal Local EMS Plan</i>
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>Non-ambulance calls provided by several private companies</i>
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	D	<i>No tax subsidiaries</i>

Organizational Structure & Leadership Benchmarks		Comments
A lead agency is identified and coordinates system activities	D	
Organizational structure and relationships are well defined	PD	<i>Need clarification or redefinition of NECCOG role with MFR and Ambulance providers</i>
Human resources are developed and otherwise valued	ND	<i>Essential HR practices are absent and HR has minimal involvement</i>
Business planning and measurement processes are defined and utilized	ND	
Operational and clinical data informs/guides the decision process	ND	
A structured and effective performance based quality improvement (QI) system exists	ND	<i>No regional QI exists</i>

Attachment B

**Recommendations
Ranked by Priority**

NECCOG Recommendations Ranked by priority

#	Recommendation	High	Medium	Low
9-1-1 and COMMUNICATIONS				
1	Update the current New World CAD and ensure there is an improved data suite.		X	
2	Clarify process to handle second-out ALS calls			X
3	All units GPS/AVL capable and QVEC can track	X		
4	Establish call taking times and measure monthly		X	
5	Electronic patient care data interface between QVEC and field units			X
6	Chiefs need to take BLS transport out of service when unstaffed.	X		
7	Reduce decision-making process when dispatching mutual aid units		X	
MEDICAL FIRST RESPONSE				
8	Up-to-date contact list of all MFR agencies		X	
9	Establish measurable response times and coverage protocols as part LEMSP		X	
10	Medical director consortium to assure quality of all aspects of pre-hospital care.	X		
MEDICAL TRANSPORTATION				
11	Provide paramedic response times to all towns monthly	X		
12	Investigate QM Medic 1 2:52 "chute time"		X	
13	14:59 minutes paramedic response time to villages with more than 5,000 residents.			X
14	NECCOG contracts for best outcome paramedic coverage	X		
15	Send the nearest paramedic asset to an emergency.		X	
16	Maintain up-to-date list of ambulance provider leaders		X	
17	Provide monthly ambulance response times to all NECCOG member towns.	X		
18	Establish measurable response times and coverage protocols as part LEMSP		X	
19	Obtain accurate cost and revenue data		X	
20	Explore regional or consolidated ambulance coverage based on workload/volunteer activity		X	
21	Quarterly meetings with ambulance providers - response times/problem solving	X		
22	Initiate an Emergency Vehicle Operator training program.			X
MEDICAL ACCOUNTABILITY				
23	Establish regional clinical guidelines for all responders		X	
24	Physicians involved in consortium should have emergency medicine credentials		X	
25	Establish a regional Quality Assurance/Quality Improvement (QA/QI) process	X		
26	Pre-hospital CEU program that is built from the local QI process		X	
CUSTOMER AND COMMUNITY ACCOUNTABILITY				
27	Provide community with published response time information		X	
28	Establish a formal local mechanism to address patient and community concerns	X		
29	Develop procedure to routinely address internal customer issues		X	
PREVENTION AND COMMUNITY EDUCATION				
30	Improve community awareness of the EMS system.			X
31	Support community health improvement projects utilizing EMS as a primary focus.		X	
32	Annual regional EMS report to elected officials and community stakeholders.	X		
ORGANIZATIONAL STRUCTURE AND LEADERSHIP				
33	Physician supervised, NECCOG coordinated QI process	X		
34	EMS Supervisor/Leader training			X
35	Develop a detailed work plan with specific timelines for service enhancement.		X	
ENSURING OPTIMAL SYSTEM VALUE				
36	Accurately portray the impact of EMS on patient outcomes and community well-being	X	X	
37	Identify areas where pre-hospital team can impact patient outcome.		X	
38	Improve the community's ability to identify a medical condition and take action	X		



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