**Consultant Report** 

Westchester County, NY

## **Emergency Medical Services System Evaluation**

December 8, 2008



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# **Executive Summary**

The report to follow is a macro assessment of the Emergency Medical Services in Westchester County conducted by Fitch & Associates. The study includes detailed descriptions of the EMS system and discussion of industry best practices. Included are five potential future system scenarios and 47 recommendations for improvement. The following is an executive summary of the findings:

- The County system is comprised of 40 independent Public Safety Answering Points (PSAPS) receiving 9-1-1 calls. Call processing follows as many as three separate process workflows. Only 60-Control has enough call volume to remain proficient.
- Each community is its own micro EMS system. With the exception of a few cities, a single call depletes first line ambulance resources. Mutual aid from neighboring communities is required to service additional calls and there is no regional process to dynamically address demand and geographic coverage.
- There is limited coordinated medical first response to reach patients with time sensitive, life-threatening emergencies (e.g., cardiac arrest). Law enforcement represents the most consistently staffed public safety group with the potential to act as medical first responders in communities without career fire departments who provide the service.
- EMS transport response time reliability varies dramatically by jurisdictions with more than one-half of communities likely not receiving a clinically appropriate response time.
- EMS response times are not measured using industry recommended patient-centric time intervals.
- The practice of using part-time paramedics to supplement volunteer staffing results in ambulance Corps relying on the same pool of personnel, which reduces staffing capacity, creates a safety risk, and is less employee friendly.
- The County needs a more coordinated mutual aid plan to enable adequate response.
- Data definitions are not in place and tracking at the local level varies from not at all to various methods. Little useful data exists locally or Countywide to monitor activity or guide system planning and process improvement.
- The system design and heavy volunteer staffing reliance places the County at risk and is unlikely to effectively respond to a large scale event and maintain emergency service operations.
- Future scenarios include status quo, process improvement options, performancebased contracting with a private provider(s), a public utility model system, or a County governmental department.
- If proactive steps are not taken to improve service delivery, there will be an unnecessary loss of life event or an inadequately managed isolated emergency (e.g., mass casualty event) that will create community scrutiny and dissatisfaction leading to forced change.

# Acknowledgements

Conducting a study of an EMS system like Westchester County is a large undertaking. It requires a great deal of local support, data collection, and coordination. The Consulting Team is appreciative of the commitment and support of many people.

The Westchester County EMS Advisory Board and the Westchester County Department of Emergency Services acted as initial advisors to the Consultant team. Members shared critical information about the system's history and operations, facilitated identifying public safety organizations, and prepared the team for potential challenges in collecting data and accessing a system. The Advisory Board's guidance enabled the Consultants to be efficient in their work, effective at capturing the needed data, and to be clear in achieving the needs of the County.

Westchester County is home to nearly one-hundred primary and secondary Public Safety Answering Points (PSAPs), first responder agencies, volunteer and career ambulance services, paramedic intercept services, and an air medical provider. The Consultant team contacted every organization and data was collected from more than one-half through telephone and online delivered surveys, focus groups, and one-on-one on-site meetings. Participation was completely voluntary and every organization was gracious and forthcoming in assisting the team. The Consultant team appreciated their support and openness.

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# Scope of Work

The study was prompted by a concern that the Westchester County Emergency Medical Services (EMS) providers would not be capable to respond to a Chemical, Biological, Radiological, Nuclear, or Explosive Device (CBRNE) event with response time reliability and do so safely. Validating the concern required conducting a broader study that assessed the day-to-day capacity and gaps in the EMS system. The study was funded through a grant from the United States Department of Homeland Security

The purpose of the study was to conduct a comprehensive inventory of the EMS System in Westchester County. Included was to be a study of EMS staffing, response times and overall preparedness to respond to large scale, man-made and natural disasters. The specific scope of work included:

- Defining and reporting on the current system configuration.
- Designing and implementing a focused study to identify current performance.
- Define and recommend certain qualitative and quantitative standards.
- Quantify system performance characteristics and develop mechanisms to measure system performance.
- Develop a performance improvement plan, if determined to be necessary and appropriate, that addresses areas identified in the above study as needing corrective action(s). Included would be recommendations for coordinated, effective, and efficient service delivery and analysis of training, equipment, and operations for EMS providers serving the County.

The scope specifically asked for direction in providing definition for several topic areas including:

- Qualitative measures of EMS system activity and performance.
- Recommendations for response time performance, staffing, deployment, certifications, utilization, communications, needed infrastructure, and resource development and deployment.
- Define the pertinent response time intervals and how defined intervals shall be measured for both wireless and landline calls.

The results of the study was hoped to include a narrative discussion of the existing system, an inventory of resources, and a grasp of current activities and preparedness levels.

Achieving the scope would evolve as the Consultant team engaged in the study process and discussed initial impressions and inherent challenges in adequately capturing data. This evolution is further described in the methodology section of this report.

# Background

Westchester County is a mixed urban, suburban, and rural County with about 950,000 residents and is part of the New York Metropolitan Area. The County is approximately 500 square miles, which includes land (433 sq mi) and water (67 sq mi). The population density is approximately 1,900 residents per square mile, but actual density varies significantly from urban to rural areas.

According to 2006 United States Department of Housing and Urban Development data, the median income for a household of one person in the County was \$67,555 and the median income for a family of four was \$96,500. A suburb of New York City, it is also home to many prominent and affluent residents.

Westchester County is home to six cities, 19 towns, and 20 villages. Land not contained in one of the cities is in a town. Towns may include one or more villages and two villages cross the boundaries of more than one town.

The County is governed by a publically elected County Executive, who serves a four-year term, and by a 17 member Board of Legislators elected every two years. Each Legislator represents a district of approximately 50,000.

New York State is a "home rule" state. The powers granted in Article IX of the State Constitution and implemented by the Municipal Home Rule Law give authority to municipalities to enact local law and control over matters related to its "property, affairs, or government." The Home Rule Law provides significant autonomy and self-rule to the local towns, villages, and cities in Westchester County, which includes responsibility and authority related to the prevision of public safety services, including EMS. Each community provides EMS service directly, relies on volunteers, or contracted private providers, and there is not a coordinated Countywide EMS system.

Emergency Services in Westchester County includes law enforcement, fire suppression, emergency medical services, and emergency management. The system design was not planned and is reflective of a system that has evolved over time in an effort to meet changing demands and expectations for service. Services are provided by a patchwork of local community career employees, volunteer groups, and not-for-profit and for-profit companies.

It is the government's responsibility to protect the health and welfare of its citizens and visitors. This study reflects Westchester County's commitment and is intended to provide an assessment of the current state of emergency services, specifically EMS, and guide future system enhancements. The County solicited the study at the request of the EMS Advisory Board.

# Methodology

The Consulting Team at Fitch & Associates traditionally uses a mixed method of inquiry that blends quantitative and qualitative data gathering tools to provide the fullest understanding of EMS systems. Many of the methods used have been developed from more than 500 client engagements over more than 25 years of consulting experience. In addition, the Firm values the unique needs of each client community and carefully assesses and customizes the approach used to achieve the individual needs of the project.

The proposed approach included multiple project phases that focused on building commitment from stakeholders, collecting qualitative and quantitative data, and resulting in a report that is defensible and actionable. Our proposed approach included nine (9) phases:

- Phase 1 Leadership Stakeholder Interviews
- Phase 2 Identification of Data Collection Points
- Phase 3 Electronic Data Collection Instrument Deployment
- Phase 4 On-site Visit
- Phase 5 Focus Groups & Provider Meetings
- Phase 6 Data Analysis
- Phase 7 Recommendation & Development of System Metrics
- Phase 8 Report Generation
- Phase 9 Final Report & Presentation

Figure 1 shows how the phases are integrated into a complete project plan.

#### Figure 1: Nine Phase Project Plan Process



Following award of the contract, the Consulting Team met with leadership stakeholders of the EMS system to gain a solid understanding of the opportunities and challenges of conducting a system analysis of Westchester County EMS (WCEMS). This resulted in a few adjustments to the proposed methodology. Those adjustments included:

1. **Study AIM**. Describing the project as a system description or inventory versus a traditional assessment or evaluation. With the large number of individual provider groups and the diversity of career and volunteer services, it was clear that collecting valid data from all stakeholders would not be possible and evaluating actual perfor-

mance would not be feasible given the limit of existing data availability and resource constraints. In addition, it became clear that the County wanted to understand the current system but also appreciate where the overall system was in relation to where it could or should be. The project focus aim adjusted to documenting or describing the current system and gathering a significant sampling of data in an effort to make assumptions or best guesses of the general volume, capacity, and performance of the system.

- 2. **Data Collection**. Onsite stakeholder interviews and internet-based surveys are traditionally used to capture large amounts of data. The number of provider organizations and ensuring electronic access was an obstacle. The project team proposed meeting with a reasonable sample of providers at their organizations for onsite data collection and remaining members were interviewed using designed protocols by a staff member over the phone to capture the greatest amount of data. Emailed surveys and focus groups also supplemented the data collection process.
- 3. **Report Presentation**. Due to the diversity of organizations and the quality and types of data accessible, it became difficult to create a simple matrix of the results that provided easy review and comparison of independent organizations. Data collected is described in aggregate throughout the report wherever possible. Analysis is provided and conclusions drawn by the Consultant team as appropriate.

The adjustments to the original scope do not have an impact on the quality of the assessments or the conclusions presented here in the report. The result is a descriptive narrative report that discusses the core issues and achieves the project's aim and is supplemented with the supporting data.

# **Study Participation**

Westchester County is served by nearly one-hundred primary and secondary Public Safety Answering Points (PSAPs), first responder agencies, volunteer and career ambulance services, paramedic intercept services, and an air medical provider. The Consultant team contacted every organization and data was collected from more than one-half through telephone and online delivered surveys, focus groups, and one-on-one onsite meetings. Participation was completely voluntary. The following is a list describing the sample of entities data was collected from.

Agency Type	Participation vs. total Agencies	Participation Percentage
Primary PSAPs	38/39	97.0%
Secondary PSAPs	3/6 (includes 60 Control)	50.0%
Medical First Response	32/38	84.2%
Transport Providers	15/28 (includes largest call volume providers)	53.6%
Independent Paramedic Intercepts	1/1 (Empress & TransCare included above)	100.0%
Air Medical	1/1	100.0%

#### Table 1: Study Participation

Data was collected through diverse methods. Ninety organizations contributed data to the study and no single agency type had less than 50% responding. Participation in the study was sufficient to provide the Consultant team with an appreciation for how the system operates at a macro level, and in many cases micro level too. In addition, the data collected provided the appropriate detail to understand and make recommendations about system processes, data definitions and collection methods, and overall system sustainability.

# **System Description**

In general, EMS systems are unique because they serve diverse communities and varying stakeholder needs. It's common in the EMS industry to hear the saying, "If you've seen one EMS system, you've seen one EMS system." No two EMS systems are exactly alike. EMS systems can have diverse emergency and non-emergency communications systems, have varied levels of first response, blend volunteerism and career personnel, and be served by public and private organizations. Regardless of the specific attributes, all EMS systems share similar components.

Clarifying the aim of an EMS system is important to understanding how it works. The primary aim is to provide reliable and responsive emergency medical care and transport to critically ill patients. Secondarily, the EMS system also provides out-of-hospital medical care and transportation to non-life threatening emergencies that are urgent to the patients that call. EMS system design and operations should strive to serve these two aims in the order described.

EMS systems, as they operate today, are a relatively new public service. While ambulance transport service in New York State dates back to the turn of the 20th Century, much of the development of EMS has occurred in the 40 plus years since the National Research Council released the "EMS White Paper" in 1966 titled: *Accidental Death and Disability: The Neglected Disease of Modern Society.* This report enabled significant federal funding to develop EMS systems and resulted in the genesis of modern EMS systems in the 1970s until direct funding was shifted to block grants for states in the early 1980s.

In many communities, the loss of direct funding stunted EMS system development. The EMS system design in place in 1981 for many communities remains the one that exists today. In the interim since 1981, systems have evolved with changing demands, but in a more incremental manner and rarely planned. Westchester County is reflective of this evolution where multiple delivery models and provider types vary from community to community.

In spite of the diversity of EMS systems, the core components of an EMS system are relatively similar and will act as the frame for the discussion of Westchester County's EMS system. The components include: communications, first response, and ambulance response and transport.

#### Table 2: EMS System Components

#### Communications $\rightarrow$ First Response $\rightarrow$ Ambulance Response & Transport

**Communications** – Includes intake from landline and wireless telephones to a primary Public Safety Answering Point (PSAP) and through a secondary PSAP. Call processing, protocol based dispatch, dispatch, and resource management are key activities.

**First Response** – Dispatching the closest resource with medical training that can intervene in perceived time sensitive, life-threatening emergencies.

**Ambulance Response & Transport** – Ambulance response, treatment, and transport of sick and injured patients.

Westchester County receives requests for service via several channels. A primary Public Safety Answering Point (PSAP) in the community of origin – often the police department - receives landline-based 9-1-1 calls. If the call is a medical emergency, it may be dispatched directly or the call may be transferred to a secondary PSAP like 60-Control. The secondary PSAP will conduct additional call interrogation and dispatch the resources.

There are two variations to the call receipt and dispatch process. First, wireless callers are all directed to a single primary PSAP operated by the New York State Police and then forwarded to 60-Control. Second, calls may be made directly to the provider. This is frequently the case when a person or a facility makes a non-emergency or scheduled transport with an ambulance company. These calls are often assumed to be non-life threatening due to their source, but one peer-reviewed study conducted in Kansas City, Missouri found many to be either emergent or requiring paramedic intervention.<sup>1</sup>

Medical first response is an emerging trend in EMS systems nationwide that was developed to shorten the interval between a patient's onset of symptoms or event and receiving some medical aid. Once a call is identified as requiring EMS response, a police officer, or in the majority of communities in America, a fire company is dispatched to provide time-sensitive intervention (e.g., defibrillation in sudden cardiac arrest) until an ambulance arrives. First response is present in limited scope in a few communities within Westchester County, but it is not system-wide.

EMS response and transport in Westchester County includes varying system design models. The diversity and effectiveness vary significantly. Ambulance service may be provided by a staffed, respond-from-home, or hybrid volunteer group, a private company, a not-for-profit organization, or some blended combination. Service delivery and performance varies significantly as one travels across community borders.

<sup>&</sup>lt;sup>1</sup> Wilson, B., Gratton, M.C., Overton, J., Watson, W.A. (1992). Unexpected ALS Procedures on Non-Emergency Ambulance Calls: The Value of a Single-Tier System. *Prehospital & Disaster Medicine*, 7(4): 380-392.

In addition to responding to the daily emergent event, communities have a responsibility to plan, prepare, and maintain the capacity and skills to respond to a large-scale man-made or natural disaster. Attention has been amplified since September 11, 2001. EMS systems must weave planning, preparation, and training into its responsibilities and regional coordination is essential.

### **Summary of System Description**

This overview discussed the Westchester County EMS system in broad strokes. The study report focuses the analysis on the topics just described and provides a detailed description of what exists today, what is the norm or best practice, and recommendations for improvements.

# **Public Safety Answering Points**

The Westchester County EMS system is a mix of multiple agencies attempting to deliver quality emergency medical services. The challenge for the emergency services organizations is that service delivery is non-integrated and independent services function at disparate levels of care. This means that care quality delivered to the visitors and residents of Westchester County in not uniform.

Unlike other communities in the United States, Westchester County EMS's primary mode of intervention is driven by law enforcement. The police respond independent of the call nature and respond to all 9-1-1 calls. Law enforcement responds to fire and ambulance calls as the primary response agents, as well as their police or civil defense calls. This situation is a result of being the only consistently fully paid emergency service throughout the County and has led to a situation in which EMS response is driven by law enforcement.

When this is combined with the dispatching functions, it creates a circular situation in which the dispatch systems are attached to 9-1-1 Public Safety Answering Points (PSAP), which are then attached to or "owned" by law enforcement because police are the primary responders. Police remain the primary responders because they operate the dispatch centers and this leads to the circular notion of what function drives which need.



Figure 2: Emergency Response Model

A primary question is whether or not the dispatching function, from an ambulance perspective, is required to be with the primary response agency or may it be independent or done by third party. This report evaluates the gaps from a best practice approach through a series of surveys, observations, and data, which will assist Westchester County Emergency Services to better understand that question and draw a conclusion.

The net effects of the current process are difficult to fully quantify because standards or metrics of performance that are required in order to fully accomplish the objectives of a modern EMS system are not present in Westchester County today. Clearly, there is no singular right answer on how to design a modern EMS system. The benefit of the existing system is that it attempts to maximize the available resources and minimizes the County's risk by having a rapid intervention done by qualified personnel and staff (police). It may not be optimal, however, because medical response is not geared to the medical personnel that need to be dispatched or that need to be the primary agencies on medical calls. This situation has led to a compromise in effective and efficient emergency medical response and is not optimal by today's standards.

To further complicate the situation, there are multiple primary points of contact (9-1-1 primary Public Safety Answering Points) and that means that no efficiencies are maximized throughout the multiple dispatch centers. Tradition and the need to have communications that are closely related to field operations are driving the overall system mindset. This creates the over abundance of primary PSAPs.

In addition, cell phone callers in Westchester County who dial 9-1-1 are answered by a single primary PSAP – the New York State Police. Emergency medical requests are then transferred to the County dispatch center - 60-Control - for dispatch of the appropriate responders for the jurisdiction where the call originated. Having cell phone calls routed to a single PSAP reduces the potential that a caller would be misdirected to the wrong PSAP due to tower proximity confusion.

The call processing for a cell phone caller is actually more expeditious than most landline calls depending on the jurisdiction of origin. Transferring these calls to 60-Control does have an inherent delay, but it is no more than any landline processes. Eliminating this process would not be recommended unless Westchester County government was to establish a Countywide combined center that acted as the primary and secondary PSAP. At this time, landline process issues are of more concern.

Figure 3: Primary PSAPs



The 39 primary Public Safety Answering Points (PSAP) are in 39 different police departments that service the Westchester County community. The map displays 32 of the 39 locations; one location did not have a zip code and could not be mapped. Six others shared the same zip code and were treated as the same by the mapping software. Like many 9-1-1 centers, the County's are associated with law enforcement. The quantity of 9-1-1 centers for a county the size of Westchester is very abnormally high. According to the U.S. Census Bureau, the County has a total area of 500 square miles (1,295 km<sup>2</sup>), of which, 433 square miles (1,121 km<sup>2</sup>) of it is land and 67 square miles (174 km<sup>2</sup>) of it (13.45%) is water.



#### Figure 4: Distribution of Primary PSAPs

On the southern half of the County there are 20 primary PSAPs that sit within an eight-mile radius. On the northern end of the County, the remaining 12 PSAPS sit within a nine-mile radius. All 39 PSAPS sit within a radius of 14.8 miles. This represents a significant duplication of services and technology and makes jurisdictional boundaries a challenge as each PSAP only covers a small isolated service area. The number of primary PSAPs would pose a significant hindrance for cellular 9-1-1 calls due to tower proximity, but fortunately the County has centralized cell phone calls to one state trooper dispatch center for the entire County.

An additional complexity for the ambulance or emergency service response is that, in some situations, a secondary PSAP processes the medical calls. There is no specific logic or reason for why some primary PSAPs transfer their medical calls for secondary processing and some do not; or why it occurs in some cases depending on the situation. The most common an-

swer as to why a call is sent to a secondary dispatch center or not was not based on a dispatch center requirements, but rather a belief that control would be lost and it would take longer to assign the police to a medical response, if the call was transferred.

Appendix 5 provides a matrix reflecting each municipality, the medical first responder agency, transport provider, and current EMS dispatch entity.

There exist five secondary PSAPs or medical dispatch centers. This is not to say (as can be seen above) that only these six do medical calls, but rather above and beyond the police 9-1-1 centers that do medical triage, there are six additional dispatch centers.



Figure 5: Additional Dispatch Centers

There is no system design logic or specific need for having these five secondary PSAPs for additional medical call processing. Their operation is a result of the fact that fire departments traditionally dispatch fire units, so in Westchester County the fire departments that do medical first response or ambulance transport have kept their dispatch center to do medical call taking.

### **EMS Communications Workflow**

The workflow or process an EMS call follows when a 9-1-1 caller requests assistance in Westchester County is very difficult to map and is fraught with inconsistencies. Depending on the jurisdiction the call originated, there are three different possible processes a patient or a client calling for an emergency ambulance may encounter. Figures 6, 7, and 8 attempt to map each process.



#### Figure 6: Situation 1 – EMS Call Center Workflow

#### Figure 7: Situation 2 – EMS Call Center Workflow





#### Figure 8: Situation 3 – EMS Call Center Workflow

The inconsistent approach to ambulance assignment, distribution, and determination of requirement are not conducive to optimal performance. The two major concerns of having disparate methodologies for patient assessment of acuity and of ambulance and emergency services personnel assignment are:

- 1. The potential points of failures are an exponential combination of the different methodologies.
- 2. The lack of consistency makes it impossible to have both metrics by which the services are held accountable and quality assurance and improvement based on consistency checking.

Westchester County Emergency Services must decide who is ultimately accountable for both determining patient acuity and assigning ambulances and emergency services personnel.

#### Recommendation

• Westchester County Emergency Services must decide who is ultimately accountable for both determining patient acuity and assigning ambulances and emergency services personnel.

### **Volumes and Volumetric Analysis**

One of the biggest challenges of having multiple 9-1-1 centers and multiple secondary PSAPs is determining whether or not there is sufficient volume of activity to maintain a level of proficiency and EMS response.

Data was collected from two sources: 1) a survey; and 2) through the 9-1-1 switch.

Using the 9-1-1 switch data for 2006, we are able to establish what kind of volume or proportional volume of activity each dispatch center managed as a part of the total call volume for the County. The County received 416,000 9-1-1 calls in 2006. Figure 9 shows how these were distributed throughout the different 9-1-1 centers.



#### Figure 9: Distribution of Call Volume by Dispatch Center

The pie chart highlights that only one 9-1-1 center received at least 10% of the total call volume. This is even more accentuated when considering the amount of 9-1-1 centers that receive less than 1% of the total calls.



Figure 10: Ranking of PSAP by Call Volume

Of the 416,000 calls that went through 9-1-1 centers in Westchester County, 22,000 (5.2%) were forwarded to a secondary PSAP. This is not reflective of the total demand for emergency medical service. As indicated earlier, in many cases, law enforcement does the 9-1-1 medical triage. Of the 22,000 calls that are forwarded to a secondary PSAP, the distribution is presented in Figure 11.

PSAP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Percentage
Fairview FD	26	17	27	27	28	31	30	35	20	18	38	19	316	1.38%
Hartsdale FD	38	23	14	9	21	17	13	22	31	72	16	10	286	1.25%
Mohegan Lake FD	23	21	29	35	38	23	15	30	40	43	35	16	348	1.52%
Somers FD	201	181	198	124	207	227	293	158	191	186	236	184	2386	10.44%
Mt Vernon FD	156	154	131	188	115	122	141	74	138	155	108	134	1616	7.07%
Westchester Fire Con	1622	1213	1313	1301	1397	1478	1562	1431	1540	1626	1528	1899	17910	78.34%
Secondary PSAP Total	2066	1609	1712	1684	1806	1898	2054	1750	1960	2100	1961	2262	22862	100.00%

Figure 11: Distribution of EMS Calls Down Streamed to Secondary PSAP

A large difference exists between the various secondary PSAPs. Nearly 80% of all forwarded medical calls are treated by 60-Control. This will become significant as standards are established for 9-1-1 and emergency call taking response. This is also very significant for quality assurance and continuous quality improvement.

Half of the secondary PSAPs are doing less than one medical call a day. Two of the secondary PSAPs are doing between four and seven medical calls a day and 60-Control is doing fifty medical calls a day. Only 60-Control has enough volume of activity to become proficient in protocol-based call taking. The other dispatch centers do not have enough volume or activity to maintain call taking proficiency.

### **Quality of Service and Performance of Dispatch**

It is important to note that the quality of the service delivered by the dispatch centers is difficult to evaluate without specific metrics or quality assurance modules. This review should be treated as a summary of both what is best practice and, in some cases, what the Consultant's observations are based on survey results and on-site interviews.

All aspects of the review are based on international standards from the National Emergency Number Association (NENA), the National Academies of Emergency Dispatch (NAED), and, where applicable, the Association of Public Safety Communication Officials (APCO). NAED standards include the use of protocol-based call interrogation – known as the Medical Priority Dispatch System (MPDS) - that enables call takers to triage emergency medical calls and provide medical instructions over the telephone in acute cases (e.g., cardiac arrest, childbirth) while help is on the way. Most of the recommendations found in this report are based on international standards and procedures.

Due to the vast number of dispatch centers, an in-depth analysis could not be properly performed. The Consulting Team chose to use a mixed method approach of surveys, on-site evaluation of select dispatch centers, and interviews with different stakeholders.

All comments on the quality of service should be applied generally to all of the dispatch centers. This does not mean that some of the dispatch centers do not have some of the processes, but none visited or surveyed had all the elements.

The best way to approach the problem of evaluation is to follow the natural sequence of call taking.





The Consultant team used a phone interview protocol to establish whether or not compliancy was being met against international best practice. It is important to note that only twelve 9-1-1 centers were aware of the NENA standards, yet most of them followed portions of the standards.

### Call Received at 9-1-1 Center

Call receipt at the 9-1-1 center is a crucially important metric because it is the measurement of responsiveness for the 9-1-1 center to the patient. It is recommended that all emergency calls coming into a 9-1-1 center be responded to within three phone rings (which is approximately 10 seconds) 90% of the time. Almost all centers (97%) reported that they met the 10-second international best practice in response time to patients or clients in distress. Only one dispatch center did not report meeting the standard because they did not actively measure the standard. However, nearly half (42%) of the 9-1-1 dispatch centers reported not measuring ring time response or were unsure of whether or not ring time response was measured. With 42% of primary PSAPs reporting they do not measure the benchmark, as many as a third to half of the centers that believe they are meeting the measure do not use data to make that assertion.

#### Recommendations

- All 9-1-1 centers should measure and track their ring time response.
- Best practice is to answer within three phone rings (which is approximately 10 seconds) 90% of the time.
- All 9-1-1 centers should post their performance on ring time response.

### Caller is Asked, "What is Your Emergency?"

The importance of having standardized emergency response for call taking is important because it significantly reduces caller hang-ups due to people in crisis having a predisposed mindset as to what will occur when dialing 9-1-1. The standardized emergency response should be, "What is your emergency?"

Half (50%) of the dispatch centers follow the recommended response. The other half (50%) added a combination of town identification or police service and town identification. For the seven-digit response, the standard was only followed by less than a third (32%) of dispatch centers. While it is less crucial for seven digit response, standardization makes it easier for quality assurance.

#### Recommendations

- That all centers follow the 9-1-1 standard response protocol for emergency calls.
- That a compliancy system is set up to evaluate response.

### **Caller Transferred to Appropriate Agency**

Ensuring that the caller is transferred appropriately and that the allied agency has received the call is crucially important so that calls are not lost. All of the agencies reported that they do ensure that calls are received by the allied agency when call transferring is required. All PSAPs use the hook flash system, which is a phone-to-phone communication.

### **Caller Location Validated**

Caller location and validation is twofold: 1) To ensure that the caller is at the location that appears on the Automatic Location Identification (ALI), and 2) that Automatic Location Identification (ALI) is correct. Determining the appropriate location of the patient is significant for appropriate response.

All of the agencies reported doing both patient location identification and validating that the ALI was accurate; some have internal Records Management Systems (RMS) from which the ALI (Automatic Location Identification) is compared against. Using computerized validation of addressing is best practice.

### Patient Acuity Determined According to Protocol

Priority Dispatch enables communications personnel to accurately prioritize the system response to those requesting assistance. Effective Emergency Medical Dispatching (EMD) has the goal of sending the right EMS resources to the right person, at the right time, in the right way, and providing the right instructions for the care of the patient until help arrives. This goal can ideally be accomplished through the trained EMD's careful use of a protocol that contains the following elements:

- Systematized caller-interrogation questions that are chief-complaint specific.
- Systematized pre-arrival instructions.
- Protocols that determine emergency vehicle response mode (e.g., lights and sirens) and configuration (e.g., level of service) based on the EMD's evaluation of the injury or illness severity.
- Referenced information for dispatcher use.

The Five elements central to an effective emergency medical dispatch program are:

- Use of medical dispatch protocols.
- Provision of dispatch "first aid" self help support (pre-arrival and post dispatch instructions).
- EMD training.
- EMD certification.
- Emergency medical dispatch quality control and improvement processes.

Medical Priority Dispatch is the best practice standard in the United States. Each of the five elements central to an emergency medical dispatch program is briefly described below.

### Element I: Use of Medical Dispatch Protocols

Medical Priority Dispatch (MPD) is a unified protocol established by the International Academies of Emergency Dispatch (IAED) as a means of bringing standardization and scientific validation to the EMD profession. Through the use of the MPD protocol, each caller to an emergency communication center receives quick, accurate, and reproducible triage and prearrival instructions from a trained EMD. The standardized protocol enables the EMD to quickly ascertain the nature of the caller's chief complaint, the severity of their symptoms, and identify the response recommendation that is most appropriate.

For the protocol to function as designed, the EMD must follow the protocol as trained and ask the questions exactly as they appear on each card. Success is dependent on objectively applying the protocol based on the caller's responses to the questions and allowing the cards to solicit information that will enable accurate triage. The protocol treats every caller as an equal.

### Element II: Provision of Dispatch "First Aid" or "Self Help" Support (Pre-Arrival and Post-Dispatch Instructions)

Emergency Medical Dispatch (EMD) is the "first" first responder. Over the phone, trained caregivers have a "zero response time" and are able to determine the nature of the emergency, quickly direct bystanders, and initiate life saving care while emergency medical responders are in route to the scene.

Common time critical interventions including first aid for opening a blocked airway, initiating cardio-pulmonary resuscitation, defibrillating, applying direct pressure to a hemorrhaging wound, and instructions not to move severely injured trauma patients can all be provided over the phone under the direction of an EMD.

In addition, EMDs can provide time saving instructions to non-acute callers, including collecting medications, turning on outside lights, securing animals, and sending someone to the street to help guide responders. EMDs effectively manage the scene until the first responder arrives on the scene.

### Element III: EMD Training

The initial training required for certification as an EMD is 24-hours in length. The course is designed to provide both didactic and practical instruction to adult learners. The program includes classroom lectures taught by certified experienced instructors who also have experience working in a communication center and focuses on understanding the principles of EMD and how to successfully follow the protocol. Trainees are partnered up to practice using the protocol in simulated emergency scenarios and gain valuable hands on practice in a con-

trolled setting. Once certified, an EMD must complete a minimum of 12 hours of continuing education a year in topic areas specific to medical priority dispatch.

In addition to certification training, it is essential for an EMD to receive mentored training with an experienced EMD in the communication center. This allows him or her to answer real emergency calls while using the protocol, but under the supervision of an experienced trainer who can provide direction and step in if necessary. Instant feedback allows the knowledge gained in the classroom to be refined in the center and reinforced into future performance.

### **Element IV: EMD Certification**

The International Academies of Emergency Dispatch (IAED) has developed the certification course for Emergency Medical Dispatch (EMD). The certification course is valid for two years. Completion of predefined continuing education requirements is required for recertification.<sup>2</sup> The certification and protocols have been adapted in 22 countries including: Australia, Austria, Canada, Germany, Italy, New Zealand, South Africa, Switzerland, the United Kingdom, and the United States. Numerous factors identify the EMD and the Medical Priority Dispatch System (MPDS<sup>™</sup>) as the international standard of care.<sup>3</sup>

# Element V: Emergency Medical Dispatch Quality Control and Improvement Process

A detailed quality program is essential to the success of Emergency Medical Dispatch (EMD). Under the direction of a physician medical director charged with oversight of the ambulance agency, a quality program includes several tiers of participating bodies, concluding a Quality Improvement Unit that reviews individual calls, a Medical Dispatch Review Committee that monitors center performance data, and a Steering Committee that establishes policy and sets direction.

Quality programs have two foci: individual case review and performance compliance indicators.

**Individual Case Review:** The review of a representative sampling of individual calls for compliance with the Medical Priority Dispatch (MPD) protocol is necessary to assure quality. A standardized Case Review Form is used to score protocol compliance and document comments for the EMD. Calls are selected based on several considerations: 1) the number of calls must be a representative sample of the total call volume; 2) the sample

<sup>&</sup>lt;sup>2</sup> This non-medical certification curriculum has been routinely and safely used for over 20 years and has resulted in the certification of nearly 50,000 persons, worldwide.

<sup>&</sup>lt;sup>3</sup> Clawson, J.J. & Dernocoeur, K.B. (2000). Principles of emergency medical dispatch (3rd. Ed). Salt Lake City, UT: The National/International Academy of EMD.

must include an adequate number of calls per provider to ensure sufficient feedback; and 3) include all calls where pre-arrival instructions were provided to a caller. Other considerations may be added by the local jurisdiction.

**Performance Compliance Indicators**: System compliance with key components of the dispatch process is essential. Key performance indicators allow monitoring of overall compliance with the MPD protocols including: chief complaint identification and compliance with the case entry, coding and pre-arrival instructions of ECHO, and cardiac arrest events. Monitoring of such indicators provides a view of system performance and a gauge of the effectiveness of improvement initiatives.

Effective use of case review and performance compliance indicators can enable the enhancement of service through MPD.

Only one primary PSAP that dispatches ambulance calls reports utilizing MPDS on every call. Of the secondary PSAPs, only 60-Control is fully using MPDS on all medical calls and it is the only center with a fulltime quality assurance staff position. 60-Control is not fully compliant to the level of ACE accreditation to the protocol. The staff of 60 Control, at the time of the report, was not doing the sufficient number of call reviews.<sup>4</sup>

This is the biggest point of failure for the Westchester County emergency services system. The failures or the problems are of varying degrees depending on the dispatch center, but none of the dispatch centers have achieved accreditation as a Center of Excellence or operate at or near those operational performance standards. This means that none of the dispatch centers are triaging the patient acuity to a level of compliance that is deemed acceptable by the National Academies of Emergency Medical Dispatch.

This can be described from a practical perspective, since the police service will assign a unit irrespective of patient acuity. The common denominator of resource efficiency is nonexistent in Westchester County. Any 9-1-1 call that requires a medical response will receive a police vehicle, so triaging for patient acuity has not been required. This has created a situation in which all the other benefits, such as pre-arrival instructions, caller control, and quality assurance and continuous quality improvement have been neglected.

#### Recommendations

- All dispatch centers that triage medical calls should use a medical protocol.
- All dispatch centers that triaged medical calls should be enabled in the provision of dispatch "first aid" self help support (pre-arrival and post dispatch instructions).

<sup>&</sup>lt;sup>4</sup> NAED ACE Random Case Review Calculator:

 $http://www.emergencydispatch.org/acc\_calculator.php?a=accHome\&b=accCalculator$ 

- All dispatch centers that triage medical calls should have trained and certified EMD call takers.
- All dispatch centers that triage medical calls should have ongoing and continuous training to a minimum of the NAED standard for all its call takers.
- All dispatch centers that triage medical calls should have a quality assurance module with quality control and improvement modules.
- All dispatch centers that triage medical calls should commit to becoming an Accredited Center of Excellence.

# Emergency Medical Dispatch Quality Control and Improvement Processes

While it is mentioned above, quality assurance and continuous improvement are, in the Consultant's opinion, the weakest link in developing a robust emergency medical response. The Consultant team observed inconsistencies in the call taking process, and it is evident that significant variations occur in how calls are handled by the different communications units.

For every call that enters a system, there are certain elements of the call that must be addressed, and there are certain best practices with regards to caller/call taker interaction. The current best practices, as defined by the National Emergency Number Association (NE-NA), for emergency call processing protocol standards (NENA 56 -006 released June 7, 2008) describes the need for structured call processing in emergency communication facilities. There is only one methodology to ensure consistency in protocol call taking and that is consistent and regular call review.

Traditionally, most communication centers review calls when there are problems with the call. This approach to call review is inherently problematic as it is a reactive approach to a pre-existing methodology problem. The notion of continuous feedback to help call takers improve in their profession is crucial and critical.

It should also be noted that it is within the quality assurance and continuous improvement module that one finds the production of the different metrics and benchmarks by which the dispatch centers are measured against and service to the population is guaranteed.

### Recommendations

- All dispatch centers should have a quality assurance module and should report the compliance to County oversight for improvement purposes.
- A culture of continuous quality improvement should be implemented throughout Westchester County.

### **Performance Metrics and Technologies**

Performance in EMS involves efficient use of both human and material resources to maximize the response to patients or clients in need. There is no one specific way of doing business. Westchester County potentially has too many primary PSAPs and inefficient secondary PSAPs. If the proper metrics and processes are followed and the necessary technologies are in place, the points of failure in the system today may be limited. Figure 13 maps out the best practice dispatch process and performance.





As noted above, the time interval between activities is quite short. This is very important for the delivery of emergency services. Every minute taken in internal dispatch time is a minute that is not given for external travel of the ambulance to a patient in need. These times cannot be achieved with the conventional technology of the telephone. In today's world, data is

transferred electronically and captured once and used for multiple purposes. Taking the above algorithm, we can assign different and appropriate technologies to it. Figure 14 shows how technology is applied to the dispatch process.





### Summary of Primary and Secondary PSAPs

First and most importantly, it should be recognized that all the responders are dedicated to the greater good and work diligently with the intent of delivering excellent service. The Consultant team also recognizes and appreciates the excellent cooperation that the team received throughout the course of this evaluation.

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Fundamentally, the system has challenges due to the historical development of EMS as an ancillary emergency service. This, coupled with a historical ownership of dispatch functionality by law enforcement and the natural desire to keep and maintain all of the independent dispatch centers, has led to a disparate emergency medical response. While this report does not specifically address the optimal quantity of dispatch centers, it does outline the different volumetric opportunities captured by each center and draws a relationship between volume and competency.

It is recommended that a working group be formed in order to establish an optimal amount of dispatch centers to service Westchester County. The Consultant team draws a distinction between primary call centers and secondary call centers. There are specific requirements to being a medical call center, particularly in the area of algorithmic or protocol-based medical triage and quality assurance. For both the primary and a secondary call centers that wish to do medical triage, it is important that all the elements be present.

Proficiency in algorithmic or protocol-based call taking comes with practice and a minimum call volume is required in order to become effective. All medical dispatch centers must strive to become Accredited Centers of Excellence. This is the standard that ensures that the community is receiving appropriate care.

Appropriate metrics need to be adopted by all the dispatch centers in all of the different tasks that they are associated with. These metrics need to be captured and shared to instill in the EMS system the philosophy of continuous quality improvement.

Integrated technologies need to be adopted in order to meet and maintain the stringent performance criteria that are set out as best practice. Time that is consumed internally is time that is not available to the responders in the field.

This system has the potential to be a very good system because of the quality of the people that work for the system, but it is time to look at Westchester County's emergency services as an integrated emergency medical services system.

#### Recommendation

• It is recommended that a working group be formed in order to establish an optimal amount of dispatch centers to service Westchester County.
# **Medical First Response**

Initial EMS system design did not include the use of medical first response and only focused on ambulance response. At the time, fire departments and law enforcement did not have an organized role in medical emergencies. Later, it was recognized that they could play a significant role in intervening in time-sensitive emergencies and greatly influence morbidity and mortality. The fire service has significantly become integrated in EMS system design in most communities and law enforcement's role is less recent, but it varies from community to community.

Early interest in developing medical first response is rooted in Sudden Cardiac Arrest (SCA) survival. An estimated 200,000 people annually fall victim to SCA. A patient's survival potential decreases by 10% for every minute following the patient entering cardiac arrest. Neither the Westchester Regional EMS Council (WREMSCO) nor Westchester County actively track out-of-hospital SCA data, including survival data. Even in absence of the data, it is safe to say that if help doesn't arrive within ten minutes of the event, resuscitation is unlikely. Only a select few communities may have that level of response time reliability; the majority does not.

The American Heart Association advocates a Chain of Survival, which includes early access; bystander initiated CPR, early defibrillation, and advanced life support care. An estimated one out of every four patients may be saved if the Chain of Survival is initiated.



Figure 15: Sudden Cardiac Arrest Chain of Survival

The Chain of Survival resulted in large efforts to increase public awareness, train citizens in CPR, make Automated External Defibrillators (AED) accessible, implement medical first response, and improve ambulance care.

Since the initiation of medical first response, other medical emergencies have been identified as potentially benefiting from rapid intervention. Medical emergencies, in addition to defibrillation, include opening an occluded airway, stopping uncontrolled bleeding, and administering a drug called Epinephrine to patients experiencing life threatening allergic reactions.<sup>5</sup> Medical first responders represent a significant leverage point for saving lives in time-sensitive events.

Two-thirds (66.7%) of communities in Westchester County self report having some form of first response with law enforcement providing 31.1% and volunteer fire services providing 35.6%. One-third (33.3%) reported no medical first response. The Consultant phone interview process discovered that many agencies were not familiar with the industry definition of a medical first responder and frequently assumed it meant the first person on scene ahead of the ambulance. Also, the presence of an agency, acting in a first response role, did not mean that it met the objective of a rapid response.

The Westchester County EMS system does not have a uniform or organized first response component. What does exist is community specific and may involve law enforcement with AEDs, volunteers responding from home or a staffed station, or career fire service personnel. Training may vary from layperson first aid through paramedic level care. This significantly limits the life saving potential of the system and has direct effect on the opportunity to reduce morbidity and mortality.

Improving the quality of the medical first responder component of the system can improve the County's morbidity and mortality, but there is no easy change. Significant reliance on volunteers for fire suppression and ambulance service limits opportunities to improve outcomes because of the reduced capability to rapidly get to the patient's side.

One opportunity for improvement of medical first response would be to use law enforcement in communities where career fire service is not already present to provide the service. Law enforcement is probably the most consistent public safety group that is routinely manned with professional personnel 24-hours a day. Including certified first responder or Emergency Medical Technician (EMT) training as a requirement of the position, and supplying each cruiser with an AED and medical jump kit, would enable officers to be dispatched and respond in advance of the ambulance.

## Medical First Responder Response Performance

Westchester County emergency services do not have an established response time measurement system or response time goal for compliance. The only national standards are NFPA (National Fire Protection Association) 1710 (career departments) and 1720 (volunteer departments). The NFPA standard for the fire service establishes time intervals for components of a medical first responder response, which would result in a call receipt to arrival at the call location of six minutes. The following figure depicts the standard and its intervals.

<sup>&</sup>lt;sup>5</sup> International City/County Management Association. (2005). EMS in critical condition: Meeting the challenge [Item No. E-43338]. *IQ Report, 37*(5). Washington, DC: International City/County Management Association.





Ninety-six percent (96.3%, n=10) of first responder agencies participating in the phone interview self-report response time goals of less than 10 minutes with 81.5% indicating less than five minutes (n=22). It is important to note that these response intervals do not include the call processing time and start at either the time the call is dispatched (70.6%, n=24) or when the unit is physically responding (5.9%, n=2). Almost one-quarter (23.5%) reported "other" as their time stamp. No one reported using 9-1-1 call receipt as the start of the measure. In nearly two-thirds of the organizations (63.0%, n=17), the clock stopped when any help arrived on scene and 2.2% (n=6) stopped the clock when an apparatus arrived (e.g., fire engine, cruiser).

The Westchester County Emergency Services Department should establish the measurement of response times for medical first response organizations based on industry recognized response intervals to allow for uniform reporting. The goal would be to enable data collection and gain an understanding of current response time performance. Due to the diversity of providers and the heavy volunteer participation, it is unlikely the County can reliably achieve the NFPA 1710 response time standard.

# **Summary of Medical First Response**

Medical first response is critical to reducing morbidity and mortality in time-sensitive lifethreatening emergencies. Westchester County is absent of an organized medical first responder component to the EMS system. Due to the heavy reliance on volunteerism in the fire suppression and ambulance service, law enforcement may represent the greatest asset for elevating medical first response in communities where career fire service is not already present to provide the service. Establishing a uniform response interval measurement and tracking data on current performance will assist the Westchester County Emergency Services in understanding and improving response times.

#### Recommendations

- In the absence of an existing medical first response system and extended ambulance response times, Westchester County emergency services needs to develop a medical first response system.
- Law enforcement is the most consistent, on duty public safety entity in each jurisdiction. In the absence of career firefighters already providing medical first response, training law enforcement officers to be certified first responders and providing first aid jump bags and Automated External Defibrillators (AED) could reduce morbidity and mortality.
- The Westchester County Emergency Services Department, the Westchester Regional Emergency Medical Advisory Committee (REMAC), and the Regional EMS Council should work with providers and communities to reach consensus on the appropriate data definitions, tracking, and regular reporting of medical first response times to monitor for opportunity for enhancement.

# **EMS Response and Transport**

Westchester County is a perfect example of an unplanned system design that has evolved over time. Volunteer, combination volunteer/paid, and full-time ambulance agencies serve the County. The "system" that exists today is not really a coordinated EMS system, but a patchwork of small mini-systems that are contiguously located in a County jurisdiction. Individual providers and EMS services are trying to serve their citizens to the best of their individual ability, but not benefiting from any of the advantages of being a true coordinated EMS system.

What is described in the pages to follow is an account of current practices and processes with recommendations for making improvements based on the existing system. For the system to see significant improvements, a system design modification would be required. This will be discussed later in the section on future scenarios.

# **EMS Transport Related Data**

EMS transport agencies serving Westchester County collectively reported 101,913 emergency responses during a 12 month period in 2006-2007 to the regional EMS office. For comparison, the Austin-Travis County EMS System, serving the City of Austin, Texas and surrounding Travis County reported 107,162 emergency responses in 2006; and the City of Boston, Massachusetts estimates an average of 100,000 responses annually. Figure 17 shows the response breakdown of that data by organization.



#### Figure 17: Breakdown of Emergency Responses by Organization in 2006-2007

Empress Ambulance Service Westchester EMS (owned by SHN) Greenburgh Police Department Port Chester/Rye Volunteer Ambulance Mohegan Volunteer Fire Assoc., Inc. Eastchester Volunteer Ambulance Corps Harrison Volunteer Ambulance Corps Cortlandt Community Volunteer Ambulance Ossining Volunteer Ambulance Corps Peekskill Community Volunteer Ambulance Larchmont/Town of Mamaroneck VAC Yorktown Volunteer Ambulance Tarrytown Volunteer Ambulance Mamaroneck EMS Cortlandt Regional Paramedics Scarsdale Volunteer Ambulance Somers Fire District Mt. Kisco Volunteer Ambulance Pleasantville Ambulance Corps Katonah Bedford Hills Volunteer Ambulance Valhalla Ambulance Corps Ossining Volunteer Ambulance Corps ALSFR Briarcliff Manor Fire Dept. Ambulance Elmsford Fire Department EMS Armonk Independent Fire Company Chappaqua Volunteer Ambulance Sleepy Hollow VAC, Village of Ardsley-Secor Volunteer Ambulance Hastings-On-Hudson Volunteer Fire Dept. Dobbs Ferry Volunteer Ambulance Corps Croton EMS Lewisboro Volunteer Ambulance Corps Irvington Volunteer Ambulance Town of Mamaroneck Ambulance District No. Salem Volunteer Ambulance Bedford Fire Department EMS Hawthorne Fire District Pound Ridge Lions Ambulance Vista Fire Department Hudson Valley V.A. Ambulance Verplanck Fire District

Westchester County Emergency Services data shows there is 150 ambulances in the County potentially available for service and 27 paramedic intercept units. Some of these units may be secondary resources and not the first line resource. Figure 18 shows the breakdown of resources by agency.





Westchester County has a disproportionately large supply of resources as a result of every community providing its own service. The County does not benefit from efficiencies and the economy of scale found in a regionalized system design. There are roughly 7.9 transport capable ambulances for every 50,000 residents. Table 3 shows a comparison of Westchester County with three jurisdictions in the region and four other counties from across the United States. Note that Westchester County has two to three times the number of ambulances capable of being placed in service than the other EMS systems benchmarked.

Jurisdiction	Ambulances per 50,000 people	Reported Ambulances	Estimated Popula- tion Served	Response Time Goal –Life Threat- ening Emergency
Westchester County	7.9	150	949,355	Not Applicable
Greenwich, CT	3.3	4	61,101	8 min. at 90%
Buffalo, NY	2.1	50	1,168,864	8 min. at 90%
Rochester, NY	1.4	29	1,039,405	8 min. at 90%
Clark Coun- ty, WA	2.8	19	342,972	7:59 min. at 90%
Mecklenburg County, NC	3.0	50	830,000	10:59 min. at 90%
Monterey County, CA	3.0	25	415,000	8 min. at 90%
Pinellas County, FL	2.9	54	930,000	10 min. at 92%
Solano County, CA	4.6	30	325,832	9 min. at 90%

#### Table 3: Ambulances per 50,000 Population served

#### Summary of EMS Transport Related Data

Westchester County generates more than 100,000 EMS responses annually. Each community is responsible for its own EMS delivery and the result is a surplus of ambulances in the County, but only four providers respond to more than 2,300 calls per year and 27 agencies respond to less than 1,000 per year. The number of ambulance per capita is two to three times reported benchmarks. Westchester County does not benefit from the efficiencies and economies of scale of a more regionalized EMS system.

### Personnel

The overall number of certified EMS personnel has grown significantly in the last decade nationwide. EMS organizations, however, have been describing a perception of a shortage of qualified personnel.<sup>6</sup> New York State has 57,398 certified EMS personnel, 6.4% of the total State certified personnel or 3,645 people reside in Westchester County. This includes 836

<sup>&</sup>lt;sup>6</sup> Institute of Medicine. (2006). *Emergency medical services: At the crossroads.* Washington, DC: National Academies of Science.

National Highway Traffic Safety Administration: *EMS Workforce for the 21st Century: A National Assessment*. May 2008. http://futurehealth.ucsf.edu/emsworkforce/

Williams, D. (2008, October). JEMS 2008 salary & workplace survey: So, remind me again why EMS is a god job. Journal of Emergency Medical Services, 33(10), 48-50, 53-54, 56-64.

(7.9%) certified first responders, 2,486 (6.7%) Emergency Medical Technician – Basics, and 265 (4.1%) Paramedics.

Table 4 compares the total EMS personnel by certification level (2008) with the breakdown for those providers that reside in Westchester County (2006). The table also includes Westchester County as a percentage of the State total.

Certification Level	State (2008) <sup>7</sup>	Westchester Co. (2006) <sup>8</sup>	Percentage of Total	
Certified First Responder	10,629	836	7.9%	
EMT-Basic	36,944	2,486	6.7%	
EMT-Intermediate	1,084	52	4.8%	
EMT-Critical Care	2,194	6	0.3%	
EMT-Paramedic	6,547	265	4.1%	
Total	57,398	3,645	6.4%	
<u>Note:</u> The totals for Westchester County represent certified residents. A segment of these providers				

#### Table 4: State Certified EMS Personnel

Westchester County emergency services rely on EMS staffing from a number of sources. These include volunteer and paid providers. More than a dozen services could be called hybrids and use paid personnel supplemented with volunteers.

Volunteer personnel represent a large segment of the emergency services workforce and include people where emergency services are not their primary job. Some volunteers may receive a nominal compensation for their service, but it traditionally is on a by-call basis and not a regular hourly rate. Volunteers may staff ambulances on designated shifts or respond from home if there is an emergency. Half of the EMS services in the County are completely staffed using volunteers.

Volunteerism had been core to many EMS systems nationwide and the people who give their time and energy to serve the community are noble servants. Use of a volunteer workforce is not without its challenges. Many communities are finding that retaining sufficiently active volunteers is a challenge as people work longer hours and have less time to donate. This may especially be true during daytime hours where volunteers may not work in the community they serve or may not have the freedom to abandon their employer to respond to a call during the business day. Finally, training requirements have been on the rise as available free time has fallen. Many communities are seriously evaluating the most responsible ways to ensure continuous service in the face of these changes.

<sup>&</sup>lt;sup>7</sup>New York State Department of Health EMS Statistical Information:

http://www.health.state.ny.us/nysdoh/ems/stat.htm

<sup>&</sup>lt;sup>8</sup> Westchester County Emergency Services.

More than a dozen EMS services in Westchester County have already begun to attempt to address the reduction of volunteerism and, at the same time, provide paramedic-level care. Several Corps that the Consultants interviewed used paid paramedic staff during the day or 24-hours per day. Volunteers on staffed shifts or responding from home rounded out the ambulance crew. This blend of paid personnel with volunteer staff, especially during the harder to serve business day, is not uncommon.

There are three concerns with the model of using a paid paramedic supplemented by volunteers. The following is a description of each concern.

First, in many of the Corps we spoke with, the paid position was not a Full Time Equivalent (FTE). This meant that paramedics had to work at other jobs to make a living wage. Often that other job was another Corps or commercial ambulance service in the County. This results in multiple organizations drawing from the same available workforce pool, which reduces staffing capacity if a jurisdiction has a major event.

The second concern is safety. EMS services that employ full-time staff traditionally has policies in place to restrict or regulate hours worked above the base. These restrictions set limits on the amount of consecutive hours an employee may work or how many hours in a week are appropriate and also how much recovery time is required between shifts. By doing so, the employer is able to ensure the safety of their staff and customers by limiting the risk of fatigued personnel. This is not possible in the current practices Countywide.

Third, if "paid" personnel are not full-time, it restricts their earning potential unless they are willing to work significant hours due to the loss of overtime opportunities. It also may mean that personnel are on their own when it comes to basic benefits like health coverage. This either adds additional expense to the employee or they simply go uncovered. Finally, it may result in no access to retirement plans or employer sponsored 401(k) plans.

In addition to all volunteer and combination paid/volunteer Corps, there are organizations (e.g., Greenburgh, Harrison, Port Chester, etc.) that are traditional employers that have full-time paid employees as well as part-time personnel. The personnel have the job securities, benefits, and earning reliability of a traditional workplace. Some of the employees of these organizations are also volunteers or may be paid staff working part-time as the paid personal at a Corps, which can pose some of the same concerns described above.

# **Summary of Personnel**

The Westchester County EMS system relies on a mix of volunteer, combination volunteer/paid, and paid personnel to deliver service. While not uncommon, concerns include agencies drawing from the same limited pool of staff, safety, and personnel considerations. Any concerns are inherent in the EMS system model.

### Recommendation

• Westchester County Emergency Services needs to evaluate the impact of Corps drawing from the same limited staffing pool and how it affects safety, crew fatigue, and availability for potential large-scale or extended length events.

# **Response Time Standards**

Response time performance is a core measure in any EMS system and a key patient expectation. Defining what is an appropriate response time, is a subject of much debate and has primarily been focused on urban EMS systems and responding to life-threatening emergencies.

Common urban response time goals range from 8 minutes and 59 seconds (8:59) to 10 minutes and 59 seconds (10:59) with 90% compliance. The Commission on Accreditation of Ambulance Services (CAAS) frames the consensus regarding response time goals by instructing communities to work with their medical control authority to develop an appropriate aim based on the best available peer-reviewed evidence and what is feasible in lieu of uncontrollable circumstances. Table 5 reflects the reported response time goals of 12 EMS providers in Westchester County.

Tuble 5. Response Time Oouls				
Reported RT in Minutes	Agencies			
<5	5			
<10	3			
8.59 @ 90	2			
7.59 @ 90	1			
>15	1			

#### Table 5: Response Time Goals

While consensus does not exist regarding the appropriate response time goals for EMS systems, there is documented agreement that response times should be measured, what intervals should specifically be measured, and that response times should be measured as a percentile of compliance versus a mean. The definition of EMS response begins when the medical PSAP receives the call from the caller until an ambulance has arrived at the call location. Figure 19 reflects the Anatomy of an EMS incident and includes the recommendation standards from multiple national sources.



Figure 19: Response Time Measurement Intervals\*

**Definition of EMS Response Time:** Clock starts when the medical PSAP receives the call from the caller until an ambulance has arrived at the location of the call.

<sup>&</sup>lt;sup>9</sup> International City/County Management Association. (2005). EMS in critical condition: Meeting the challenge [Item No. E-43338]. *IQ Report*, 37(5). Washington, DC: International City/County Management Association.

National Fire Protection Association. (2001). NFPA 1710: Standard for Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments. Quincy, MA.

Bailey, E. D., & Sweeney, T. Considerations in establishing emergency medical services response time goals. *Prehospital Emergency Care, 7*(3), 397-9. doi: 12879393.

Commission on Accreditation of Ambulance Services (2005, November). *CAAS Standards for the accreditation of ambulance services* (Version 2.5). Glenview, IL: Author.

National Association of State EMS Officials. (2006, December). *Recommended attributes and Indicators for system/service performance*. Falls Church, VA: Authors.

Westchester County does not have response time compliance requirements Countywide. Individual EMS organizations have set their own standards or have none at all and some communities have negotiated response standards for their contracted providers. Measurement intervals vary and predominantly focus on either dispatched to arrival on scene or the travel time or wheels turning to arrival on scene. These exclude the PSAP call processing time, which can mean as much as two minutes are not included. Table 6 shows data from 11 ambulance providers in Westchester County and when their measurement clock start and stop. Only one service reports and aims for 8 minutes and 59 seconds (8:59) from call receipt to arrival at the call location with 90% compliance.

Start		Stop	
Dispatch	8	Any Help Arrives	10
Responding	1	Ambulance Arrives	1
Secondary PSAP receipt	1		
Other	1		

Table 6: Resp	onse Time Cl	lock Start and	<b>Stop Points</b>

Response time reporting is also inconsistent. Some services track and document their response time performance as means or percentiles based on their internal definition. Tracking methods range from documenting each call in a handwritten ledger to capturing data in aggregate in an electronic form. Others do not track at all and make a best guess when asked. Of the data that is tracked, it is all at the local service level and Westchester County Emergency Services has no mechanism for capturing or accessing this data for system assessment and improvement.

As an initial effort for Westchester County to support response time performance, it is recommended that the Westchester County Emergency Services and the Westchester Regional EMS Council (WREMSCO) establish a uniform standard for the measuring and tracking of response time intervals based on nationally recognized benchmarks (i.e., medical PSAP call receipt to arrival at call location) that includes at least monthly reports. This tracking and reporting should occur, at a minimum, at the local EMS service level and evolve to someday be captured in a Countywide system to better understand opportunities for enhancement of reliability in the EMS system.

#### Recommendations

 Westchester County Emergency Services, WREMSCO, and service providers need to adopt the consensus standard definition of response time measured from call receipt at the medical PSAP to the appropriate EMS transport unit on scene. Response times should be measured as percentiles at the 90<sup>th</sup>. • Response times should be tracked electronically locally for every call and be reported at least monthly. The process should evolve to be a Countywide data tracking and reporting system.

# System Status Management

The existing EMS system design is not integrated and is composed of almost 40 EMS transport agencies. In general, each operates independently and is stationed statically in fixed locations. Some communities with more than one ambulance resource may perform periodic "move ups" to cover the geographic coverage area if a unit is on a call or add an additional ambulance during peak demand periods, but true matching of supply to the call demand based on a data trend analysis is absent. This approach to the management and deployment of resources is inefficient and poses several system challenges including:

- 1. EMS resources are positioned based on jurisdiction and not on demand.
- 2. If an ambulance is committed to a call, the system is not capable to adjust to ensure adequate coverage Countywide. Instead there is an uncovered community relying on mutual aid with extended response performance.
- 3. Resources are not staffed based on actual demand. This creates excess capacity in the evening and insufficient resources during peak demand hours.



Figure 20: Example of Mismatch of Supply and Demand<sup>10</sup>

<sup>&</sup>lt;sup>10</sup> Figure 20 is for illustration purposes only and is not reflective of actual data from Westchester County.

# Mutual Aid

In an EMS system that does not have a sole provider, it is critical that communities have established mutual aid agreements in the event the primary EMS provider is out-of-service, assigned to call, or otherwise unavailable. New York State EMS Code (800.21.p) requires EMS services to have written mutual aid plans. Regional EMS Councils are encouraged to coordinate the development of individual and/or Countywide agreements. Every EMS service we spoke with reported having a Countywide mutual aid agreement.

Mutual aid agreements and plans on file are a good first step, but more importantly is do they work? How are those plans initiated? Do they provide timely secondary response?

Traditionally, most mutual aid plans are designed to request aid from the next contiguously closest provider. In Westchester County, if a volunteer Corps is dispatched on a call, each individual community has its own process for determining if someone is responding or is available to respond. In many communities, a primary PSAP will dispatch the ambulance; if no one responds, then the Corps is dispatched a second and sometimes third time before the dispatcher is empowered to request mutual aid. Alternatively, a Corps member may be a single responder and, upon recognition that adequate personnel are not responding, they will instruct the PSAP to dispatch mutual aid or the resource on a call and either an automatic mutual aid process is in place or the committed crew will request dispatch call for mutual aid.

There are two challenges with these current processes and how they attempt to achieve the aim of ensuring a timely response under the code. First, the process is neither standardized Countywide nor does it enable PSAPs to uniformly and automatically activate mutual aid resources. Second, the mutual aid resource has a high likelihood of being another volunteer Corps that may result in additional serial dispatches or further need for mutual aid. The result is low confidence in a timely response. Anecdotally, the Consultants were told of numerous incidents where ambulances failed to arrive in a reasonable amount of time or took as long as 45 minutes. This is not acceptable from the customer's perspective and results in preventable morbidity and mortality.

Westchester County Emergency Services, in collaboration with the Westchester Regional EMS Council and in cooperation with EMS services, needs to develop a standardized process for mutual aid initiation. This process should be based on a set time interval (e.g., 2 minutes) for confirmed adequate response and enable automatic dispatch of mutual aid. In addition, the mutual aid agreement should be drafted to enable timely response of a confirmed resource to be co-dispatched with the closest contiguous Corps. A confirmed resource would be the next closest Corps or EMS service that has an actively staffed ambulance ready for immediate response to minimize further delay.

Establishing response of volunteers responding from the community, but who are not staffing a station can be a challenge. The Westchester County Emergency Services should explore alternative processes for rapid communications. One example of an innovation available is a service that uses cell phones for dispatch and responding notification. An example of one vendor is www.iamresponding.com<sup>11</sup>, which allows volunteers to designate their response via their cell phone when paged and an Internet based platform allows PSAPs real time notification of how many members are responding and who they are. A system like this is a significant innovation for facilitating dispatch of volunteer resources and activating mutual aid.

# Summary of Mutual Aid

Westchester County Emergency Services has the mutual aid plans in place at the local level to comply with New York State EMS Code (800.21.p). The mutual aid agreements are not standardized across the County and do not guarantee the aim of timely response. West-chester County Emergency Services and WREMSCO need to work with EMS services and Corps to develop uniform processes to ensure clinically appropriate response reliability. Technology may assist in that process.

#### Recommendations

- Westchester County Emergency Services, in collaboration with the Westchester Regional EMS Council and in cooperation with EMS services, needs to develop a standardized process for mutual aid initiation. This process should be based on a set time interval (e.g., 2 minutes) for confirmed adequate response and enable automatic dispatch of mutual aid.
- The mutual aid agreement should be drafted to enable timely response of a confirmed resource to be co-dispatched with the closest contiguous Corps. A confirmed resource would be the next closest Corps or EMS service that has a currently staffed ambulance ready for immediate response to minimize further delay.
- The Westchester County Emergency Services should explore an alternative process for rapid communications.

# Paramedic Non-transporting Intercepts

Paramedic intercepts are used throughout the nation and includes one or two paramedics staffing a quick response vehicle or ambulance in a tiered system. A tiered system is one where the initial responding ambulance is not Advanced Life Support (ALS) capable and a second resource must also respond with a paramedic to provide ALS-level care. Tiered systems are used for a number of reasons. Some communities use tiered response as a specific

<sup>&</sup>lt;sup>11</sup> Fitch & Associates does not have any relationship with www.iamresponding.com and has not reviewed the product. This information is only provided to highlight an option and is no way an endorsement of this specific vendor.

system design approach because they believe it is more cost effective, that it matches ALS care to only those patients that are predicted to need it, or in an effort to maintain skill proficiency by sending paramedics to only the sickest patients.

In rural jurisdictions, paramedic intercepts are used to backfill volunteer Corps or BLS-level ambulance service and enable ALS level service. Westchester EMS, Empress EMS, and TransCare all offer paramedic intercept services in Westchester County. Medicare does not reimburse for paramedic intercept service in the United States. New York State is the only state allowed to bill Medicare for paramedic intercept services under a specific provision for rural jurisdictions, but no part of Westchester County qualifies as rural under the existing definition.

One of the major obstacles to service delivery using paramedic intercepts is that it still relies on a responding transport unit to complete the call. If the initial Corps is unable to respond and mutual aid requests are initiated, the paramedic intercept may be the only confirmed responder and may arrive unassisted at the scene of a call. Anecdotally, the Consultant team was shared stories of paramedics making patient contact, initiating care, and having lengthy wait times before a transport unit arrived to support the paramedic and transport the patient to the hospital. The number of occurrences or the length of the wait times is not routinely tracked by Westchester County Emergency Services or individual paramedic intercept providers. The paramedic intercept cannot be effective unless it is adequately paired with a transport unit.

Another common issue is returning the paramedic intercept to service following the call. To expedite return to service, the paramedic's vehicle must follow the transporting ambulance to the hospital. This requires either the paramedic to have a driver or have a Corps member drive the ambulance. If an adequate number of Corps members respond or if Corps members not riding in the ambulance to the hospital are not willing or able to shuttle the paramedic intercept vehicle to the hospital, the resource is significantly delayed and not available to achieve its primary mission.

# **Summary of Paramedic Intercepts**

Paramedic Intercepts are common in New York State to support rural areas. They are heavily reliant on the transport unit for maximum value and effectiveness. Delays in coresponding ambulance Corps are a significant obstacle to quality service. Inadequate staffing to shuttle the intercept vehicle to the emergency department with the transport unit results in extended delays in returning the Paramedic Intercept to service for the next call.

#### Recommendations

- An ambulance must be reliably responding to every call with a paramedic intercept to ensure the paramedic is adequately supported on scene and transport to the emergency department is not delayed.
- Westchester County Emergency Services should coordinate the measurement of the number of occurrences that a paramedic intercept unit is on scene waiting for an ambulance Corps to arrive and the length of the wait time.
- Ambulance Corps responding with a paramedic intercept need to enable shuttling the paramedic intercept vehicle to the emergency department following the transport ambulance to allow for the resource to return to service in a timely manner.

# A System within a System

While officially considered a single EMS system, Westchester County actually contains one self-contained urban system surrounded by a patchwork of single provider communities that operate loosely as a Countywide system.

The City of Yonkers is a system within the Westchester EMS System and is relatively selfcontained and unique from the rest of the County. Served by a private provider, Empress Emergency Medical Services; the City contracts for service delivery that includes a secondary PSAP and emergency ambulance response and transport.

Many years ago, EMS Consultant Jack Stout was engaged to design the Yonkers EMS system using a high performance model. This includes matching the number of resources to the historical demand, using geographical and volume-based deployment, and a focus on economic efficiency and response time reliability. Empress reports response time reliability of eight minutes and fifty-nine seconds with 90% compliance.<sup>12</sup>

Empress EMS appears to be an active member in the Westchester County EMS System and meet any requirements set for EMS services by the Westchester County Emergency Services or WREMSCO. This should continue to be an expectation, but it is also important that Yonkers be recognized as a self-contained system when making Countywide decisions about EMS practices to ensure that any rules, regulations, or requirements do not unintentionally disrupt the ability to maintain and continue the high performance model that is core to the operations.

<sup>&</sup>lt;sup>12</sup> Empress EMS' response time reliability is self-reported and was not independently validated by Fitch & Associates.

#### Recommendation

• Yonkers is a self-contained high performance system within the Westchester County EMS system. Westchester County Emergency Services should be conscious of any Countywide decisions that would have a negative effect on the City's system design.

# **Hospital Transport Destinations**

Three decisions traditionally drive what emergency department an ambulance transports a patient to: 1) patient preference, 2) closest appropriate facility and 3) protocol driven considerations (e.g., trauma). The EMS transport providers interviewed described the same criteria.

Acquiring definitive data on exactly how often an organization transported to a facility or the number of patients transported to each was not feasible. Some organizations had very detailed statistics and others could only produce estimates or best guess (e.g., "roughly onethird goes to hospital X"). The following figure reflects the utilization of hospitals in the region by the seventeen agencies interviewed. Included were the agencies with greatest volumes including Westchester EMS, Empress EMS, and TransCare.



Figure 21: Hospital Destinations Based on Large Sample of Providers<sup>13</sup>

## **EMS System Key Performance Indicators**

EMS system performance measures and basic data collection tracking are a significant issue nationwide. EMS systems without data to understand the needs and gauge performance are managing by their best guess. The result is unrecognized inadequacies in the system and limited data to influence process improvement. The agencies in the Westchester County EMS system reflect this description and have access to little data to monitor and improve.

<sup>&</sup>lt;sup>13</sup> <u>Note</u>: Figure 21 reflects self-reported hospital transport destinations. The larger the colored portion, the larger the number of EMS transport organizations reporting it as a regular transport destination. It is not a distribution of transport volume to those destinations.

The National Association of State EMS Officials (NASEMSO) and the National Association of EMS Physicians (NAEMSP) presented the results of a performance measure project to the National Highway Traffic Safety Administration (NHTSA) in 2006 with a recommended scorecard for EMS system consideration.<sup>14</sup> In addition, the U.S. Metropolitan Municipalities EMS Medical Directors Consortium recently published a consensus peer-reviewed paper on recommended evidence-based clinical measures.<sup>15</sup> These key performance measures are all worthy of every EMS system to aspire to achieve tracking.

The Westchester County EMS system providers need to start with the basics first. Currently, data measuring and tracking is not uniform and consistent. Individual EMS transport providers cannot produce meaningful data because they do not have a clear measurement definition to start with. In addition, tracking of data ranges from individual calls being entered by hand into a paper ledger to best-practice Computer Aided Dispatch (CAD) tracking. Westchester County Emergency Services, WREMSCO, and member providers need to focus on developing a data system to get a basic understanding of the EMS system. The following are a few items for consideration.

**Develop Definitions** – Every ambulance service and Corps should track basic data using the same industry recognized definitions. The performance measure project mentioned above provides the definitions recommended to the NHTSA. Adopting those definitions would be an efficient way to reach consensus and create comparisons with national benchmarks.

**Track Data** – Every organization should start tracking basic data on every call in electronic format as simple as a Microsoft Excel (\$\$\$), OpenOffice.Org Calc (Open Source – Free), or Google Docs spreadsheet (Internet-based – Free). This would allow for individual call tracking and the ability to generate reports weekly, monthly, and annually. Recommended foundational data includes:

#### Every Call -

- Date
- Time of Call Receipt (e.g., 23:17 hrs)
- Unique Call Identifier/Call Number (e.g., 08-0909-001)
- Call Location (preferably including latitude/longitude or postal code)
- Call Type (Medical Priority Dispatch Code is ideal)
- Response time in seconds (call receipt at PSAP to arrival at call location)

<sup>&</sup>lt;sup>14</sup> EMS Performance Measures Project: Recommended Attributes and Indicators for System/Service Performance (http://www.nasemso.org/Projects/PerformanceMeasures/documents/EMSPerformanceMeasuresFinalDraftforNHTS A12-06.pdf).

<sup>&</sup>lt;sup>15</sup> Myers, J. B., Slovis, C. M., Eckstein, M., Goodloe, J. M., Isaacs, S. M., Loflin, J. R., et al. (2008). Evidence-Based Performance Measures for Emergency Medical Services Systems: A Model for Expanded EMS Benchmarking. Prehospital Emergency Care, 12(2), 141-51.

- Refusal: Yes/No
- Transport Destination
- BLS or ALS
- Mutual Aid: Yes/No

#### Monthly, Quarterly, Annually -

- Total Number of Responses
- Total Number of Transports
- Total Number of BLS and ALS
- Response Time at the 90<sup>th</sup> Percentile
- Number of Mutual Aid Responses
- Number of Refusals
- Call Type Distribution (e.g. protocol 10 X 5, protocol 6 X 4)
- Hospital Transport Destination Distribution (e.g. Westchester Medical Center X 5, White Plains X 4)

The preceding list is just a point to start and build a foundation. Several services will likely already have the majority of this detail. The data elements are simple, but intended to provide a uniform approach for gathering base data on what the system activity is currently like and begin the process of arming providers with data that can help them understand their service area and potential to improve the process.

Ideally, this would evolve into a process that included reporting to Westchester County Emergency Services so that the office can have an accurate assessment of the level of activity in Westchester County and potentially identify services in need of support and areas that are opportunities for service enhancement. The focus should not be on who is performing and who is not, but what is happening in the system and how the data can facilitate identifying enhancements.

# Summary of EMS Key Performance Indicators

Westchester County Emergency Services and the service providers who provide EMS response and transport have limited data to understand call volume trends and performance obstacles. A simple data definition and tracking process can stimulate developing a foundation to support system enhancements.

#### Recommendations

- Develop uniform data definitions based on national standards and best practices.
- Track basic metrics and activity data.
- Develop a process for Countywide submission and reporting.
- Evolve to greater performance measure tracking and reporting (e.g., Utstein Style Sudden Cardiac Arrest Survival).

# Air Medical

Stat Flight serves Westchester County as an air medical provider. The program is operated by Air Methods, which is a national private air provider. Stat Flight is based at Westchester Medical Center which is the regional level I trauma & burn center. Stat Flight operates two medical helicopters and ground mobile intensive care units. Helicopters are staffed with a critical care flight nurse and paramedics.

Air medical resources are used to rapidly transport severely sick and injured patients to the most appropriate resource (e.g., traumatic injuries). Limiting inappropriate response is both a safety and a financial issue. In general, the distribution of hospitals across the service area and the reasonable transports distance makes routine usage of a helicopter for non-acutely ill or injured patients inappropriate.

Stat Flight reports in 2007 that 60-Control made 109 requests that resulted in 49 transports. Year-to-date from January to July 2008 reflects a similar usage with 58 requests resulting in 24 transports. Helicopter usage should be light in a county like Westchester and approximately two requests and one air medical transport per week reflects reasonable usage patterns.

# Summary of Medical First Response & EMS Response & Transport

Response time measurement, tracking, reporting, and reliability are inadequate Countywide and can be assumed to have a negative impact on morbidity and mortality. The Westchester County Emergency Services needs to develop uniform standards collaboratively and start to track activity and response time performance to guide future improvements.

Medical first response is not coordinated and is limited. Law enforcement represents a unique opportunity in communities where career fire departments are not already providing the service because they are career departments in most communities, are already dispatched on medical calls, and can be trained and equipped to intervene in time sensitive, life-threatening emergencies.

EMS response and transport is operated as a patchwork of career and volunteer services and quality and reliability varies dramatically. The current system model is inadequate. The City of Yonkers is a system within a system and operating using a high performance system model.

Mutual aid plans are inadequate to ensure timely response if the primary service is committed to a call or unable to respond. Extended delayed responses currently occurring place patients at risk of preventable mortality.

Westchester County will likely experience an unnecessary loss of life event or an inadequately managed isolated emergency (e.g., mass casualty event) that will raise public scrutiny and fuel expectations of change unless the County is proactive in improving performance reliability.

# Homeland Security and Disaster Preparedness Summary

The purpose of this assessment was to determine solutions for providing effective quality service delivery of EMS in Westchester County during large-scale, high impact incidents such as hazardous materials incidents, natural disasters, and terrorism events involving Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) agents. This section of the report provides a high level summation of the Consultant findings and recommendations. A detailed analysis is included as Appendix 6.

The EMS component of homeland security planning should be approached from an allhazards perspective, and this report provides recommendations aimed at ensuring proven incident response doctrine, including:

- EMS practices and principles of planning for, protecting against, and responding to large-scale emergency incidents;
- Maintenance of an EMS system operation capable of expanding to meet the demands of an incident that escalates in scope and magnitude;
- Inter-agency collaboration to integrate resources through contracts, mutual aid agreements, state-provided assistance, and federal government response; and
- Communication processes, procedures, and protocols that ensure effective interoperable communications among emergency responders, 9-1-1 centers, and multiagency coordination systems.

The long-term goal of Westchester County Emergency Services (WCES) must be to maintain a consistent operational framework for all aspects of managing an emergency incident of any scope or magnitude. This framework should be sustainable, flexible, and scalable to meet changing incident needs and allow for integration of all EMS resources and other emergency response partners through mutual aid agreements. WCES was benchmarked against current industry standards in nine (9) critical categories that require near-term implementation of specific objectives:

- 1. Integrated planning, hazard vulnerability, threat, and risk assessment with partner public safety and emergency response organizations;
- 2. Comprehensive and multi-agency disaster response training;
- 3. Adequate equipment for safe and effective response to events involving mass casualties and/or chemical, biological, radiological, nuclear, or explosive agents;
- 4. Comprehensive exercise program involving partner public safety and emergency response organizations;
- Mutual aid agreements and memorandums of agreement/understanding (MOAs/MOUs) with partner public safety and emergency response organizations;

- 6. Interoperable communications and regional interoperable strategic planning;
- 7. National Incident Management System (NIMS) compliance;
- 8. Pandemic influenza and public health emergency planning and operations: and
- 9. Continuity of operations planning.

# Current EMS System Performance and Its Impact on Disaster Preparedness

Westchester County's first responders proudly serve their communities by responding daily to calls for help from the citizens they serve. As we have seen in recent years, catastrophic events will demand significant resources and specialized capabilities from first responders. Nationwide, there is a continuing challenge to adequately meet the demands for routine EMS calls every day. Westchester County is no different.

Several of the communities in Westchester County are at increased risk for negative outcomes based on extended response times or unavailable EMS resources due to a fragmented deployment and dispatching model that is susceptible to miscommunication and delays in mutual aid assistance from neighboring communities. On a daily, routine basis, this represents a risk to individual or small groups of patients; during a large-scale event, this represents a significant risk to large numbers of patients that will be adversely impacted if they are faced with extended delays while waiting for EMS care and transport. If an EMS system is challenged to meet the daily demands for service during routine operations, the system's challenges during the response to a large-scale event will be compounded. Because of the current system model that encompasses multiple agencies attempting to deliver quality medical service to the population, the overall preparedness capabilities are challenged to provide an integrated and consistent response to a large-scale event. Simply put, if the EMS system cannot effectively manage day-to-day, routine call volumes, then during a large-scale event, it is a certainty that they will not have sufficient units to provide an effective initial response.

Additionally, based on the nature of the Westchester EMS system and its composition of many small organizations with often poor overall command and coordination, the phenomenon of self-dispatching and responder convergence will lead to paralyzing congestion, confusion, hindrance of the delivery of care, compromised security, and wasted scarce resources. This proved to be a major concern during the response to the September 11, 2001 attack on the World Trade Center and is likely to occur in Westchester when the next disaster occurs. The very nature of the EMS system composition will likely compound this lack of command, coordination, and control. Converging responders will stream to the site(s) of the incident, leaving other parts of the County vulnerable. In contrast to this problem, virtually every large-scale exercise or response experiences problems in agency notification, mobilization, information management, communication systems, and administrative and logistical support. Organizations have particular difficulty in optimizing flexibility and the capacity to decentralize operations and conduct rapid problem solving, often a key requirement for responding effectively to major disasters. The lack of a single, unified EMS system will lead to a poor situational awareness during a large-scale crisis, which will lead to a decreased effectiveness in command and control and management of converging responders from multiple agencies and levels of government.

# Integrated Planning, Hazard Vulnerability, Threat, and Risk Assessment

The Westchester County EMS system will play an integral role in mass casualty and disaster response and is tasked with protecting the public's health during such events. While there is significant evidence that WCES and the Westchester County Office of Emergency Management (WCOEM) have coordinated planning and response efforts, there is a consistent response from the individual EMS organizations in the County that there is a lack of coordination with the individual organizations. It is very challenging to coordinate the number of organizations that comprise the EMS system under the current model, especially with regard to communications and planning. The EMS organizations have unique perspectives on the planning process as compared to the priorities of its public safety, emergency management, and other emergency response partners (i.e. law enforcement, public works, public health, etc). Westchester's County and regional vulnerability, threat, and risk assessment process should include all of these response partners in a better coordinated effort. Currently, there are varied levels of engagement by the individual EMS organizations into the overall planning process, and very few of the individual EMS organizations have conducted municipality or organizational hazard and threat assessments, which lead to even greater challenges to the overall coordination and information sharing between the stakeholder agencies. It will prove challenging under the current model of "home rule" and "voluntary participation" to change this, as there is no clear authority or ownership of this issue at the County level and a lack of management authority WCES has over the individual EMS organizations.

#### Recommendation

• Westchester's County and regional vulnerability, threat, and risk assessment process should include all of these response partners in a better coordinated effort.

### **Threat Scenarios**

Even without conducting a comprehensive threat and risk assessment, it is easy to see that Westchester County is exposed to many hazards that have the potential for disrupting the communities and causing mass casualties. Westchester is prone to all forms of severe weather, including a threat from hurricanes, tornadoes, major winter storms, and severe rainstorms that lead to flooding. Major transportation and hazardous material infrastructure, including major Interstate Freeways, several high volume State Highways, major railway

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corridors, and significant hazardous material pipelines and storage facilities present the real potential for hazardous materials accidents to cause mass casualty incidents (see attached Maps of Transportations Corridors and Hazardous Materials Facilities). Additionally, the County faces the threat of these hazardous materials being targeted by criminal or terrorist elements. WCES and the individual EMS organizations should actively engage in threat assessments and coordinate their data with other public safety and emergency response agencies in a more cohesive manner. WCES should be obtaining, tracking, and coordinating the following data indicators related to potential hazardous events: <sup>16</sup>

- Human impact (fatalities, injuries requiring EMS transport, outpatient injuries, emergency department visits due to injury, and trauma center injuries)
- Interruption of healthcare services (EMS, outpatient services, emergency department services, trauma units, ancillary services)
- Community impact (water supply contamination, water supply availability, population displacement/evacuated, public utilities interruption, transportation interruption)
- Impact on the EMS system and public health infrastructure
- Equipment loss
- Communication

#### Recommendation

• WCES should be obtaining, tracking and coordinating the data indicators related to potential hazardous events.

To address these threats, WCOEM publishes a Comprehensive Emergency Management Plan (CEMP). However, discussion with representatives from the individual EMS organizations reveals that the plan is not well known or understood by most individual organizations or their personnel. It is highly recommended that OEM further develop an emergency management strategy that better engages the individual EMS organizations with other emergency response and support organizations including public works, transportation, each of the County's acute care medical facilities, the County government leadership, environmental services, telecommunications providers, school districts, public health, animal services, all of the communications/PSAP centers, and utilities. A comprehensive emergency management plan must include all of these entities to ensure smooth coordination during the planning and response phases of an incident, and there is a clear indication that the EMS organizations should be more involved during the planning. This emergency management team should meet regularly (at least monthly) in order to update plans, communicate threats and intelligence, share resource information, and maintain working relationships with each other that will lead to effective coordination during a crisis.

<sup>&</sup>lt;sup>16</sup> Hazard Risk Assessment Instrument. 2006, University of California Los Angeles Center for Public Health and Disasters: Los Angeles. p. 15-37.

#### Recommendation

• OEM further develop an emergency management strategy that better engages the individual EMS organizations with other emergency response and support organizations including public works, transportation, each of the County's acute care medical facilities, the County government leadership, environmental services, telecommunications providers, school districts, public health, animal services, all of the communications/PSAP centers, and utilities.

WCES should also be working closely with public health and environmental health to ensure that the individual communities and the County fully develop and maintain a Crisis and Emergency Communication Plan consistent with the guidance provided by the Department of Homeland Security. During a bioterrorism, pandemic influenza, or other public health event, a coordinated risk communications plan between the public health agencies, OEM, WCES, and the individual EMS organizations will be essential to providing timely, accurate, and helpful information to the public, partners, and media.

### Recommendation

• WCES should work closely with public health and environmental health to ensure that individual communities and the County fully develop and maintain a Crisis and Emergency Communication Plan consistent with the guidance provided by the Department of Homeland Security.

The Homeland Security and Emergency Management Preparedness activities conducted by WCES and OEM should be consistent with the guidance by the U.S. Department of Homeland Security related to developing all-hazards planning scenarios. The threat scenarios should be viewed as planning tools representative of the range of potential terrorist attacks and natural disasters and the related impacts that face Westchester County, the greater New York City metropolitan region, and the nation. In order to establish the range of response requirements to facilitate preparedness planning, WCES and OEM must continue to examine the broad range of potential large-scale events that may impact the County. See Appendix 6 for discussion of specific threat scenarios and their associated planning factors.

### Recommendation

 The Homeland Security and Emergency Management Preparedness activities conducted by WCES and OEM should be consistent with the guidance by the U.S.
 Department of Homeland Security related to developing all-hazards planning scenarios.

# Comprehensive and Multi-Agency Disaster Response Training

Because the individual EMS organizations and WCES will play an integral role in mass casualty and disaster response, and because they are tasked with protecting the public's health during such events, training for such events is of paramount importance. WCES should maintain the lead role in identifying relevant and cost-effective training programs that will prepare personnel within the EMS system for these events.

#### Recommendation

• WCES should maintain the lead role in identifying relevant and cost-effective training programs that will prepare personnel within the EMS system for these events.

WCES leadership should take guidance from the U.S. Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) Training and Exercise Integration Division (TEI) during preparation and maintenance of an all-hazards training program. TEI provides tailored training to enhance the capacity of local jurisdictions to respond safely and effectively to incidents of natural disaster and terrorism, including incidents involving chemical, biological, radiological, nuclear, and explosive weapons. Much of this training is available to both WCES and members of the EMS community at no direct cost. In addition to the direct delivery courses, consideration should also be given to the alternative training delivery mediums that may make more fiscal sense for the County (also provided by TEI training partners) such as train-the-trainer, computer-based training, web-based training, and video teleconferencing. TEI training programs are consistent with nationally recognized standards and adult learning principles that will benefit all public safety personnel in the EMS system. *See Appendix 6 for a comprehensive discussion of relevant training opportunities and requirements*.

### Recommendations

- All EMS personnel, from all EMS organizations in the County, who may potentially respond to a large-scale or mass casualty incident, maintain the following training: WMD/Terrorism Awareness, Hazardous Materials First Responder: Awareness, Hazardous Materials First Responder: Operations, IS-700 NIMS: An Introduction, ICS-100 Introduction to Incident Command System.
- First line supervisors for WCES and the EMS organizations should complete ICS-200 ICS for Single Resources and Initial Action Incidents.
- Middle management should complete ICS-300 Intermediate ICS for Expanding Incidents.

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• Senior management and middle managers who may function as Command and General Staff during an incident for WCES and the individual EMS organizations should complete ICS-400 Advanced ICS Command and General Staff for Complex Incidents.

### Training Records

It was our intent to obtain a comprehensive list of all "WMD related certifications" as requested by WCES so that they could gain a planning and operational perspective of WMD response capabilities of the EMS organizations and EMS personnel in the County. During the data collection process, it became clear that obtaining such an inventory would not be possible within the scope and nature of this project. There are several factors that will make it challenging for WCES to oversee this important data set and track personnel preparedness training:

- Varied level of effort by individual EMS organizations to coordinate, track, document, and verify training, including multiple organizations that have no such training records.
- EMS providers who work/volunteer for multiple organizations will skew the training data being tracked unless there is a central training data repository and an individual who tracks the data to ensure valid information and ensures that there is no duplication.
- There is WMD related coursework that is not approved by DHS or the state of New York, but may still have validity in capacity building efforts. It is difficult to track all of these different courses (there are over 900 courses currently in the federal compendium of training alone).
- While many courses offer certificates of completion, others offer actual certifications. While many of these courses do not have "expiration dates," many do have recommended renewal or refresher requirements. In addition to simply tracking which courses have been completed, expiration and refresher completions should be monitored and tracked as well.

# Adequate Equipment for Safe and Effective Response to Events

One of the current greatest challenges to any EMS system is maintaining the capability to safely respond to an incident involving chemical, biological, or radiological agents. In order for EMS responders to care for the casualties of such an event, they first need to ensure their own safety by having the right PPE for the given situation. This requires not only that EMS system agencies purchase the equipment, but also that they: 1) maintain it; 2) ensure its usefulness and readiness; 3) train personnel on appropriate use; 4) and ensure that it is available for personnel upon the immediate need for it.

WCES has ensured that all of the EMS agencies in the County are provided with, at a minimum, Level C PPE at all times. This is appropriate for the need and the threat. However, the equipment is issued to EMS units and not personnel individually. Universally during the data collection process, EMS personnel described the fact that they have access to the "backpacks" (kits that each contain a level C ensemble) while on duty. However, it appears as though there is no fit testing program in place that would comply with the requirements of the current Occupational Safety and Health Administration (OSHA) Respiratory Protection Regulation (29 CFR 1910.134). The challenge for WCES is to not only deploy the equipment, but also to provide the necessary training and respiratory protection program, including maintenance and suitability (fit testing program that ensures the equipment will work when it is needed). This will come at a significant expense. In order to meet the requirements of the regulation, each member who is expected to wear the equipment would need to be issued their own individual mask that is annually certified to fit the responder. WCES is recommended to further demonstrate their commitment to EMS personnel safety by issuing the equipment and better clarifying who is expected to be capable of wearing the equipment and in which circumstances the providers are expected to deploy the equipment. There is clearly a lack of training that is needed to accompany the issued equipment. This commitment can be verified in either of two ways:

- 1. The EMS organizations can be required to provide documentation verifying that all personnel have been issued Level C PPE, trained on its use, and certified (annual fit testing) to the Respiratory Protection Regulation; or
- 2. WCES can mandate that all certified EMS personnel comply with PPE requirements by response personnel participating in a respiratory protection program (possibly for a cost-recovery fee) managed by the County. Under this scenario, EMS personnel would be issued by WCES and participate in training and respiratory protection testing managed by WCES. This is likely the only way to fully ensure that all EMS personnel have standardized PPE and the appropriate training, but it leaves unanswered questions as to how such a program would be funded.

#### Recommendation

• WCES should further demonstrate commitment to EMS personnel safety by issuing the equipment and better clarifying who is expected to be capable of wearing the equipment and in which circumstances the providers are expected to deploy the equipment.

# Comprehensive Exercise Program

Personnel from nearly every EMS organization have indicated that exercises are currently a weak link in their preparedness activities in Westchester County. In the words of one midlevel manager, "We don't do a lot." There are attempts to conduct an in-house drill, but these efforts are not consistent with a comprehensive overall exercise management program or the current threat environment. There is a bi-annual airport mass casualty drill, but it appears that there is little coordination during the planning process for these exercises, and the exercises that are conducted are not on a large-scale consistent with the threats that Westchester County now faces. WCES has a responsibility and opportunity to further its preparedness activities. This may also present as an opportunity to catalyze the other emergency response agencies into planning and exercising, which will further relationships in the emergency response community.

Not only is it important for personnel to be adequately trained and equipped to respond to large-scale events, but it is also critical for personnel to exercise their response capabilities. Exercise plays a crucial role in the County's preparedness. They provide opportunities for response personnel, leadership, and the emergency management community to practice and assess their collective capabilities. Exercises will afford WCES, the individual EMS organizations, and other emergency response agencies, from first responders to senior officials, to train and practice preparedness, response and recovery capabilities in a risk-free environment.

Exercises will also prove to be a valuable tool for assessing and improving performance, while demonstrating community resolve to prepare for large-scale incidents. This is the only true mechanism (other than real incidents) for the County to gain objective assessments of their capabilities so that gaps, deficiencies, and vulnerabilities are identified and addressed prior to a real incident. Well-designed and executed exercises are the most effective means of:

- 1. Testing and validating policies, plans, procedures, training, equipment, and interagency agreements;
- 2. Clarifying personnel roles and responsibilities;
- 3. Improving interagency coordination and communications;
- 4. Identifying gaps in resources;
- 5. Improving individual personnel performance; and
- 6. Identifying opportunities for improvement.

In accordance with Homeland Security Presidential Directive 8 (HSPD-8) and the National Preparedness Goal, WCES and its emergency response organizations and partners are strongly encouraged to utilize a capabilities-based approach to exercises and comprehensive exercise program management.

#### Recommendation

• WCES, the individual EMS organizations, and other emergency response agencies, from first responders to senior officials, should expand the frequency and diversity of exercises to train and practice preparedness, response, and recovery capabilities in a risk-free environment.

## Mutual Aid Agreements and Memorandums of Agreement/Understanding

WCES is encouraged to further codify understandings and relationships with other municipal response agencies, hospitals, private EMS resources, and the private organizations that will be needed during response to a large-scale incident, especially across state lines with their counterparts in Connecticut. The needs of Westchester County to manage an incident will be determined upon conducting the hazard vulnerability, threat, and risk assessment during the planning process. As part of the planning process, agreements that are already in place need to be reviewed for currency, accuracy, and relevancy. Entities that are identified as needed resource providers should be identified and worked with to develop strong written mutual aid agreements to support the County's response efforts during an emergency. As WCES evaluates and develops these agreements, the following goals and purposes should be the focus:

- *Planning coordination* ensure that agreements complement regional and state planning for large-scale incidents that will have consequences that extend beyond Westchester County.
- *Maximum resource availability* ensure that agreements will result in the resources required for response to large-scale events.
- *Timely arrival* ensure that agreements avoid procedural impediments that will delay the arrival of resources.
- Specialized resources ensure that agreements meet the demands of events involving mass casualties or Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) agents, as these events will necessitate unique and definitive resources.
- *Minimal administrative conflict and liability exposure* ensure that agreements address liability, reimbursement, and other administrative matters to eliminate confusion during an event.

WCES should continue to consider, at a minimum, the following functional areas during mutual aid and service agreement development and review: <sup>17</sup>

<sup>&</sup>lt;sup>17</sup> This list is not intended to be all-inclusive.

- Animals/Veterinary Services
- Administrative Support
- Continuity of Operations
- Coroner/Mortuary Services
- Building Inspectors and Engineers
- Damage Assessment
- Technical Decontamination
- Evacuation
- Transportation/Buses
- Infrastructure Restoration

- WMD Civil Support Team
- Security
- Logistical Support
- Mass Care Shelters
- Military Support
- Alternative Medical Care Sites
- Private Sector Support
- Communications Support
- Schools
- Search and Rescue

#### Recommendation

 WCES is encouraged to further codify understandings and relationships with other municipal response agencies, hospitals, private EMS resources, and the private organizations that will be needed during response to a large-scale incident, especially across state lines with their counterparts in Connecticut.

# Interoperable Communications and Regional Interoperable Strategic Planning

In the DHS Urban Area Security Initiative (UASI), The New York City Urban Area (NYCUA), which includes Westchester County, was recently assessed by DHS for their tactical interoperable communications capabilities. All 75 of the Urban Areas across the country were assessed and DHS released their nationwide findings in the *Tactical Interoperable Communications Scorecard*.<sup>18</sup> This report indicates that the NYCUA has made significant accomplishments in improving their interoperability communications capability. After interviewing personnel from Westchester County, our conclusions are consistent with the Scorecard findings. *See Appendix 6 for further discussion and recommendations for improvement of interoperable communications*.

# National Incident Management System (NIMS) Compliance

Westchester County and surrounding jurisdictions have been steadily meeting the objectives of NIMS in order to build a consistent operational framework for incidents of any scope or magnitude. NIMCAST is the preferred tool for use by states and local jurisdictions to assess NIMS compliance, and WCES and WCOEM is encouraged to continue to utilize this effective tool. Other independently developed electronic tools may be used for this purpose, as long as those tools are able to replicate the same questions and metrics that NIMCAST will as-

<sup>&</sup>lt;sup>18</sup> *Tactical Interoperable Communications Scorecard.* 2007, U.S. Department of Homeland Security.

sess. The FY07 and FY08 NIMS requirements have been listed in Appendix 6 here to reflect the transition from the self-certification process of past years to specific performance-based metrics. These requirements describe the necessary actions for Westchester County to be compliant with NIMS in FY08 (Must be completed and documented prior to September 30, 2008).<sup>19</sup>

### Pandemic Influenza and Public Health Emergency Planning & Operations

One of the biggest challenges of a rapidly developing and sustained influenza pandemic is its capacity to disrupt the essential services of society's critical infrastructure. EMS personnel will be on the front lines during a pandemic event. A recent survey in New York City revealed that 48% of healthcare workers indicated that they would be unwilling to work during a SARS outbreak,<sup>20</sup> and there is no reason to expect any difference in those statistics if the outbreak is H5N1 or in a different locale. The major concern is personal safety and safety of family members.

Westchester County must continue to work aggressively on planning for this inevitable event. Using national estimates and demographic information for Westchester County, over 300,000 people in the County will become infected with the virus and require treatment over the course of twelve to eighteen months. Estimates place the number of deaths near 190,000 during the same period. In order to draft useful and realistic plans for confronting the challenge of a pandemic event, Westchester County does not need to "reinvent the wheel." There are numerous planning guidance documents and templates available for reference as WCES develops their plan. WCES is strongly encouraged to dedicate personnel to make development of this plan a priority. Several guidance documents and planning tools are attached to this report to assist WCES through this process.

#### **Recommendation:**

• WCES is strongly encouraged to dedicate personnel to develop a pandemic flu plan based on available planning guidance documents and templates. Development of the plan must be a priority.

<sup>&</sup>lt;sup>19</sup> *FY 2008 NIMS Compliance Objectives and Metrics for Local Governments.* 2008 FEMA NIMS Integration Center. <sup>20</sup> Qureshi, e.a., *Healthcare Workers' Ability and Willingness to Report to Duty During Catastrophic Disasters.* Journal of Urban Health, 2005. **82**(3): p. 378-388.
# **Continuity of Operations Planning**

Westchester County, including WCES, should have the overarching goal of implementing a comprehensive and effective program to ensure continuity of operations of local and County government under all circumstances. As part of this effort, WCES is encouraged to further develop and maintain a viable plan that ensures continuity of operations through a full range of potential emergencies. The plan should be based on the following:

- Continuing a continuity of operations mindset;
- Identifying critical and essential activities and functions of WCES that must continue no matter what events are occurring;
- Determining vital records, systems, and equipment and a process to safeguard and update these items;
- Evaluating needs and selecting alternate work sites and relocation activities;
- Creating a procedure for reconstitution in the event of catastrophic losses;
- Preparing for the well-being of families;
- Testing and executing the continuity of operations plan and revising it periodically as part of the overall exercise program as necessary.

In order to draft a useful and realistic continuity of operations plan, WCES may take advantage of their hazard risk and vulnerability assessments (see Section 1) to determine which systems require backup. There are numerous planning guidance documents and templates available for reference as WCES further refines their continuity of operations plan. WCES is strongly encouraged to dedicate personnel to make development of this plan a priority. Several guidance documents and planning tools are attached to this report to assist WCES through this process.

## Recommendation

• WCES is encouraged to further develop and maintain a viable continuity of operations plan that ensures continuity of operations through a full range of potential emergencies.

# **Summary of Homeland Security and Preparedness**

This assessment has revealed that WCES has demonstrated a commitment to Homeland Security preparedness and the overarching goal of maintaining an EMS system that is responsive to the growing demands of a changing threat environment. The recommendations listed in this report, if followed, will further enhance the capability of Westchester County and the EMS system to maintain an emergency medical service system that is consistent with the best practices for Homeland Security preparedness and response. The leadership of WCES is strongly encouraged to continue their dedication to maintaining an agency and a system that meets the challenges and opportunities of a prosperous, growing community.

# **Future Scenarios**

While there are many options that could be considered for the future of an EMS system, Fitch & Associates traditionally only advises future scenarios that are feasible and based on the existing system. Five scenarios will be discussed: status quo, process improved, regional performance-based contracting approach, a public utility model, and County governmental third service.

## Status Quo

The easiest option is to do nothing and continue to operate the same as today. This is a comfortable decision for many because it's what they know. Others may feel it's worked okay so far, why change it or let's just tweak it.

Westchester County Emergency Services doesn't have data to be able to definitively say lives are lost because of response time reliability. Based on the system design in place, if help is not reaching a sudden cardiac arrest patient in less than 10 minutes following the arrest, they will not survive. It is safe to assume that survival potential is currently dismal.

The system is designed based on home rule where every community operates its own service in its own way. This is inefficient and results in available resources functioning independently and without the ability to benefit from surrounding resources. The system struggles to reliably reach the first call and additional simultaneous calls suffer from extended response delays.

Volunteerism historically has been a significant component of the system and many dedicated citizens give their time to serve their community. That time is limited today and providing daytime coverage, when the bulk of calls occur, is a challenge.

If it hasn't happened already, there will be a significant incident where a patient dies as a result of the system design and poor response time reliability, which will draw media scrutiny. Any look at the system in comparison to national standards will reveal the system is not modern and citizens will question why they do not have basic services.

While continuing as the system has always functioned is always an option, it will be forced to change in the future and it will continue to produce sporadic quality of service. It would be preferable that Westchester County be proactive than reactive.

# **Process Improvements**

The recommendations in this report provide several system enhancements that range from simple to more complex that would achieve a significant improvement and reliability.

First, the County could designate 60-Control as the sole secondary EMS dispatch center for the system. Yonkers should be excluded because Empress EMS already operates a comparable secondary PSAP. For the rest of the County, once the primary PSAP hears that a call is for an ambulance, it should be patched though a "hot button transfer" to 60-Control for protocol-based interrogation and appropriate dispatch.

Second, with 60-Control as the sole secondary PSAP and dispatch center, there is a single point of Countywide resource dispatch, system status management, and mutual aid activation. This would empower 60-Control to improve response times and resource utilization and reduce delays in mutual aid activation. It would also improve response to and the management of any large-scale event.

Third, law enforcement officers trained as certified first responders and equipped with basic medical supplies and an Automated External Defibrillator (AED) would be dispatched as the medical first responder on all EMS calls in areas not already served by career firefighters in this role. Law enforcement represents the most reliably staffed and available resource consistent in each community and can have an influence on the reduction of morbidity and mortality.

Finally, by initiating data measurement and reporting for basic data system-wide, the EMS advisory board and individual providers will be armed with data that can better enable them to know when and where the call volume occurs, how the system is able to match supply to demand, and what the call natures of the events are.

These process improvements would be significant changes to the system. They would not be easy, would require culture change, and take time, but would result in significant improvements in the quality and reliability of the system.

# **Performance-Based Contracting**

If Westchester County were to consider system design changes to enhance overall system quality, it may consider engaging in performance-based contracting with a private provider. This could be accomplished at several levels. The following is a description of two potential options. **Daytime Coverage** – Call volumes are traditionally higher during the main daylight hours when citizens are awake and moving throughout the community and volunteer capacity is less. Individual towns, cities, and villages could enter into an Inter-local agreement to engage in a performance-based contract with a private provider. This could either occur as a single contract with a single provider Countywide or the County could be divided into volumetrically equal segments and each jurisdiction could be bid out independently.

The pros of such a change would be greater economies of scale that would result in lower costs, greater efficiency, and better resource availability and utilization. It also would allow existing commercial providers an opportunity to compete in the market for the contracts. The cons are significant and include communities having to give up some control for increased quality. It also would not likely be accepted by volunteer Corps and may even be seen as a threat. Also, this option results in quality being different depending on the time of day and who is providing coverage.

**24-Hour Coverage** – A more significant change that would improve overall quality, but would result in significant resistance from volunteer Corps would be to conduct a competitive bid process for fulltime coverage from a private provider. This could again be done as the Countywide or as volumetrically equal segments of the system.

The pros of such a choice are the same as those discussed above. An additional, pro is that the contract would be more attractive to a potential bidder because it involves greater call volume and does not leave costly resources idle for segments of the day. The most significant con is that it would eliminate the need for volunteer ambulance Corps and may even place in question the need for the few small ambulance services. The improvement in quality would come with significant system change and culture shock and would meet significant resistance.

# **Public Utility Model**

Public Utility Model (PUM) EMS systems are the least common system design model in the industry. The system model was developed in the 1970s following research conducted at the Oklahoma Center for Economic and Management Research (CEMR). The research team evaluated high performance EMS systems that operated well without federal or local tax subsidies. The aim of the researchers was to deliver solid patient care, financial stability, and a professional work environment.<sup>21</sup> The result was the PUM EMS system.

PUM systems are a very sophisticated EMS system design that blends tight governmental oversight with performance-based contracting for emergency and non-emergency ambulance services. The exact design can vary slightly from city to city. In general, a

<sup>&</sup>lt;sup>21</sup> Dean, S.F. (2004, March). Public utility model EMS. EMS Magazine. Retrieved from: http://publicsafety.com/article/article.jsp?id=2293&siteSection=5.

governmental body called an ambulance authority is responsible to an authority board for the financial stability of the system, managing the billing and collections, and maintaining ownership of the infrastructure (e.g., fleet and facilities). The ambulance authority is also responsible with managing a competitive bid process for a private ambulance provider to manage the operations under a strict performance-based contract. The authority acts as the contract enforcer and manager.

Roughly half a dozen of these systems are in place in the United States today. Another seven systems in North America operate using similar operational efficiency practices, but do not engage in performance-based contracting with a private provider. While the underlying system design results in the highest performing EMS systems, three cities have terminated their ambulance contractors in the last year due to contractor non-compliance. A combination of the revenue loss from the Medicare fee schedule and a limited pool of qualified contractors have made it challenging to operate as a pure PUM.

The communities in Westchester County could opt to create a single PUM EMS system, but it would be a significant transformation of the system. Five considerations exist when looking at a PUM system design change. First, Fitch & Associates is the only consulting firm with experience designing high performance EMS systems. Second, the County, and all of the thirty-nine jurisdictions, would have to agree to join in a single EMS system. Third, the system design requires a monopoly for emergency and non-emergency call volume and transport resulting in the elimination of the need of local ambulance providers and volunteers. Fourth, there are only a handful of large ambulance providers (e.g., American Medical Response, Rural/Metro, Paramedics Plus, etc.) that have the skill sets and experience necessary to be awarded a competitive, high performance ambulance operations contract for a PUM. And finally, the pool of EMS leaders with the qualifications to lead an ambulance authority of a PUM is limited.

The PUM EMS system design is the only system model design based on research that looked to provide good patient care, response time reliability, and financial sustainability. PUM systems represent the best practice in the industry of quality and performance. Due to a host of complex factors, a PUM is an unlikely system design for Westchester County.

# **County-Based Third Service**

The second most unlikely and the most expensive option would be for Westchester County to establish a governmental EMS department to provide EMS service. This would require significant tax subsidy infusion to launch and would be a huge undertaking. Communities evolving from a volunteer-based system have done this to provide only weekday coverage and sharing staffing with volunteers (e.g., Prince William County, VA) or as a completely paid, 24-hour service.

In addition to expense, this would also be a major cultural shift and likely draw significant opposition. It also would require Westchester County to purchase and maintain facilities, fleet, staffing, and recruit professional EMS managers. Several small paid squads and the commercial squads would no longer be needed to operate in the County as well. Finally, governmental third service systems are traditionally less efficient and more costly than private providers.

# **Summary of Future Scenarios**

The future scenarios described include remaining status quo, making specific process improvements to the existing system, engaging in performance-based contracted emergency ambulance service, a public utility model, or having the County provide the service directly. In all five scenarios, the City of Yonkers would be maintained as a system within a system.

# **Report Summary**

Westchester County's emergency medical services system is not a planned system and has never conducted an analysis or developed a Countywide organized plan to ensure demand and geographic coverage. Similar to many communities, the system has evolved in increments with each jurisdiction acting independently. The system can continue to follow this path, but it will also see reductions in quality and performance and increased risk of preventable morbidity and mortality that will not be acceptable to the taxpayer.

The primary and secondary Public Safety Answering Points (PSAPs) are a significant hindrance to quality call processing, responder assignment, system status management, and mutual aid. 60-Control is the only secondary PSAP with the volume needed to remain proficient. Improvement of workflow processes, protocol-based dispatch, and system deployment management would be a significant system improvement.

EMS systems were initially developed to meet the needs of patients suffering time-sensitive, life threatening emergencies (e.g., traumatic injuries and sudden cardiac arrest). Medical first response is a key component of reducing potentially preventable death and, with a few exceptions, it is absent in Westchester County. Law enforcement represents a significant opportunity to reduce morbidity and mortality by providing medical first response in communities where career firefighters are not already providing the service.

The patchwork of mini-systems is uncoordinated and system performance varies dramatically. A single call can be taxing for almost half of the County and, if a second call occurs in a jurisdiction, there is little guarantee of service performance or quality.

The EMS system lacks basic data to understand the level of activity that presently exists. Data definitions are absent or don't match industry recommended standards. The result is limited evidence-based information to recognize the need for system enhancements and guide planning.

The underlying system design places the community at risk in the event of a large-scale event. Routine operations will be interrupted. Increased planning, training, and multi-stakeholder exercises are needed to maintain proficiency and awareness and to identify improvement opportunities.

To reach industry baselines of performance Countywide will require significant changes to the EMS system. This would likely result in changes in the volunteer system and require communities to cooperate to enhance service delivery. Improvements will not be easy, but are necessary. The system has many great and committed people in every facet of the system and collectively they can improve in increments or as a transformative process. Change is necessary.

# **Summary of Recommendations**

# **Public Safety Answering Points**

- 1. Westchester County Emergency Services must decide who is ultimately accountable for both determining patient acuity and assigning ambulances and emergency services personnel.
- 2. All 9-1-1 centers should measure and track their ring time response.
- Best practice is to answer within three phone rings (which is approximately 10 seconds) 90% of the time.
- 4. All 9-1-1 centers should post their performance on ring time response.
- 5. That all centers follow the 9-1-1 standard response protocol for emergency calls.
- 6. That a compliancy system is set up to evaluate response.
- 7. All dispatch centers that triage medical calls should use a medical protocol.
- 8. All dispatch centers that triaged medical calls should be enabled in the provision of dispatch "first aid" self help support (pre-arrival and post dispatch instructions).
- 9. All dispatch centers that triage medical calls should have trained and certified EMD call takers.
- 10. All dispatch centers that triage medical calls should have ongoing and continuous training to a minimum of the NAED standard for all its call takers.
- 11. All dispatch centers that triage medical calls should have a quality assurance module with quality control and improvement modules.
- 12. All dispatch centers that triage medical calls should commit to becoming an Accredited Center of Excellence.
- 13. All dispatch centers should have a quality assurance module and should report the compliance to County oversight for improvement purposes.
- 14. A culture of continuous quality improvement should be implemented throughout Westchester County.
- 15. It is recommended that a working group be formed in order to establish an optimal amount of dispatch centers to service Westchester County.

# **Medical First Reponses**

- 16. In the absence of an existing medical first response system and extended ambulance response times, Westchester County EMS needs to develop a medical first response system.
- 17. Law enforcement is the most consistent, on duty public safety entity in each jurisdiction. In the absence of career firefighters already providing medical first response, training law enforcement officers to be certified first responders and providing first aid jump bags and Automated External Defibrillators (AED) could reduce morbidity and mortality.
- 18. The Westchester County Emergency Services Department, the Westchester Regional Emergency Medical Advisory Committee (REMAC), and the Regional EMS Council should

work with providers and communities to reach consensus on the appropriate data definitions, tracking, and regular reporting of medical first response times to monitor for opportunity for enhancement.

# **EMS Response and Transport**

- 19. Westchester County Emergency Services needs to evaluate the impact of Corps drawing from the same limited staffing pool and how it affects safety, crew fatigue, and availability for potential large-scale or extended length events.
- 20. Westchester County EMS, WREMSCO, and service providers need to adopt the consensus standard definition of response time measured from call receipt at the medical PSAP to the appropriate EMS transport unit on scene. Response times should be measured as percentiles at the 90<sup>th</sup>.
- 21. Response times should be tracked electronically locally for every call and be reported at least monthly. The process should evolve to be a Countywide data tracking and reporting system.
- 22. Westchester County Emergency Services, in collaboration with the Westchester Regional EMS Council and in cooperation with EMS services, needs to develop a standardized process for mutual aid initiation. This process should be based on a set time interval (e.g., 2 minutes) for confirmed adequate response and enable automatic dispatch of mutual aid.
- 23. The mutual aid agreement should be drafted to enable timely response of a confirmed resource to be co-dispatched with the closest contiguous Corps. A confirmed resource would be the next closest Corps or EMS service that has a currently staffed ambulance ready for immediate response to minimize further delay.
- 24. The Westchester County Emergency Services should explore an alternative process for rapid communications.
- 25. An ambulance must be reliably responding to every call with a Paramedic Intercept to ensure the paramedic is adequately supported on scene and transport to the emergency department is not delayed.
- 26. Ambulance Corps responding with a paramedic intercept need to enable shuttling the paramedic intercept vehicle to the emergency department following the transport ambulance to allow for the resource to return to service in a timely manner.
- 27. Ambulance Corps responding with a paramedic intercept need to enable shuttling the paramedic intercept vehicle to the emergency department following the transport ambulance to allow for the resource to return to service in a timely manner.
- 28. Yonkers is a self-contained high performance system within a system. The County should be conscious of any Countywide decisions that would have a negative effect on the City's system design.
- 29. Develop uniform data definitions based on national standards and best practices.
- 30. Track basic metrics and activity data.
- 31. Develop a process for Countywide submission and reporting.

32. Evolve to greater performance measure tracking and reporting (e.g., Utstein Style Sudden Cardiac Arrest Survival).

# Homeland Security and Disaster Preparedness

- 33. Westchester's County and regional vulnerability, threat, and risk assessment process should include all of these response partners in a better coordinated effort.
- 34. WCES should be obtaining, tracking and coordinating the data indicators related to potential hazardous events.
- 35. OEM further develop an emergency management strategy that better engages the individual EMS organizations with other emergency response and support organizations including public works, transportation, each of the city's acute care medical facilities, the County government leadership, environmental services, telecommunications providers, school districts, public health, animal services, all of the communications/PSAP centers, and utilities.
- 36. WCES should work closely with public health and environmental health to ensure that individual communities and the County fully develop and maintain a Crisis and Emergency Communication Plan consistent with the guidance provided by the Department of Homeland Security.
- 37. The Homeland Security and Emergency Management Preparedness activities conducted by WCES and OEM should be consistent with the guidance by the U.S. Department of Homeland Security related to developing all-hazards planning scenarios.
- 38. WCES should maintain the lead role in identifying relevant and cost-effective training programs that will prepare personnel within the EMS system for these events.
- 39. All EMS personnel, from all EMS organizations in the County, who may potentially respond to a large-scale or mass casualty incident, maintain the following training: WMD/Terrorism Awareness, Hazardous Materials First Responder: Awareness, Hazardous Materials First Responder: Operations, IS-700 NIMS: An Introduction, ICS-100 Introduction to Incident Command System.
- 40. First line supervisors for WCES and the EMS organizations should complete ICS-200 ICS for Single Resources and Initial Action Incidents.
- 41. Middle management should complete ICS-300 Intermediate ICS for Expanding Incidents.
- 42. Senior management and middle managers who may function as Command and General Staff during an incident for WCES and the individual EMS organizations should complete ICS-400 Advanced ICS Command and General Staff for Complex Incidents.
- 43. WCES should further demonstrate commitment to EMS personnel safety by issuing the equipment and better clarifying who is expected to be capable of wearing the equipment and in which circumstances the providers are expected to deploy the equipment.
- 44. WCES, the individual EMS organizations, and other emergency response agencies, from first responders to senior officials, should expand the frequency and diversity of exercises to train and practice preparedness, response, and recovery capabilities in a risk-free environment.

- 45. WCES is encouraged to further codify understandings and relationships with other municipal response agencies, hospitals, private EMS resources, and the private organizations that will be needed during response to a large-scale incident, especially across state lines with their counterparts in Connecticut.
- 46. WCES is strongly encouraged to dedicate personnel to develop a pandemic flu plan based on available planning guidance documents and templates. Development of the plan must be a priority.
- 47. WCES is encouraged to further develop and maintain a viable continuity of operations plan that ensures continuity of operations through a full range of potential emergencies.

# **Primary PSAP Phone Protocol**



## Appendix 1 - Primary PSAP Phone Protocol

### Introduction:

Hello. My name is [First Name] with Fitch & Associates. The Westchester County Department of Emergency Services has hired our consulting firm to analyze the EMS system. John Elliott (9-1-1 Coordinator) authorized us to contact your organization and your Chief provided you as the contact to obtain this information. The survey is completed over the phone and takes just 15 minutes. If you have a minute, I'd appreciate completing the information for your center? Thank you

1. What is the Name of your PSAP? \_\_\_\_\_\_

- 2. What is the address of your PSAP?
  - a. Street\_\_\_\_\_
  - b. City \_\_\_\_\_
  - c. ZIP Code \_\_\_\_\_
  - d. Main Non-Emergency Phone Number \_\_\_\_\_
- 3. Is your PSAP connected to a secondary function such as Police/Fire/ EMS?
  - a. Yes
  - b. No
  - c. Other, please explain \_\_\_\_\_

4. What is the total call volume of your PSAP? \_\_\_\_\_

- 5. What is the distribution of calls assigned to Police/Fire/EMS?
  - a. Police \_\_\_\_\_
  - b. Fire \_\_\_\_\_
  - c. EMS \_\_\_\_\_
- 6. What territory/territories does your PSAP cover?
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - C. \_\_\_\_\_
- 7. Does your organization follow the NENA (National Emergency Number Association) standards and guidelines for Primary PSAP response?
  - a. Yes
  - b. No
  - c. Unsure, please describe \_\_\_\_\_

- 8. For PSAPs that have a secondary function do you use a triage tool i.e. MPDS, FDS etc.?
  - a. Yes
  - b. No
  - c. Unsure, please describe \_\_\_\_\_
- 9. Standard for answering 9-1-1 calls is 90% of all 9-1-1 calls arriving at the Public Safety Answering Point shall be answered in 10 seconds does your service?
  - a. Measure the performance
    - i. Yes
    - ii. No
  - b. Meet this objective
    - i. Yes
    - ii. No
- 10. The Order answering priority should be 9-1-1 first, 7/10 digit calls second, administrative lines third does your organization use this priority?
  - a. Yes
  - b. No
- 11. Describe your standard answering protocols for 9-1-1 calls: The standard is "nineone-one what is your emergency?" \_\_\_\_\_\_
- 12. Describe your standard answering protocols for non-emergency line: the standard is "County dispatch, [operator name] how may I help you?)"

The following information asks about specific activities in your center.

- 13. <u>As part of standard information gathering</u>; does your 9-1-1 center gather address or exact location?
  - a. Yes
  - b. No
  - c. Unsure, please describe \_\_\_\_\_
- 14. <u>During address verification</u>: does your dispatch center validate that the caller address matches the ALI display?
  - a. Yes
  - b. No
  - c. Unsure, please describe \_\_\_\_\_

- 15. <u>When transferring emergency calls</u>: does your agency stay online until the connection is complete to the secondary PSAP?
  - a. Yes
  - b. No
  - c. Unsure, please describe \_\_\_\_\_
- 16. With abandoned calls: does your agency call back all abandoned calls?
  - a. Yes
  - b. No
  - c. Unsure, please describe \_\_\_\_\_
- 17. When receiving silent calls: does your agency answer all silent calls with a TTY / TTD?
  - a. Yes
  - b. No
  - c. Unsure, please describe \_\_\_\_\_

### 18. When reporting for duty: do your call takers:

- a. Review daily logs (sign or initial)?
  - i. Yes
  - ii. No
  - iii. Unsure, please describe\_\_\_\_\_
- b. Review all communication (sign or initial)?
  - i. Yes
  - ii. No
  - iii. Unsure, please describe\_\_\_\_\_
- c. Review ongoing calls (sign or initial)?
  - i. Yes
  - ii. No
  - iii. Unsure, please describe\_\_\_\_\_

### 19. At start of shift, do the call takers

- a. Start a new shift log?
  - i. Yes
  - ii. No
  - iii. Unsure, please describe\_\_\_\_\_
- b. Assure equipment is working order?
  - i. Yes
  - ii. No

	iii.	Unsure, please describe
C.	Re	port any needs to supervisor?
	i.	Yes
	ij.	No
	iii.	Unsure, please describe
20. <u>At the</u>	e enc	d of shift, do the call takers:
a.	Ass	sure that paper work is complete?
	i.	Yes
	ii.	No
	iii.	Unsure, please describe
b.	Bri	ef on coming shift completely?
	i.	Yes
	ii.	No
	iii.	Unsure, please describe
C.	Lea	ave work area clean?
	i.	Yes
	ii.	No
	III.	Unsure, please describe
d.	Ass	sure that resource material is returned to its proper place?
	i.	Yes
	ii.	No
	III.	Unsure, please describe
e.	Ass	sure that loose and unwanted teletypes are properly disposed of?
	i.	Yes
	ii.	No
	iii.	Unsure, please describe
f.	Ass	sure that they are relieved by on coming shift supervisor prior to shift end?
	i.	Yes
	ij.	No
	iii.	Unsure, please describe

## Closing:

Sir/Madam. On behalf of Fitch & Associates and the Westchester County Department of Emergency Services, thank you for your time and contributing your data to the success of the project.

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# Secondary PSAP On-Site Protocol



### Appendix 2 - Secondary PSAP Onsite Protocol

#### Demographics

- 1. What is the Name of your PSAP?
  - a. Fairview Fire Department
  - b. Hartsdale Fire Department
  - c. Lake Mohegan Fire Department
  - d. Mt. Vernon City Fire Department
  - e. Somers Township Fire Department
  - f. Westchester Fire Control
  - g. Westchester County (60-Control)
  - h. Other \_\_\_\_\_
- 2. What is the address of your PSAP?
  - a. Street\_\_\_\_\_
  - b. City \_\_\_\_\_
  - c. ZIP Code \_\_\_\_\_

d. Main Non-Emergency Phone Number \_\_\_\_\_

- 3. Is your PSAP connected to a secondary function such as Police/Fire/EMS?
  - a. Yes
  - b. No
  - c. Other, please explain \_\_\_\_\_

4. What is the total call volume of your PSAP? \_\_\_\_\_

- 5. What is the distribution of calls assigned to Police/Fire/EMS?
  - a. Police \_\_\_\_\_
  - b. Fire \_\_\_\_\_
  - c. EMS \_\_\_\_\_
- 6. What territory/territories does your PSAP cover?
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - C. \_\_\_\_\_
- 7. What organizations do you dispatch?
  - a. \_\_\_\_\_ FR/TR
  - b. \_\_\_\_\_ FR/TR
  - c. \_\_\_\_\_ FR/TR
  - d. \_\_\_\_\_ FR/TR
  - e. \_\_\_\_\_ FR/TR

#### Secondary PSAP Operations

What is staffing for the dispatch center?

What, if any, call-taking protocol does your dispatch center use?

What quality assurance mechanism is used by your dispatch center?

What is the length of training for the call taking portion?

What is the length of training for the dispatch/radio function?

Does your dispatch center dispatch both ambulance and first response units? Yes

No

Other, please describe
------------------------

Does your dispatch center follow the transport units through to the end of the transport phase (for transport units only)?

Yes

No

Other, please describe \_\_\_\_\_

Is data readily available for all time intervals of both internal time and external time? Yes

No

Other, please describe \_\_\_\_\_

**Medical First Responder Phone Protocol** 



## Appendix 3 - Medical First Responder Phone Protocol

### Introduction:

Hello. My name is [First Name] with Fitch & Associates. The Westchester County Department of Emergency Services has hired our consulting firm to analyze the EMS system. Commissioner Anthony Sutton authorized us to contact your organization and your Chief provided you as the contact to obtain this information. The survey is completed over the phone and takes just 15 minutes. If you have a minute, I'd appreciate completing the information for your medical first responder organization? Thank you.

Medical first responder organization name \_\_\_\_\_

What is the address of your medical first responder organization?

- a. Street\_\_\_\_\_
- b. City \_\_\_\_\_
- c. ZIP Code \_\_\_\_\_
- d. Main Non-Emergency Phone Number \_\_\_\_\_
- e. Email contact \_\_\_\_\_

### **Organizational and Call Data**

- 1. Is your organization connected to a secondary function?
  - a. No
  - b. Yes, law enforcement
  - c. Yes, fire service
  - d. Yes, ambulance transport
  - e. Other, please explain \_\_\_\_\_
- 2. What is the total call volume (EMS and other calls/all calls) of your organization?

### 3. What is the distribution of calls assigned to Police/Fire/EMS?

- a. Fire \_\_\_\_\_%
- b. EMS \_\_\_\_\_%
- c. Police \_\_\_\_\_% [if applicable]
- d. Other \_\_\_\_\_%
- 4. For what municipalities/jurisdictions does your organization cover medical first response and what is your call volume in each?
  - a. \_\_\_\_\_ Call Vol \_\_\_\_\_
  - b. \_\_\_\_\_ Call Vol \_\_\_\_\_
  - c. \_\_\_\_\_ Call Vol \_\_\_\_\_
  - d. \_\_\_\_\_ Call Vol \_\_\_\_\_

- 5. What entity is primarily responsible for dispatching your organization?
  - a. Fairview Fire Department
  - b. Hartsdale Fire Department
  - c. Lake Mohegan Fire Department
  - d. Mt. Vernon City Fire Department
  - e. Somers Township Fire Department
  - f. Westchester Fire Control
  - g. Westchester County (60-Control)
  - h. Other \_\_\_\_\_
- 6. Response Times: Does your organization measure a defined response time?
  - a. Yes [go to question 7]
  - b. No [skip to question10]
- 7. Response Times: When does your organization *start* the response clock?
  - a. Unknown
  - b. Secondary PSAP receive call
  - c. Your organization is dispatched
  - d. Your organization acknowledges responding
  - e. When apparatus is responding to the scene
  - f. Other, please describe:
- 8. Response Times: When does your organization *stop* the response clock?
  - a. Unknown
  - b. When any help arrives at the scene (e.g., PD, FD, Ambulance)
  - c. When the first medical first responder arrives at the scene.
  - d. When the first responder apparatus arrives at the scene.
  - e. Contact is made with the patient.
- 9. Response Times: How long would you estimate your average response time in your primary response area from dispatch to arrival at scene to be?
  - a. < 5 minutes
  - b. < 10 minutes
  - c. < 15 minutes
  - d. < 20 minutes
  - e. > 20 minutes

10. The next question asks you about your emergency vehicles. How many of each of the following does you organization have in service and ready to respond to a call? a. Engine \_\_\_\_\_ b. Pumper \_\_\_\_\_ c. Ladder Truck \_\_\_\_ d. Rescue/Ambulance \_\_\_\_\_ e. Brush Truck \_\_\_\_\_ f. Other, please describe \_\_\_\_\_ number 11. Where are your apparatus located? Please describe: 12. What is the minimum staffing required to run an EMS call? Please describe? 13. What percentage and how many of your active members/staff have the following certifications as the highest level achieved? a. No certification: \_\_\_\_\_ b. CPR/1<sup>st</sup> Aid: c. Certified First Responder (CFR) d. Emergency Medical Technician - Basic (EMT-B) \_\_\_\_\_ e. Advanced Emergency Medical Technician - Intermediate (AEMT-I) Advanced Emergency Medical Technician - Critical Care (AEMT-CC) Advanced Emergency Medical Technician - Paramedic (AEMT-P) \_\_\_\_\_ 14. In the event your organization has no one to respond, what criteria are used to determine a need for mutual aid? Please describe 15. Does your organization have mutual aid agreements with neighboring peer medical first responder organizations? a. Unknown b. Yes c. No

16. Does your organization provide ambulance transport to the hospital? a. No

Yes, how many per year \_\_\_\_\_

- 17. If no, which transport providers primarily provide transport?
  - a. \_\_\_\_\_\_ b. \_\_\_\_\_\_ c. \_\_\_\_\_ d. \_\_\_\_\_

### Homeland Security

- 18. Do you have any pre-positioned or repositioned supplies, equipment, (e.g., EMS supplies, spare SCBA cylinders, foam, etc.) apparatus, or staff for better access/coverage during crises?
  - a. Yes
  - b. No
  - c. Other, please explain \_\_\_\_\_
- 19. Does your organization have plans in place to ensure adequate personal protective equipment and decontamination equipment is quickly accessible, either within your agency or by mutual aide agreement, for a local chemical, biological, or radiological incident?
  - a. No
  - b. Yes, please describe\_\_\_\_\_
  - c. Other, please describe
- 20. Have you developed and exercised detailed plans for the decontamination of first responder personnel, apparatus and equipment, as well as essential critical infrastructure support transportation such as buses, food and pharmaceutical trucks, etc?
  - a. Yes
  - b. No
  - c. Other, please describe

- 21. Do you receive federal funds to support homeland security or preparedness efforts?
  - a. No
- b. Yes, please describe 22. In the last five years, indicate the name of all DHS approved and non-DHS approved disaster, emergency management, terrorism, and/or CBRNE [Chemical, Biological, Radiological/Nuclear, and Explosive] training attended and the number of people from your organization who have participated in each: Course Name Number Trained a. DHS Approved \_\_\_\_\_ \_\_\_\_\_ b. DHS Approved c. DHS Approved \_\_\_\_\_ d. DHS Approved \_\_\_\_\_ e. DHS Approved \_\_\_\_\_ f. Other, Non DHS g. Other, Non DHS \_\_\_\_\_ h. Other, Non DHS \_\_\_\_\_ \_\_\_\_\_ i. Other, Non DHS \_\_\_\_\_ j. Other, Non DHS \_\_\_\_\_ 23. Describe all recent (last 3 years) staff training on all disaster-related plans, SOPs, etc. a. No training in the last three years. b. \_\_\_\_\_ 24. Does your organization have an emergency mobilization plan, including personnel callback lists? a. Yes b. No c. Other, please explain \_\_\_\_\_ 25. For how many severely injured trauma patients can your agency provide care during a single mass casualty event? a. Unknown b. Number = \_\_\_\_\_

- 26. How many of your personnel have multiple responsibilities to include a service commitment to another local provider, a state response asset, or a federal response asset?
  - a. Unknown
  - b. Number = \_\_\_\_\_
- 27. What percentages of your organization's personnel have completed their mandatory NIMS training?
  - a. Unknown
  - b. Number = \_\_\_\_\_

### Closing:

Sir/Madam. On behalf of Fitch & Associates and the Westchester County Department of Emergency Services, thank you for your time and contributing your data to the success of the project.

**Transport Provider Interview Protocol** 



### Appendix 4 - Transport Provider Interview Protocol

Transport organization name \_\_\_\_\_

What is the primary address of your organization?

- a. Street\_\_\_\_\_
- b. City \_\_\_\_\_
- c. ZIP Code \_\_\_\_\_
- d. Main Non-Emergency Phone Number \_\_\_\_\_
- e. Email contact \_\_\_\_\_

### Organizational and Call Data

- 1. Is your organization paid, volunteer, or a combination?
  - a. Paid
  - b. Volunteer
  - c. Combination
  - d. Other, please describe
- 2. Select the best description for your organization:
  - a. Fire Department
  - b. Not-for-profit
  - c. For profit
  - d. Other, please explain \_\_\_\_\_
- 3. What is the total call volume (EMS and other calls/all calls) of your organization?
- 4. What is the distribution of calls assigned to emergency, non-emergency, and other (e.g., fire)?
  - a. Emergency \_\_\_\_\_\_%
     N = \_\_\_\_\_\_

     b. Non-emergency \_\_\_\_\_\_%
     N = \_\_\_\_\_\_

     c. Other \_\_\_\_\_%
     N = \_\_\_\_\_\_
- 5. For what municipalities/jurisdictions does your organization cover medical first re
  - sponse and what is your call volume in each?

  - d. \_\_\_\_\_ Resp/Trans \_\_\_\_\_

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- 6. Do you have or can you generate a report from CAD that reflects the following information related to call distribution?
  - a. Incidents by time of day
  - b. Day of week
  - c. Nature
  - d. Number of patients treated/transported
  - e. Seasonal variation
  - f. Response time/level of service
- 7. What entity is primarily responsible for dispatching your organization?
  - a. Fairview Fire Department
  - b. Hartsdale Fire Department
  - c. Lake Mohegan Fire Department
  - d. Mt. Vernon City Fire Department
  - e. Somers Township Fire Department
  - f. Westchester Fire Control
  - g. Westchester County (60-Control)
  - h. Other \_\_\_\_\_
- 8. Response Times: Does your organization measure a defined response time?
  - a. Yes [go to question 7]
  - b. No [skip to question10]
- 9. Response Times: When does your organization *start* the response clock?
  - a. Unknown
  - b. Secondary PSAP receive call
  - c. Your organization is dispatched
  - d. Your organization acknowledges responding
  - e. When apparatus is responding to the scene
  - f. Other, please describe: \_\_\_\_\_
- 10. Response Times: When does your organization *stop* the response clock?
  - a. Unknown
  - b. When any help arrives at the scene (e.g., PD, FD, Ambulance)
  - c. When the first medical first responder arrives at the scene.
  - d. When the first responder apparatus arrives at the scene.
  - e. Contact is made with the patient.

- 11. Response Times: How long would you estimate your average response time in your primary response area from dispatch to arrival at scene to be?
  - a. < 5 minutes
  - b. < 10 minutes
  - c. < 15 minutes
  - d. < 20 minutes
  - e. > 20 minutes
- 12. The next question asks you about your emergency vehicles. How many of each of the following does you organization have in service and ready to respond to a call?
  - a. Engine \_\_\_\_\_
  - b. Pumper \_\_\_\_\_
  - c. Ladder Truck \_\_\_\_\_
  - d. Rescue/Ambulance \_\_\_\_\_
  - e. Non-transporting fly car \_\_\_\_\_
  - f. Brush Truck \_\_\_\_\_\_
    g. Other, please describe \_\_\_\_\_\_ number \_\_\_\_\_\_
- 13. Where are your apparatus located? Posts and stations? Please describe:

- 14. What is the minimum staffing required per ambulance and/or fly car for BLS and ALS? What do you routinely staff? Please describe:
- 15. What is your ambulance staffing by hour of day and day a week? (obtain copy if possible)

- 16. What percentage and how many of your active members/staff have the following certifications as the highest level achieved?
  - a. No certification: \_\_\_\_\_
  - b. CPR/1<sup>st</sup> Aid: \_\_\_\_\_
  - c. Certified First Responder (CFR) \_\_\_\_\_
  - d. Emergency Medical Technician Basic (EMT-B)
  - e. Advanced Emergency Medical Technician Intermediate (AEMT-I)

Advanced Emergency Medical Technician - Critical Care (AEMT-CC)

Advanced Emergency Medical Technician - Paramedic (AEMT-P) \_\_\_\_\_

- 17. In the event your organization has no one to respond, what criteria are used to determine a need for mutual aid? Please describe
- 18. Does your organization have mutual aid agreements with neighboring peer transport organizations?
  - a. Unknown
  - b. Yes
  - c. No
- 19. What hospitals do you transport to and how would you describe their daily capacity and potential surge capacity?

#### **Homeland Security**

- 20. Do you have any pre-positioned or repositioned supplies, equipment, (e.g., EMS supplies, spare SCBA cylinders, foam, etc.) apparatus, or staff for better access/coverage during crises?
  - a. Yes
  - b. No
  - c. Other, please explain \_\_\_\_\_

21.	Does your organization have plans in place to ensure adequate personal protective
	equipment and decontamination equipment is quickly accessible, either within your
	agency or by mutual aide agreement, for a local chemical, biological, or radiological
	incident?

- a. No
- b. Yes, please describe\_\_\_\_\_

c. Other, please describe

- 22. Have you developed and exercised detailed plans for the decontamination of first responder personnel, apparatus and equipment, as well as essential critical infrastructure support transportation such as buses, food and pharmaceutical trucks, etc?
  - d. Yes
  - e. No
  - f. Other, please describe

23. Do you receive federal funds to support homeland security or preparedness efforts?

- g. No
- h. Yes, please describe\_\_\_\_\_
- 24. In the last five years, indicate the name of all DHS approved and non-DHS approved disaster, emergency management, terrorism, and/or CBRNE [Chemical, Biological, Radiological/Nuclear, and Explosive] training attended and the number of people from your organization who have participated in each:

		Course Name	Number Trained
a.	DHS Approved		
b.	DHS Approved		
C.	DHS Approved		
d.	DHS Approved		
e.	DHS Approved		
f.	Other, Non DHS		
g.	Other, Non DHS		
h.	Other, Non DHS		
i.	Other, Non DHS		
j.	Other, Non DHS		

25. Describe all recent (last 3 years) staff training on all disaster-related plans, SOPs,
etc.
a. No training in the last three years.
b
26. Does your organization have an emergency mobilization plan, including personnel
callback lists?
a. Yes
b. No
c. Other, please explain
27. For how many severely injured trauma patients can your agency provide care during
a single mass casualty event?
a. Unknown
b. Number =
28. How many of your personnel have multiple responsibilities to include a service com-
mitment to another local provider, a state response asset, or a federal response
asset?
a. Unknown
b Number =
5. Namber –
29 What percentage of your organization's personnel has completed their mandatory
NIMS training?
b. Number =

# Matrix of Dispatch, First Responder, & Transport by Municipality


MUNICIPALITY	NON-TRANSPORT EMS		TRANSPORT EMS		EMS Dispatch
	BLSFR	ALSFR	ALS Ambulance	BLS Ambulance(s)	
City of Mt. Vernon	Mt. Vernon FD		Empress Ambulance		Empress
City of New Ro- chelle	New Rochelle FD		TransCare		60 Control
City of Peekskill	Peekskill FD	Cortlandt Regional Paramedics (Peekskill FD Unit)		Peekskill Community VAC	60 Control
City of Rye	Rye City PD Playland EMS (on Playland Park prop- erty only)		Portchester Rye Brook EMS		Rye (C) PD
City of White Plains	White Plains De- partment of Public Safety		TransCare		White Plains PD
City of Yonkers	Yonkers FD		Empress Ambulance		Empress
Town of Bedford	Bedford PD			Katonah-Bedford VAC (northern section) Bedford FD (southern section)	60 Control (BFD) Bedford (T) PD (KBHVAC)
Town of Cortland	Lake Mohegan FD (in Fire District area)	Cortlandt Regional Paramedics Ossining VAC ALSFR (section covered by Croton EMS)		Cortlandt Community VAC (west/central sec- tion) Mohegan Lake VFA VAC (northeastern section) Peekskill VAC (northwes- tern section) Croton EMS (southeas- tern section)	60 Control (CRP, CCVAC, MLVFA, PCVAC) Croton PD (CEMS) Ossining (V) PD (OVAC ALSFR)
Town of Eastches- ter	Eastchester FD Eastchester PD		Eastchester VAC		60 Control
Town of Green- burgh	Greenville FD Hartsdale FD Fairview FD		Greenburgh PD		Greenburgh PD
Town of Lewisboro	None	Westchester EMS		Lewisboro VAC	60 Control

MUNICIPALITY	NON-TRANSPORT EMS		TRANSPORT EMS		EMS Dispatch
	BLSFR	ALSFR	ALS Ambulance	BLS Ambulance(s)	
				Vista FD	
Town of Mamaro- neck	Mamaroneck FD (Town)		Town of Mamamroneck Ambulance District, Town of Mamaro- neck/Larchmont VAC (dual coverage)		Mamaroneck (T) PD (60 Control can also dispatch if call re- ceived directly)
Town of Mt. Plea- sant		TransCare	TransCare (Grasslands Cam- pus/Westchester Medical Center property)	Valhalla VAC (eastern section) Pleasantville VAC (north section) Sleepy Hollow VAC (western section) Hawthorne FD (central section)	60 Control
Town of New Cas- tle	New Castle PD	Westchester EMS (CVAC / MKVAC covered areas)	Ossining VAC (western section)	Chappaqua VAC (central section) Mt. Kisco VAC (eastern section)	Ossining (V) PD (OVAC) New Castle PD (CVAC) Mt. Kisco PD (MKVAC)
Town of North Castle	North Castle South Fire Dist 1 (aka North White Plains VFD) Banksville FD	Westchester EMS (Armonk FD area) TransCare (Valhalla VAC area)		Armonk FD Valhalla VAC (North White Plains area)	60 Control (AFD, WEMS) Mt. Pleasant PD (VVAC, TransCare)
Town of North Salem	Golden's Bridge FD Croton Falls FD South Salem FD	Westchester EMS		North Salem VAC	60 Control
Town of Ossining	None		Ossining VAC		Ossining (V) PD
Town of Pelham	Pelham FD	Empress Ambul- ance	Empress Ambulance		Empress
Town of Pound Ridge	None	Westchester EMS		Pound Ridge VAC	60 Control
Town of Rye	None		Portchester Rye Brook EMS		Port Chester PD
Town of Somers	None	Westchester EMS		Somers FD	60 Control (WEMS) Somers FD (Somers FD)
Town of Yorktown	Yorktown PD	Empress Ambul- ance (Yorktown		Yorktown VAC Mohegan Lake VFA VAC	60 Control (MLVFA/CRP)

MUNICIPALITY	NON-TRANSPORT EMS		TRANSPORT EMS		EMS Dispatch
	BLSFR	ALSFR	ALS Ambulance	BLS Ambulance(s)	
		VAC areas) Cortlandt Regional Paramedics (MLVFA areas)		(north/northwestern area)	Yorktown PD (YVAC/Empress)
Town/Village of Harrison	Harrison PD		Harrison EMS		Harrison PD
Village of Arsdley	None	Greenburgh PD		Arsdley-Secor VAC	Ardsley PD
Village of Briarcliff Manor	None	Ossining VAC ALSFR		Briarcliff Manor FD VAC	Briarcliff PD (BMFD) Ossining (V) PD (OVAC ALSFR)
Village of Bronx- ville	None		Eastchester VAC		60 Control
Village of Bucha- nan	None	Cortlandt Regional Paramedics		Verplanck FD (northwes- tern section) Cortlandt Community VAC (southeastern sec- tion)	60 Control
Village of Croton	None	Ossining VAC ALSFR		Croton EMS	Croton PD (CEMS) Ossining (V) PD (OVAC ALSFR)
Village of Dobbs Ferry	None	Greenburgh PD		Dobbs Ferry VAC	Greenburgh PD (GPD) Dobbs Ferry PD (DFVAC)
Village of Elmsford	None	Greenburgh PD		Elmsford FD	Greenburgh PD (GPD) Elmsford PD (EFD)
Village of Hastings	None	Greenburgh PD		Hastings FD	Greenburgh PD (GPD) Hastings PD (HFD)
Village of Irvington	None	Greenburgh PD		Irvington VAC	Greenburgh PD (GPD) Irvington PD (IVAC)
Village of Lar- chmont	Larchmont FD		Town of Mamamroneck Ambulance District, Town of Mamaro- neck/Larchmont VAC (dual coverage)		Larchmont PD (60 Control can also dis- patch if call received directly)
Village of Mama- roneck	None		Town of Mamamroneck Ambulance District, Mamaroneck EMS (dual cov-		Mamaroneck (V) PD (60 Control can also dispatch if call re-

MUNICIPALITY	NON-TRANSPORT EMS		TRANSPORT EMS		EMS Dispatch
	BLSFR	ALSFR	ALS Ambulance	BLS Ambulance(s)	
			erage)		ceived directly)
Village of Ossining	None		Ossining VAC		Ossining (V) PD
Village of Pelham	Pelham FD	Empress Ambul- ance	Empress Ambulance		60 Control (ALSFR Unit) Empress (Ambulance Unit)
Village of Pelham Manor	Pelham FD	Empress Ambul- ance	Empress Ambulance		60 Control (ALSFR Unit) Empress (Ambulance Unit)
Village of Plea- santville	None	TransCare		Pleasantville VAC	Mt. Pleasant PD (TransCare) Pleasantville PD (PVAC)
Village of Port Chester	Port Chester FD, Port Chester PD		Portchester Rye Brook EMS		Port Chester PD
Village of Rye Brook	Rye Brook FD		Portchester Rye Brook EMS		Rye Brook PD
Village of Sleepy Hollow	None	TransCare		Sleepy Hollow VAC	Mt. Pleasant PD (TransCare) Sleepy Hollow PD (SHVAC)
Village of Tarry- town	None	Greenburgh PD		Tarrytown VAC	Greenburgh PD (GPD) Tarrytown PD (TVAC)
Village of Tuck- ahoe	Tuckahoe PD		Eastchester VAC		60 Control
Village/Town of Mt.Kisco	None	Westchester EMS		Mt. Kisco VAC	60 Control (WEMS) Mt. Kisco PD (MKVAC)
Village/Town of Scarsdale	None		Scarsdale VAC		Scarsdale PD

# **Comprehensive Homeland Security and Disaster Preparedness Analysis**



# Appendix 6 – Comprehensive Homeland Security and Disaster Preparedness Analysis

The purpose of this assessment was to determine solutions for providing effective quality service delivery of EMS in Westchester County during large-scale, high impact incidents such as hazardous materials incidents, natural disasters, and terrorism events involving Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) agents... The EMS component of homeland security planning should be approached from an all-hazards perspective, and this report provides recommendations aimed at ensuring proven incident response doctrine, including:

- EMS practices and principles of planning for, protecting against, and responding to large-scale emergency incidents;
- Maintenance of an EMS system operation capable of expanding to meet the demands of an incident that escalates in scope and magnitude;
- Inter-agency collaboration to integrate resources through contracts, mutual aid agreements, state-provided assistance, and federal government response; and
- Communication processes, procedures, and protocols that ensure effective interoperable communications among emergency responders, 9-1-1 centers, and multiagency coordination systems.

The long-term goal of Westchester County Emergency Services (WCES) must be to maintain a consistent operational framework for all aspects of managing an emergency incident of any scope or magnitude. This framework should be sustainable, flexible, and scalable to meet changing incident needs and allow for integration of all EMS resources and other emergency response partners through mutual aid agreements. WCES was benchmarked against current industry standards in nine (9) critical categories that require near-term implementation of specific objectives:

- 1. Integrated planning, hazard vulnerability, threat, and risk assessment with partner public safety and emergency response organizations;
- 2. Comprehensive and multi-agency disaster response training;
- 3. Adequate equipment for safe and effective response to events involving mass casualties and/or chemical, biological, radiological, nuclear, or explosive agents;
- 4. Comprehensive exercise program involving partner public safety and emergency response organizations;
- Mutual aid agreements and memorandums of agreement/understanding (MOAs/MOUs) with partner public safety and emergency response organizations;
- 6. Interoperable communications and regional interoperable strategic planning;
- 7. National Incident Management System (NIMS) compliance;
- 8. Pandemic influenza and public health emergency planning and operations: and
- 9. Continuity of operations planning.

## Current EMS System Performance and Its Impact on Disaster Preparedness

Westchester County's first responders proudly serve their communities by responding daily to calls for help from the citizens they serve. As we have seen in recent years, catastrophic events will demand significant resources and specialized capabilities from first responders. Nationwide, there is a continuing challenge to adequately meet the demands for routine EMS calls every day. Westchester County is no different. Several of the communities in Westchester County are at increased risk for negative outcomes based on extended response times or unavailable EMS resources due to a fragmented deployment and dispatching model that is susceptible to miscommunication and delays in mutual aid assistance from neighboring communities. On a daily, routine basis, this represents a risk to individual or small groups of patients; during a large-scale event, this represents a significant risk to large numbers of patients that will be adversely impacted if they are faced with extended delays while waiting for EMS care and transport. If an EMS system is challenged to meet the daily demands for service during routine operations, the system's challenges during the response to a large-scale event will be compounded. Because of the current system model that encompasses multiple agencies attempting to deliver quality medical service to the population, the overall preparedness capabilities are challenged to provide an integrated and consistent response to a large-scale event. Simply put, if the EMS system cannot effectively manage day-to-day, routine call volumes, then during a large-scale event, it is a certainty that they will not have sufficient units to provide an effective initial response.

Additionally, based on the nature of the Westchester EMS system and its composition of many small organizations with often poor overall command and coordination, the phenomenon of self-dispatching and responder convergence will lead to paralyzing congestion, confusion, hindrance of the delivery of care, compromised security, and wasted scarce resources. This proved to be a major concern during the response to the September 11, 2001 attack on the World Trade Center and is likely to occur in Westchester when the next disaster occurs. The very nature of the EMS system composition will likely compound this lack of command, coordination and control. Converging responders will stream to the site(s) of the incident, leaving other parts of the county vulnerable. In contrast to this problem, virtually every large-scale exercise or response experiences problems in agency notification, mobilization, information management, communication systems, and administrative and logistical support. Organizations have particular difficulty in optimizing flexibility and the capacity to decentralize operations and conduct rapid problem solving, often a key requirement for responding effectively to major disasters. The lack of a single, unified EMS system will lead to a poor situational awareness during a large-scale crisis, which will lead to a decreased effectiveness in command and control and management of converging responders from multiple agencies and levels of government.

# Integrated Planning, Hazard Vulnerability, Threat, and Risk Assessment

The Westchester EMS system will play an integral role in mass casualty and disaster response and is tasked with protecting the public's health during such events. While there is significant evidence that WCES and the Westchester County Office of Emergency Management (WCOEM) have coordinated planning and response efforts, there is a consistent response from the individual EMS organizations in the County that there is a lack of coordination with the individual organizations. It is very challenging to coordinate the number of organizations that comprise the EMS system under the current model, especially with regard to communications and planning. The EMS organizations have unique perspectives on the planning process as compared to the priorities of its public safety, emergency management, and other emergency response partners (i.e. law enforcement, public works, public health, etc). Westchester's county and regional vulnerability, threat, and risk assessment process should include all of these response partners in a better coordinated effort. Currently, there are varied levels of engagement by the individual EMS organizations into the overall planning process, and very few of the individual EMS organizations have conducted municipality or organizational hazard and threat assessments, which lead to even greater challenges to the overall coordination and information sharing between the stakeholder agencies. It will prove challenging under the current model of "home rule" and "voluntary participation" to change this, as there is no clear authority or ownership of this issue at the County level and a lack of management authority WCES has over the individual EMS organizations.

## Recommendation

• Westchester's county and regional vulnerability, threat, and risk assessment process should include all of these response partners in a better coordinated effort.

# Threat Scenarios

Even without conducting a comprehensive threat and risk assessment, it is easy to see that Westchester County is exposed to many hazards that have the potential for disrupting the communities and causing mass casualties. Westchester is prone to all forms of severe weather, including a threat from hurricanes, tornadoes, major winter storms, and severe rainstorms that lead to flooding. Major transportation and hazardous material infrastructure, including major Interstate Freeways, several high volume State Highways, major railway corridors, and significant hazardous material pipelines and storage facilities present the real potential for hazardous materials accidents to cause mass casualty incidents (see attached Maps of Transportations Corridors and Hazardous Materials Facilities). Additionally, the County faces the threat of these hazardous materials being targeted by criminal or terrorist elements. WCES and the individual EMS organizations should actively engage in threat assessments and coordinate their data with other public safety and emergency response

agencies in a more cohesive manner. WCES should be obtaining, tracking and coordinating the following data indicators related to potential hazardous events:<sup>22</sup>

- Human impact (fatalities, injuries requiring EMS transport, outpatient injuries, emergency department visits due to injury, and trauma center injuries)
- Interruption of healthcare services (EMS, outpatient services, emergency department services, trauma units, ancillary services)
- Community impact (water supply contamination, water supply availability, population displacement/evacuated, public utilities interruption, transportation interruption)
- Impact on the EMS system and public health infrastructure
- Equipment loss
- Communication

## Recommendation

• WCES should be obtaining, tracking and coordinating the data indicators related to potential hazardous events.

To address these threats, WCOEM publishes an Emergency Operations Plan (EOP). However, discussion with representatives from the individual EMS organizations reveals that the plan is not well known or understood by most individual organizations or their personnel. It is highly recommended that OEM further develop an emergency management strategy that better engages the individual EMS organizations with other emergency response and support organizations including public works, transportation, each of the County's acute care medical facilities, the County government leadership, environmental services, telecommunications providers, school districts, public health, animal services, all of the communications/PSAP centers, and utilities. A comprehensive emergency management plan must include all of these entities to ensure smooth coordination during the planning and response phases of an incident, and there is a clear indication that the EMS organizations should be more involved during the planning. This emergency management team should meet regularly (at least monthly) in order to update plans, communicate threats and intelligence, share resource information, and maintain working relationships with each other that will lead to effective coordination during a crisis.

## Recommendation

• OEM further develop an emergency management strategy that better engages the individual EMS organizations with other emergency response and support organizations including public works, transportation, each of the County's acute care medical facilities, the County government leadership, environmental services, telecommuni-

<sup>&</sup>lt;sup>22</sup> Hazard Risk Assessment Instrument. 2006, University of California Los Angeles Center for Public Health and Disasters: Los Angeles. p. 15-37.

cations providers, school districts, public health, animal services, all of the communications/PSAP centers, and utilities.

WCES should also be working closely with public health and environmental health to ensure that the individual communities and the County fully develop and maintain a Crisis and Emergency Communication Plan consistent with the guidance provided by the Department of Homeland Security. During a bioterrorism, pandemic influenza, or other public health event, a coordinated risk communications plan between the public health agencies, OEM, WCES, and the individual EMS organizations will be essential to providing timely, accurate, and helpful information to the public, partners, and media.

## Recommendation

• WCES should work closely with public health and environmental health to ensure that individual communities and the County fully develop and maintain a Crisis and Emergency Communication Plan consistent with the guidance provided by the Department of Homeland Security.

The Homeland Security and Emergency Management Preparedness activities conducted by WCES and OEM should be consistent with the guidance by the U.S. Department of Homeland Security related to developing all-hazards planning scenarios. The threat scenarios should be viewed as planning tools representative of the range of potential terrorist attacks and natural disasters and the related impacts that face Westchester County, the greater New York City metropolitan region, and the nation. In order to establish the range of response requirements to facilitate preparedness planning, WCES and OEM must continue to examine the broad range of potential large-scale events that may impact the County. In line with the National Planning Scenarios developed by US DHS, these potential scenarios are presented to represent the minimum number necessary to develop the range of response capabilities and resources, and thus other hazards have been omitted.<sup>23</sup> Examples of other potentially high-impact events include a nuclear power plant incident involving the surrounding communities of Indian Point Nuclear Power Plant, industrial and transportation accidents, and frequently occurring natural disasters such as the "Nor'easter" that struck Westchester County in April 2007. A severe incident at Indian Point, whether or not it is terrorist-related, could result in a release of radioactive materials to the environment with adverse consequences to public health. Scenarios for such severe incidents have not been included in this report because current federal regulations from the Nuclear Regulatory Commission and DHS Federal Emergency Management Agency (FEMA) mandate robust emergency planning and preparedness for each nuclear plant to include the full range of response organizations, including WCES. Additionally, scenarios for such an event cannot be generically extrapolated to other types of facilities such as industrial chemical facilities.

<sup>&</sup>lt;sup>23</sup> National Planning Scenarios. 2005, US Department of Homeland Security.

## Recommendation

 The Homeland Security and Emergency Management Preparedness activities conducted by WCES and OEM should be consistent with the guidance by the U.S. Department of Homeland Security related to developing all-hazards planning scenarios.

WCES, along with public safety and other emergency response disciplines at all levels of government within Westchester County can use these scenarios as a reference to help them identify the potential scope, magnitude, and complexity of potential major events. This report does not preclude WCES or other agencies from developing their own scenarios to supplement this threat list. It is anticipated that emerging threats and lessons learned from other events will necessitate that WCES continue to evolve their planning activities to meet the challenges of the future. These scenarios reflect a rigorous analytical effort by federal Homeland Security experts, with reviews by state and local Homeland Security representatives. However, it is recognized that refinement and revision over time will be necessary to ensure the scenarios remain accurate, represent the evolving all-hazards threat picture, and embody the capabilities necessary to respond to domestic incidents.

As there is a possibility that multiple incidents will occur simultaneously or sequentially; WCES should always consider the need to respond to multiple incidents of the same type and multiple incidents of different types, either within Westchester County, or in surrounding jurisdictions. These incidents will invariably require the coordination and cooperation of Homeland Security response organizations across multiple regional, State, and local jurisdictions, and a regional planning effort should exist with neighboring jurisdictions.

## Scenario 1: Nuclear Detonation – 10-kiloton Improvised Nuclear Device (IND)

- Casualties: Tens of thousands
- Infrastructure Damage: Complete devastation within radius of 0.5 to 3 miles
- Evacuations/Displaced Persons: 100,000 in affected area will seek shelter in safe areas (decontamination required for all before entering shelters)
- Shelter-in-place Persons: Up to 250,000 may require shelter-in-place as plume moves across the region
- If this event occurs within New York City, over one million people will likely selfevacuate to and through Westchester County, potentially bringing radioactive contamination to the County
- Contamination: Various levels up to approximately 3,000 square miles
- Economic Impact: Hundreds of billions of dollars
- Recovery Timeline: Years

The response timeline for this scenario will begin the instant the detonation occurs. Initially, only survivors in the immediate area will conduct rescue and lifesaving activities. Later (minutes to hours), rescue teams, comprised mostly of citizens without any formal training, will begin to arrive and provide assistance. With the current state of education, training, and equipment, it is likely that many of these people, both lay persons and emergency responders will subject themselves to very large (perhaps incapacitating or fatal) doses of radiation. As various command posts are set up (which may take hours or even days), the response will become more coordinated, especially as state and federal assistance arrives. For a nuclear detonation, the actual occurrence of injuries does not stop when the immediate blast effects have subsided. The most critical components of the post-detonation response may not be the lifesaving efforts that assist the victims directly injured by the detonation. Instead, it is likely that the most effective lifesaving activities will be those that address the evacuation or sheltering-in-place decisions for the potential victims in the immediate fallout path, the effective communication of instructions to the affected population, and the efficient decontamination of the evacuated population. In this scenario, command and control are far more important than the actual skill sets of initial emergency responders.

The detonation will be easily recognized as nuclear. Actions required include dispatching response units; making incident scene reports; detecting and identifying the source; establishing a perimeter; collecting information; making hazard assessments and predictions; coordinating hospital and urgent care facilities; coordinating County and State response requests; and coordinating monitoring, surveying, and sampling operations.

Evacuation/shelter-in-place decisions must be made immediately. Required actions include alerting the public, providing traffic and access control, protecting at-risk and special populations, supporting requests for assistance, directing and controlling critical infrastructure assets, and directing public information activities. Location and removal of injured and disabled people will be a significant undertaking that will be greatly complicated by the need to keep the radiation dose of the individual workers As Low As Reasonably Achievable (ALA-RA). Initial emergency workers will likely receive high doses of radiation and must be trained on how to avoid as much as possible.

Self-evacuation should occur in the short-term, and the greatest factor impacting the reduction of the effects of the detonation on the general population will remain the speed and appropriateness of the decisions that are made and the effectiveness of the dissemination of this information (e.g., evacuation/shelter-in-place instructions). Evacuees must be promptly decontaminated. Evacuation and/or sheltering of downwind populations will be required. Actions of the WCES and other emergency response and emergency management personnel should include monitoring and decontaminating evacuees, protecting schools and day care facilities, and providing shelter/reception facilities. Tens of thousands will require decontamination and both short-term and long-term treatment. Due to a high number of casualties, the level of care may be significantly lower than normally expected. When overwhelmed

with victims who need care, decisions must be made based on the fact that the sooner the onset of the symptoms, the higher the dose received and the less likely the victim is to survive (even with medical intervention). It is critical to note that, a nuclear detonation will have an equal impact, in terms of medical resource deployment for evacuated populations, on Westchester County if it occurs in New York City as if it occurs within Westchester County itself. Expected radiation levels will limit the total time personnel can spend in the affected area, quickly leading to a shortage of willing, qualified, and trained responders. The volume of contaminated material that will be removed will overwhelm the national hazard-ous waste disposal facilities and will severely challenge the Nation's ability to transport the material. This effort will be the most expensive and time-consuming part of recovery and will likely cost many billions of dollars and take many years.

A full description of the fatalities and injuries for a nuclear detonation is difficult, complicated, and beyond the scope of this analysis. There will be casualties directly associated with the blast, which will cause "translation/tumbling" (the human body being thrown) and subsequent impacts of people and other objects. A nuclear detonation will also produce a great deal of thermal (heat) energy that will cause burns to exposed skin and eyes. There are two general "categories" of nuclear radiation produced in a detonation. 1) "Prompt" nuclear radiation, arbitrarily defined as being emitted within the first minute - it is actually produced as the device detonates or shortly thereafter. For a 10-kiloton blast, this radiation may expose unprotected people within a couple of miles to extremely large gamma ray and/or neutron doses. 2) A detonation of a nuclear device near the surface of the ground will result in a great deal of fallout in the form of dirt particles that is radioactively contaminated. This fallout will settle out of the radioactive cloud over a period of time, mostly in the first weeks. By far, the most dangerously radioactive fallout will be deposited near the detonation-site and will happen within the first couple of hours after detonation. Radioactive fallout will exponentially decay with time, but may expose many people to large doses and will certainly contaminate large areas of land for years. Many fatalities and injuries will result from a combination of these various effects.

The largest radiation concerns following an IND incident will be the "prompt" radiation (gamma and neutron) and the gamma dose received from the "ground shine" (radioactive particles deposited on the ground) as people are evacuated from the fallout areas. These effects are likely to have significantly larger impacts on the population than internal doses. Internal doses tend to expose the body to relatively small radiation doses over a long period of time, which produces different effects than large radiation doses received during a short period of time. As the distance from ground zero increases past 12 miles, the injuries due to acute radiation exposure will decrease, and lower level contamination, evacuation, and sheltering issues will become the major concern. In general, at distances greater than 150 miles from ground zero of a 10-kiloton nuclear detonation, acute health concerns will not be a significant issue. However, contamination of people and the environment will still be a concern. Years later, there will still be health consequences in the form of increased

probabilities of cancers in the exposed population. The number of these cancers will likely run into the thousands and will extract a large human, social, and financial cost.

## Scenario 2: Biological Attack – Aerosol Anthrax

- Casualties: Thousands
- Infrastructure Damage: Minimal, except contamination
- Evacuations/Displaced Persons: 25,000 in affected area will seek shelter in safe areas (decontamination required for all before entering shelters)
- Shelter-in-place Persons: Up to 10,000 may require shelter-in-place
- If this event occurs within New York City, over 100,000 people will likely selfevacuate to and through Westchester County, potentially bringing contamination to the County
- Contamination: Extensive, depending on dispersal method
- Economic Impact: Billions of dollars
- Potential for Multiple Events
- Recovery Timeline: Months

Anthrax spores delivered by aerosol delivery results in inhalation of anthrax which develops when the bacterial organism bacillus anthracis is inhaled into the lungs. A progressive infection follows. This scenario describes a single aerosol anthrax attack in one city using a concealed improvised spraying device in a densely populated area, such as Yonkers or New York City. It does not, however, exclude the possibility of multiple attacks in disparate cities or time-phased attacks.

It is possible that a Bio-Watch signal would be received and processed, but this is not likely to occur until the day after the release. The first cases of anthrax would begin to present to Emergency Rooms approximately 36 hours post-release, with rapid progression of symptoms and fatalities in untreated patients. The situation in the hospitals could be complicated by factors such as a release occurring at the beginning of an unusually early influenza season and the prodromal symptoms of inhalation anthrax are relatively non-specific. Physician uncertainty will result in low thresholds for admission and administration of available countermeasures (e.g., antibiotics), producing severe strains on commercially available supplies of such medications as ciprofloxacin and doxycycline, and exacerbating the surge capacity problem.

It will be necessary to monitor attack impact, determine resource needs, classify the type of event, and identify other events (if any). Environmental sampling for exposure risk assessment, identification of anthrax strain, and determination of any drug resistance will also be required. Management and response will require public alerts, mobilization of the Strategic National Stockpile, activation of treatment sites, traffic/access control, special population protection, protective measures (e.g., shelter-in-place), requests for resources and assistance, and public information activities.

Current analysis of existing resources of Personal Protective Equipment (PPE) for WCES and EMS organization personnel reveals that this scenario would result in an extremely high casualty rate for emergency response personnel, as the overwhelming response from interviewees reveals a lack of PPE and related training.

Evacuation and treatment of victims will be required. There will be an immediate need to coordinate efforts to provide warnings to the population-at-large and the population-at-risk, to notify people to shelter-in-place and/or evacuate. Care to the ill must be provided and should include disbursing PEP/vaccinations and establishing treatment/distribution centers.

Extensive decontamination and cleanup will be required, as anthrax is long-lived in the environment, costing billions of dollars. Remediation will also require environmental testing, highly contaminated area closures, and public information provision. This attack could result in hundreds of thousands of exposures; thousands of untreated fatalities; and tens of thousands of other casualties. Although property damage will be minimal, city services will be hampered by safety concerns. The costs of the closure of a large section of the city and the decrease in revenue from economic activity for an indeterminate period would be enormous, as would the costs of remediation and decontamination.

## Scenario 3: Biological Attack – Plague

- Casualties: Hundreds of fatalities, thousands of illnesses
- Infrastructure Damage: None
- Evacuations/Displaced Persons: No evacuation required; shelter-in-place or quarantine given to certain highly affected areas; possible large-scale self-evacuation from affected communities, particularly if the event occurs in New York City
- Contamination: Lasts for hours
- Economic Impact: Millions of dollars
- Potential for Multiple Events
- Recovery Timeline: Weeks

Plague is a bacterium that causes high mortality in untreated cases and has epidemic potential. Although the release may occur only in a neighboring city or state, rapid dissemination to distant locations through foreign and domestic travel is possible in this scenario. Following a release in the environment, plague may become established within animal populations (e.g., rats), which then pose a risk of ongoing exposure to humans through bites of arthropod vectors (fleas). Plague cases rapidly occur in the United States and Canada. As a result of foreign and domestic travel, rapid dissemination to distant locations occurs. By Day 3, the plague may spread across both the Pacific and Atlantic oceans and by Day 4, the plague may be found in many other countries. Although health professionals should rapidly recognize the seriousness of the incident, diagnosis of the plague may be delayed. Detection of the plague should initiate laboratory identification of the strain and a determination of the potentially known antimicrobial drug resistance. Origin of the initial contaminant should be traced back to the source.

Identification of drug-resistant plague strains would require full utilization of personal protective equipment (PPE) and quarantine measures. Response will require provision of public alerts, mobilization of the National Strategic Stockpile, activation of treatment sites, traffic and access control, protection of special populations, potential quarantine measures including shelter-in-place recommendations, requests for resources and assistance, and public information activities. Victims must receive antibiotic therapy within 24 hours to prevent fatality. Exposed victims must be isolated and minimizing disease spread will require epidemiological assessments, including contact investigation and notification. Evacuation and treatment of some victims will be required. Self quarantine through shelter-in-place may be instituted. Victims will require treatment or prophylaxis with ventilators and antibiotics, as well as information measures for preventing spread of the disease. Advanced medical care will be required for those with pneumonia. Extensive decontamination and cleanup will not be necessary because plague cannot live long in the environment and is not viable when exposed to heat and sunlight. However, some efforts would be undertaken to support political/public confidence.

The total number of illnesses at the end of seven to ten days may exceed ten thousand. The total number of fatalities may be in the hundreds. Assumptions affecting these figures include length of incubation period following primary exposure, rate of secondary transmission, incubation period following secondary exposure, and timing and effectiveness of the intervention such as respiratory precautions and antimicrobial treatment. Although the actual physical damage to property will be negligible, there will be an associated negative impact of buildings and areas that were or could have been contaminated. Service disruption will be significant for call centers, pharmacies, and hospitals due to overwhelming casualty needs. It will be necessary to close or restrict certain transportation modes. The threat of reduced food supply will cause food prices to rise. Many people will be killed, permanently disabled, or sick as a result of the plague. The primary illness will be pneumonia, although the plague can also cause septicemia, circulatory complications, and other manifestations.

## Scenario 4: Chemical Incident – Toxic Industrial Chemicals (TIC)

- Casualties: Hundreds of fatalities possible, 1,000 hospitalizations possible
- Infrastructure Damage: Limited
- Evacuations/Displaced Persons: 10,000 evacuated; tens of thousands may need to temporarily shelter in place as plume moves across region; possible large-scale self-evacuation from affected communities, particularly if the event occurs in New York City
- Contamination: Yes
- Economic Impact: Billions of dollars

- Potential for Multiple Events
- Recovery Timeline: Months

An accidental or intentional release of toxic industrial chemicals may result in large casualty numbers, depending on the location of the incident, the chemical(s) involved, and the amounts involved. Casualties may occur at the scene due to explosion, fire, or other chemical reactions and etiology related to liquid or vapor exposure to the toxic industrial chemical. Downwind casualties will likely occur due to vapor exposure. Fires resulting from such an incident could take many hours, possibly days, to extinguish.

Actions required include alerts, activation and notification, traffic and access control, protection of special populations, resource support and requests for assistance, and public information activities. Multiple chemicals and the potential for secondary device concerns may complicate response measures if the event is intentional. Actions required include isolating and defining the hazard; establishing, planning, and operating incident command; firefighting; performing bomb disposal dispatch and IED render-safe procedures; preserving the scene; conducting mitigation efforts; decontaminating responders; and performing site remediation and monitoring. Evacuation/sheltering/protection of downwind populations will be required. Injuries to be treated will include trauma, burns, smoke inhalation, severe respiratory distress, seizures, and/or comas. Short- and long-term treatment will be required as well as decontamination.

The extent of decontamination required will depend on the chemicals involved. Regardless, monitoring and sampling for the geographic challenges of Westchester County with its waterways and major transportation routes will be a challenge. Site restoration will be a major challenge if the incident involves a chemical production or storage facility. Environmental impact issues are likely to significantly delay rebuilding efforts. Thousands of people may be in the actual downwind area, and of these (and depending on the chemicals), many may receive lethal exposures, and many may die before or during treatment. An additional significant number will require hospitalization, and the remainder will be treated and released at the scene by EMS personnel. However, tens of thousands of "worried well" may seek treatment at local medical facilities.

Depending on which chemicals are released, there may be significant property damage in the downwind area. Waterways may temporarily close due to contamination. Some public transportation and other facilities may be lost. Overwhelming demand will disrupt communications (landline telephone and cellular) in the local area. Significant disruptions in health care occur due to the overwhelming demand of the injured and the "worried well." Authorities will need to verify portability of the water supply.

In addition to their toxic effects, many toxic industrial chemicals are known carcinogens. Long-term damage to internal organs and eyes is possible, depending on which TICs are present.

## Scenario 5: Chemical Attack – Nerve Agent

- Casualties: Thousands possible, thousands of hospitalizations possible
- Infrastructure Damage: Limited, other than contamination
- Evacuations/Displaced Persons: Tens of thousands may need to temporarily shelter in place; possible large-scale self-evacuation from affected communities, particularly if the event occurs in New York City
- Contamination: Extensive
- Economic Impact: Hundreds of millions of dollars
- Potential for Multiple Events
- Recovery Timeline: Months

Sarin is a human-made chemical warfare agent classified as a nerve agent. Nerve agents are the most toxic and rapidly acting of the known chemical warfare agents and are similar to organophosphate pesticides, in terms of how they work and the nature of harmful effects they cause. If deployed in an enclosed space such as an office building or transportation depot, it may kill most of occupants in the buildings, and may kill or sicken many of the first responders. In addition, some of the agent exits through ventilation ports, creating a downwind hazard.

Rapid recognition of an attack will be key to avoiding first responder casualties. Actions required include dispatch; agent detection; and hazard assessment, prediction, monitoring, and sampling; alerts, activation and notification, traffic and access control, protection of special populations, resource support and requests for assistance, and public information activities; isolating and defining the hazard; establishing, planning, and operating incident command; preserving the scene; conducting mitigation efforts; decontaminating responders, and conducting site remediation and monitoring. Evacuation and/or sheltering of downwind populations will be required. Tens of thousands of persons may require monitoring and decontamination as they are allowed to leave their buildings. Hundreds may require hospital treatment.

Anything exposed to a high-vapor agent concentration will require decontamination, including bodies. There will be little damage to the structures as a direct result of the attack. However, decontamination of some materials may be difficult or impossible. Even if structures and property could be technically decontaminated, the psychological impact on future usability would be significant. Fatality percentages of exposed persons will potentially be high. Patients who experience prolonged seizures may sustain permanent damage to the central nervous system. Fatalities and major injuries will occur due to falling and crushing during the panic. Little direct damage due to the attack, except the structures interiors and

contents, will be highly contaminated by agent condensing on surfaces. Buildings will likely be a total loss due to decontamination measures and/or psychological impacts of future usability. However, airing and washing should decontaminate adjacent structures adequately.

Overwhelming demand will disrupt communications (landline telephone and cellular) in the local area. There will be large numbers of "worried well" swamping the medical system – past experience indicates that 20 to 100 times the number of actual victims may seek medical care. Loss of fire and EMS personnel will impact readiness for other events in the short term. Decontamination, destruction, disposal, and replacement of structures could cost tens or hundreds of millions of dollars. Business in the structures may never reopen, and an overall national economic downturn is possible in the wake of the attack due to loss of consumer confidence.

Those who survive usually recover within 4 to 6 weeks, with full cholinesterase level restoration within 3 to 4 months. Patients who experience prolonged seizures may sustain permanent damage to the central nervous system.

## Scenario 6: Major Hurricane

- Casualties: Thousands of fatalities possible, thousands of hospitalizations possible
- Infrastructure Damage: Buildings destroyed, large amounts of debris
- Evacuations/Displaced Persons: Tens of thousands evacuated, thousands may seek shelter in safe areas away from waterways, tens of thousands of displaced persons possible. Tens of thousands of people from New York City will also seek shelter in Westchester County.
- Contamination: Possible, from hazardous materials storage sites
- Economic Impact: Billions of dollars
- Recovery Timeline: Months to years

If a hurricane approaches the Westchester County area or the New York City area in general, there will be an enormous impact on WCES and the EMS organizations that serve Westchester County. As the storm moves closer to land, massive evacuations will be required, with a need for WCES to assist with the evacuation of special needs populations, especially from the areas close to the Hudson River or Long Island Sound. Certain low-lying escape routes will be inundated by water up to 5 hours before the eye of the hurricane reaches land. The rain associated with the storm will cause rivers to overflow their banks, and several rivers systems will experience record flood levels. Assessment is required for infrastructure, rapid needs, search and rescue, health and medical, and navigation. Remote sensing and modeling may help determine the extent of the damages. Some of the response actions require include search and rescue operations, mortuary services and victim identification, medical system support, debris clearance and management, temporary emer-

gency power, transportation infrastructure support, infrastructure restoration, and rary roofing.

State and local planners and managers will have time to execute evacuation plans. Roads leading from densely populated areas such as Yonkers and New York City will be overwhelmed, and massive traffic jams will hinder the evacuation efforts. Measures will need to be taken to provide for temporary shelter and interim housing for the exodus of people from New York City. Permanent housing support may also be required. Care must include medical assistance; shelter and temporary housing assistance; emergency food, water, and ice provision; and sanitary facility provision. Hazardous materials may contaminate many areas, and decontamination and site restoration could be a major challenge.

Major portions of New York City and the waterside Westchester County will become flooded. Structures in the low-lying areas are inundated when storm surges reach their peak. Many older facilities suffer structural collapse due to the swift influx of water and degradation of the supporting structural base. Newer facilities and structures survive the influx of water, but sustain heavy damage to contents on the lower levels. Most all shrubbery and trees within the storm's path are damaged or destroyed, generating massive amounts of debris. Debris is also generated from structures destroyed from tornadoes and structures that have been destroyed or damaged by the hurricane. Many structures will need to be demolished.

Service disruptions will be numerous. Shelters throughout the region will fill to capacity. Hundreds of people may be trapped and require search and rescue. Until debris is cleared, rescue operations are difficult because much of the area is reachable only by helicopters and boats. Wind and downed trees will likely damage nearly all of the electric transmission lines in close proximity of the land fall site. Most communications systems will fail within the impacted area, often due to damage and lack of power. Thousands will become homeless, and all areas will be in serious need of drinking water. Food will be in short supply and will spoil due to lack of refrigeration. Sewage treatment plants in the region may flood and sustain damage from the storm. Many businesses will experience damage to buildings and infrastructure as well as lost employees and customers.

Many hospitals may sustain severe damage and those that remain open will be overwhelmed. Schools that are not severely damaged will likely be used as shelters for the disaster victims. Thousands of pets, domesticated animals, and wild animals will be killed or injured, and officials will be overwhelmed with requests for assistance in finding lost pets.

## Scenario 7: Radiological Attack

- Casualties: Scores to hundreds of fatalities possible, thousands of hospitalizations possible (most of whom will be "worried well")
- Infrastructure Damage: Limited, except contamination
- Evacuations/Displaced Persons: Tens of thousands evacuated, thousands may seek shelter in safe areas away from the incident, tens of thousands of displaced persons possible. Tens of thousands of people from New York City will also seek shelter in Westchester County if the incident occurs in New York City.
- Contamination: Extensive radiological contamination
- Economic Impact: Billions of dollars
- Recovery Timeline: Months to years
- Potential for multiple events

Variable winds of 3 to 8 miles per hour will carry a radioactively contaminated aerosol throughout an area of many city blocks. Complex urban wind patterns can carry the contamination in unpredictable directions, leaving highly variable contamination deposition with numerous hot spots created by wind eddies and vortices. Using a scenario of common Cesium 137 as the model, radioactivity concentrations in this zone may be 5-50 microcuries/m2, with hot spots measuring 100-500 microcuries/m2; however, traces of the plume may carry more than 2 miles on prevailing winds. Negative indoor building pressure may draw radioactive aerosols into buildings via cracks around windows and doors. Exterior air intakes will increase the contamination in the interior of larger buildings.

The attacks will likely have no advance notice. The explosion will be instantaneous, but plume dispersion is possible for many minutes to hours while winds navigate the complex environments before particles have fully settled. First responders in Westchester County will likely not recognize the radioactive contamination for an extended period of time, as radioactive monitoring and detection capability has been found to be very lacking. First responders are likely to be contaminated. The downwind aerosol dispersion will be a significant component of the hazard. Assessment and coordination efforts required are numerous. Actions required include mobilizing and operating incident command; overseeing victim triage; stabilizing the site; cordoning the site and managing and controlling the perimeter; providing notification and activation of special teams; providing traffic and access control; providing protection of at-risk and special populations; providing direction and control of critical infrastructure mitigation; and providing public information, outreach, and communication activities.

Actions required include isolating the incident scene and defining the hazard areas, building stabilization, providing fire suppression, conducting debris management and radioactive and hazardous contamination mitigation, decontaminating responders and equipment as well as local citizens, and conducting local site contamination control. Sheltering and/or evacuation

of downwind populations will be required and must occur quickly. Injured people will require some decontamination in the course of medical treatment and, if possible, prior to hospital admission. Thousands more will likely need superficial decontamination, and both shortterm and long-term medical follow-ups.

The extent of contamination will be a major challenge. In the case of Cesium 137, it is highly water-soluble and is chemically reactive with a wide variety of materials, including common building materials such as concrete and stone. Several buildings (those most damaged) will be torn down and eventually rebuilt. Decontamination activities are required to be undertaken for building exteriors and interiors, streets, sidewalks, and other areas.

The blast may result in scores of fatalities and hundreds of injured requiring medical care. In addition, thousands of individuals in each primary deposition zone will potentially have detectable superficial radioactive contamination. Over the long term, decontamination efforts are expected to be effective, but some property owners will often choose demolition and rebuilding. Many square blocks will be unavailable to businesses and residents for several years until remediation is completed. Transportation will be severely hampered. Bus, rail, and air transport routes will have to be altered, and officials will have to build highway checkpoints to monitor incoming traffic for contamination. Hospitals will face unfathomable numbers of "worried well."

In the long term, very few, if any, will suffer acute radiation syndrome, but thousands of individuals are likely to become externally contaminated at such an event. Low-level contamination may enter food and water supplies. The sum of the cumulative exposures results in an increased lifetime cancer risk proportionate to the dose. Mental health services will be required.

## Scenario 8: Explosives Attack – Bombings using Improvised Explosive Devices (IED)

- Casualties: Scores to hundreds of fatalities possible, hundreds of hospitalizations possible
- Infrastructure Damage: Structures affected by blast and fire
- Evacuations/Displaced Persons: Evacuation of immediate area around explosion(s), resulting in potential for hundreds seeking shelter in safe areas
- Contamination: None
- Economic Impact: Millions of dollars
- Recovery Timeline: Days to Months
- Potential for multiple events

The use of Improvised Explosive Devices (IEDs) is still the number one choice of terrorists due to their low cost, ease of access, and immediate impact. High profile and densely populated targets are likely to be preferred for attack. Suicide bombers or attackers using vehicle-borne IEDs (VBIEDs) strategically located at mass gatherings or high profile locations, with secondary targets of hospital receivers or first responders can cause significant

fatalities, injuries, confusion, and disruption to society and services. The impact of such an incident would be expected to produce casualties primary blast, collapse, secondary and tertiary blast effects, increased exposure to products of combustion, thermal effects, and crowd surge.

During and immediately after an attack of this nature, actions required include dispatch; agent detection; and hazard assessment, prediction, monitoring, and sampling. After area safe-rendering, actions required include search and rescue, alerts, activation and notification, traffic and access control, protection of special populations, resource support, requests for assistance, and public information. Primary hazards include fire; toxic atmosphere/smoke; un-detonated explosives; unstable structures; electrical hazards; and low visibility. Hospital personnel must ensure that arriving vehicles are not delivery systems for additional weapons. Evacuation is required as well as additional threat assessment. The area(s) must be cordoned. Injuries range from "walking wounded" to multiple systems trauma, burns, and obvious fatalities. Decontamination may be required for debris and remains at all sites and appropriate removal and disposal after evidence search and recovery. Casualties may include civilians and emergency personnel, and must be triaged for effective treatment and hospital transportation destination decisions. Service disruption may be severe may also include traffic, public transportation, emergency services, and hospitals. Major health issues include severe burn treatment and therapy for the victims; permanent hearing loss; long-term tinnitus; vertigo for some exposed to the blast; and post-traumatic stress for victims, first responders, and bystanders.

## **Comprehensive and Multi-Agency Disaster Response Training**

Because the individual EMS organizations and WCES will play an integral role in mass casualty and disaster response, and because they are tasked with protecting the public's health during such events, training for such events is of paramount importance. WCES should maintain the lead role in identifying relevant and cost-effective training programs that will prepare personnel within the EMS system for these events.

## **Recommendation:**

• WCES should maintain the lead role in identifying relevant and cost-effective training programs that will prepare personnel within the EMS system for these events.

WCES leadership should take guidance from the U.S. Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) Training and Exercise Integration Division (TEI) during preparation and maintenance of an all-hazards training program. TEI provides tailored training to enhance the capacity of local jurisdictions to respond safely and effectively to incidents of natural disaster and terrorism, including incidents involving chemical, biological, radiological, nuclear, and explosive weapons. Much of this training is

available to both WCES and members of the EMS community at no direct cost. In addition to the direct delivery courses, consideration should also be given to the alternative training delivery mediums that may make more fiscal sense for the County (also provided by TEI training partners) such as train-the-trainer, computer-based training, web-based training, and video teleconferencing. TEI training programs are consistent with nationally recognized standards and adult learning principles that will benefit all public safety personnel in the EMS system.

At a minimum, it is recommended that **all EMS personnel**, from all EMS organizations in the County, who may potentially respond to a large-scale or mass casualty incident, maintain the following training:

- WMD/Terrorism Awareness<sup>24</sup>
- Hazardous Materials First Responder: Awareness<sup>25</sup> •
- Hazardous Materials First Responder: Operations<sup>26</sup> •
- IS-700 NIMS: An Introduction<sup>27</sup>
- ICS-100 Introduction to Incident Command System<sup>5</sup>

In addition to the above training, first line supervisors for WCES and the EMS organizations should also complete the following training:

ICS-200 ICS for Single Resources and Initial Action Incidents<sup>5</sup>,<sup>28</sup>

In addition to the above training, **middle management** should also complete the following training:

ICS-300 Intermediate ICS for Expanding Incidents<sup>5</sup> ٠

In addition to the above training, senior management and middle managers who may function as Command and General Staff during an incident for WCES and the individual EMS organizations should also complete the following training:

ICS-400 Advanced ICS Command and General Staff for Complex Incidents<sup>5</sup>

<sup>&</sup>lt;sup>24</sup> Examples include TEI courses AWR-160, AWR-110; FEMA/NFA courses Emergency Response to Terrorism: Self Study, Emergency Response to Terrorism: Awareness.

<sup>&</sup>lt;sup>25</sup> This training should be compliant with the National Fire Protection Association (NFPA) 472 standard. Certain WMD/Terrorism Awareness training courses may meet the standards and training requirements for Hazardous Materials First Responder: Awareness (i.e. TEI course AWR-110 and the soon-to-be released updated AWR-160) <sup>26</sup> This training should be compliant with NFPA 472. TEI course PER-212 meets this standard. Also, NFPA 472 (2008) now recommends that all emergency responders meet the Haz Mat Operations level requirements

<sup>&</sup>lt;sup>27</sup> Mandatory for NIMS compliance

<sup>&</sup>lt;sup>28</sup> All interviewed organizations indicate that their members have completed ICS 100 and 200 for all personnel, but training records could not be confirmed.

## **Recommendation**:

- All EMS personnel, from all EMS organizations in the County, who may potentially respond to a large-scale or mass casualty incident, maintain the following training: WMD/Terrorism Awareness, Hazardous Materials First Responder: Awareness, Hazardous Materials First Responder: Operations, IS-700 NIMS: An Introduction, ICS-100 Introduction to Incident Command System.
- First line supervisors for WCES and the EMS organizations should complete ICS-200 ICS for Single Resources and Initial Action Incidents.
- Middle management should complete ICS-300 Intermediate ICS for Expanding Incidents.
- Senior management and middle managers who may function as Command and General Staff during an incident for WCES and the individual EMS organizations should complete ICS-400 Advanced ICS Command and General Staff for Complex Incidents.

The above listed training is critical for immediate implementation for the EMS system. The other critical component of the recommended training program is training for appropriate selection, maintenance, donning and doffing Personnel Protective Equipment (PPE). Additional training opportunities that will also benefit emergency response personnel for WCES and the individual EMS organizations in order to better prepare them to respond to significant incidents include the following:

- FEMA NFA R152: Emergency Medical Services Special Operations
- FEMA NFA R154: Advanced Safety Operations and Management
- FEMA NFA R229: Hazardous Materials Operating Site Practices
- FEMA NFA R243: Hazardous Materials Incident Management
- FEMA NFA R247: ALS Response to Hazardous Materials Incidents
- FEMA EMI B301: Radiological Emergency Response Operations
- FEMA EMI B302: Advanced Radiological Incident Operations
- FEMA CSEPP: Agent Characteristics and Toxicity First Aid and Special Treatment (ACTFAST)
- FEMA CSEPP: Management of Chemical Warfare Injuries
- TEEX AWR-111: EMS for WMD: Basic Concepts (Internet)
- TEEX PER-211: EMS Operations and Planning for WMD Incidents
- LSU PER-220: Emergency Response to Domestic Biological Incidents
- DOE REAC/TS: Health Physics in Radiation Accidents
- AFRRI/USUHS: Medical Effects of Ionizing Radiation
- USAMRICD/USAMRIID: Medical Management of Chemical and Biological Casualties

For the senior leadership of Westchester County, WCES, and the individual EMS organizations, the following courses are also highly recommended as supplemental training:

- TEEX MGT-312: Senior Officials Workshop Preparedness and Response for Terrorist Incidents Involving WMD
- FEMA EMI IS-15: Special Events Contingency Planning for Public Safety Agencies
- FEMA EMI E408: Terrorism Planning for Local Governments

# **Training Records**

It was our intent to obtain a comprehensive list of all "WMD related certifications" as requested by WCES so that they could gain a planning and operational perspective of WMD response capabilities of the EMS organizations and EMS personnel in the County. During the data collection process, it became clear that obtaining such an inventory would not be possible within the scope and nature of this project. There are several factors that will make it challenging for WCES to oversee this important data set and track personnel preparedness training:

- Varied level of effort by individual EMS organizations to coordinate, track, document, and verify training, including multiple organizations that have no such training records.
- EMS providers who work/volunteer for multiple organizations will skew the training data being tracked unless there is a central training data repository and an individual who tracks the data to ensure valid information and ensures that there is no duplication.
- There is WMD related coursework that is not approved by DHS or the state of New York, but may still have validity in capacity building efforts. It is difficult to track all of these different courses (there are over 900 courses currently in the federal compendium of training alone).
- While many courses offer certificates of completion, others offer actual certifications. While many of these courses do not have "expiration dates," many do have recommended renewal or refresher requirements. In addition to simply tracking which courses have been completed, expiration and refresher completions should be monitored and tracked as well.

# Adequate Equipment for Safe and Effective Response to Events

One of the current greatest challenges to any EMS system is maintaining the capability to safely respond to an incident involving chemical, biological, or radiological agents. In order for EMS responders to care for the casualties of such an event, they first need to ensure their own safety by having the right PPE for the given situation. This requires not only that EMS system agencies purchase the equipment, but also that they: 1) maintain it; 2) ensure its usefulness and readiness; 3) train personnel on appropriate use; 4) and ensure that it is available for personnel upon the immediate need for it.

WCES has ensured that all of the EMS agencies in the County are provided with, at a minimum, Level C PPE at all times. This is appropriate for the need and the threat. However, the equipment is issued to EMS units and not personnel individually. Universally during the data collection process, EMS personnel described the fact that they have access to the "backpacks" (kits that each contain a level C ensemble) while on duty. However, it appears as though there is no fit testing program in place that would comply with the requirements of the current Occupational Safety and Health Administration (OSHA) Respiratory Protection Regulation (29 CFR 1910.134). The challenge for WCES is to not only deploy the equipment, but also to provide the necessary training and respiratory protection program, including maintenance and suitability (fit testing program that ensures the equipment will work when it is needed). This will come at a significant expense. In order to meet the requirements of the regulation, each member who is expected to wear the equipment would need to be issued their own individual mask that is annually certified to fit the responder. WCES is recommended to further demonstrate their commitment to EMS personnel safety by issuing the equipment and better clarifying who is expected to be capable of wearing the equipment and in which circumstances the providers are expected to deploy the equipment. There is clearly a lack of training that is needed to accompany the issued equipment. This commitment can be verified in either of two ways:

- 1. The EMS organizations can be required to provide documentation verifying that all personnel have been issued Level C PPE, trained on its use, and certified (annual fit testing) to the Respiratory Protection Regulation; or
- 2. WCES can mandate that all certified EMS personnel comply with PPE requirements by response personnel participating in a respiratory protection program (possibly for a cost-recovery fee) managed by the County. Under this scenario, EMS personnel would be issued by WCES and participate in training and respiratory protection testing managed by WCES. This is likely the only way to fully ensure that all EMS personnel have standardized PPE and the appropriate training, but it leaves unanswered questions as to how such a program would be funded.

## **Recommendation**:

• WCES should further demonstrate commitment to EMS personnel safety by issuing the equipment and better clarifying who is expected to be capable of wearing the equipment and in which circumstances the providers are expected to deploy the equipment.

## Comprehensive Exercise Program

Personnel from nearly every EMS organization have indicated that exercises are currently a weak link in their preparedness activities in Westchester County. In the words of one midlevel manager, "We don't do a lot." There are attempts to conduct an in-house drill, but these efforts are not consistent with a comprehensive overall exercise management program or the current threat environment. There is a bi-annual airport mass casualty drill, but it appears that there is little coordination during the planning process for these exercises, and the exercises that are conducted are not on a large-scale consistent with the threats that Westchester County now faces. WCES has a responsibility and opportunity to further its preparedness activities. This may also present as an opportunity to catalyze the other emergency response agencies into planning and exercising, which will further relationships in the emergency response community.

Not only is it important for personnel to be adequately trained and equipped to respond to large-scale events, but it is also critical for personnel to exercise their response capabilities. Exercise plays a crucial role in the County's preparedness. They provide opportunities for response personnel, leadership, and the emergency management community to practice and assess their collective capabilities. Exercises will afford WCES, the individual EMS organizations, and other emergency response agencies, from first responders to senior officials, to train and practice preparedness, response and recovery capabilities in a risk-free environment.

Exercises will also prove to be a valuable tool for assessing and improving performance, while demonstrating community resolve to prepare for large-scale incidents. This is the only true mechanism (other than real incidents) for the County to gain objective assessments of their capabilities so that gaps, deficiencies, and vulnerabilities are identified and addressed prior to a real incident. Well-designed and executed exercises are the most effective means of:

- 1. Testing and validating policies, plans, procedures, training, equipment, and interagency agreements;
- 2. Clarifying personnel roles and responsibilities;
- 3. Improving interagency coordination and communications;
- 4. Identifying gaps in resources;
- 5. Improving individual personnel performance; and
- 6. Identifying opportunities for improvement.

In accordance with Homeland Security Presidential Directive 8 (HSPD-8) and the National Preparedness Goal, WCES and its emergency response organizations and partners are strongly encouraged to utilize a capabilities-based approach to exercises and comprehensive exercise program management.

Guidance set forth by DHS in the Homeland Security Exercise and Evaluation Program (HSEEP)<sup>29</sup> should be the model followed by the County. The purpose of the HSEEP is to provide common exercise policy and program guidance that sets the national standard for Homeland Security exercises. HSEEP includes consistent terminology that can be used by not only all of the County resources, but also regional organizations, neighboring jurisdictions, and the rest of the emergency management community exercise planners.

The volumes of HSEEP also provide tools to help exercise managers plan, conduct, and evaluate exercises to improve overall preparedness to respond to large-scale events. The HSEEP will also assist WCES and the EMS organizations to integrate language and concepts from NIMS, the National Response Framework (NRF), the National Preparedness Goal, the Universal Task List (UTL), the Target Capabilities List (TCL), existing exercise programs, and response protocols. In the spirit of NIMS, all efforts should be made to ensure consistent use of the terminology and processes described in HSEEP during exercise planning activities.<sup>30</sup>

## **Recommendation:**

• WCES, the individual EMS organizations, and other emergency response agencies, from first responders to senior officials, should expand the frequency and diversity of exercises to train and practice preparedness, response, and recovery capabilities in a risk-free environment.

## Mutual Aid Agreements and Memorandums of Agreement/Understanding

WCES is encouraged to further codify understandings and relationships with other municipal response agencies, hospitals, private EMS resources, and the private organizations that will be needed during response to a large-scale incident, especially across state lines with their counterparts in Connecticut. The needs of Westchester County to manage an incident will be determined upon conducting the hazard vulnerability, threat, and risk assessment during the planning process. As part of the planning process, agreements that are already in place need to be reviewed for currency, accuracy, and relevancy. Entities that are identified as needed resource providers should be identified and worked with to develop strong written mutual aid agreements to support the County's response efforts during an emergency. As WCES evaluates and develops these agreements, the following goals and purposes should be the focus:

 <sup>&</sup>lt;sup>29</sup> Homeland Security Exercise and Evaluation Program (HSEEP). 2006, US Department of Homeland Security.
<sup>30</sup> For more information and sample exercise documents, utilize the HSEEP website: http://hseep.dhs.gov

- *Planning coordination* ensure that agreements complement regional and state planning for large-scale incidents that will have consequences that extend beyond Westchester County.
- *Maximum resource availability* ensure that agreements will result in the resources required for response to large-scale events.
- *Timely arrival* ensure that agreements avoid procedural impediments that will delay the arrival of resources.
- Specialized resources ensure that agreements meet the demands of events involving mass casualties or Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) agents, as these events will necessitate unique and definitive resources.
- *Minimal administrative conflict and liability exposure* ensure that agreements address liability, reimbursement, and other administrative matters to eliminate confusion during an event.

WCES should continue to consider, at a minimum, the following functional areas during mutual aid and service agreement development and review: <sup>31</sup>

- Animals/Veterinary Services
- Administrative Support
- Continuity of Operations
- Coroner/Mortuary Services
- Building Inspectors and Engineers
- Damage Assessment
- Technical Decontamination
- Evacuation
- Transportation/Buses
- Infrastructure Restoration

- WMD Civil Support Team
- Security
- Logistical Support
- Mass Care Shelters
- Military Support
- Alternative Medical Care Sites
- Private Sector Support
- Communications Support
- Schools
- Search and Rescue

#### **Recommendation:**

 WCES is encouraged to further codify understandings and relationships with other municipal response agencies, hospitals, private EMS resources, and the private organizations that will be needed during response to a large-scale incident, especially across state lines with their counterparts in Connecticut.

<sup>&</sup>lt;sup>31</sup> This list is not intended to be all-inclusive.

# Interoperable Communications and Regional Interoperable Strategic Planning

In the DHS Urban Area Security Initiative (UASI), The New York City Urban Area (NYCUA), which includes Westchester County, was recently assessed by DHS for their tactical interoperable communications capabilities. All 75 of the Urban Areas across the country were assessed and DHS released their nationwide findings in the *Tactical Interoperable Communications Scorecard*.<sup>32</sup> This report indicates that the NYCUA has made significant accomplishments in improving their interoperability communications capability. After interviewing personnel from Westchester County, our conclusions are consistent with the Scorecard findings.

The Governance recommendations from the *Scorecard* are:

- Ensure that all applicable local agencies are documented and referenced in agreements (e.g., memoranda of understanding, inter-governmental agreements) at a regional level
- Reference all applicable agreements in the Tactical Interoperable Communications Plan (TICP), and store them in an accessible format
- Develop, document, and implement a region wide strategic plan (beyond the operational focus to the TICP) with participant approval, adoption, and acceptance that takes into account a long-term communications funding strategy (in addition to grants)
- Align local and state strategic planning efforts to ensure that regional interoperability needs are met
- Develop a funding strategy for identifying sustainable funding sources (in addition to grants) to cover lifecycle and recurring costs of the UA's communications interoperability assets
- Encourage broader involvement by senior government leadership from across the area on interoperability funding and procurement plans <sup>33</sup>

The Standard Operating Procedures (SOPs) recommendations from the *Scorecard* are:

- Continue to distribute updated regional communications interoperability SOPs (e.g., document demonstrated exercise procedures not originally included in the TICP)
- Develop training policies and requirements for inclusion in the TICP
- Ensure that the same command structure is used throughout the area (e.g., ensure CIMS and NIMS are consistently applied and practiced across the area)

<sup>&</sup>lt;sup>32</sup> Tactical Interoperable Communications Scorecard. 2007, U.S. Department of Homeland Security.

<sup>&</sup>lt;sup>33</sup> *Tactical Interoperable Communications Scorecard*. 2007, U.S. Department of Homeland Security.

 Continue basic and advanced training and exercises on SOPs (include communications unit implementation consistent with the TICP) to ensure that all participating first responder agencies attain and maintain NIMS/ICS compliance<sup>34</sup>

The Usage recommendations from the *Scorecard* are:

- Conduct robust exercises to test interoperable communications capabilities (e.g., more complexity, additional local, regional, state, and federal agencies)
- Consider adding interoperable communications as an evaluation component for all future exercises and day-to-day activities<sup>35</sup>

## National Incident Management System (NIMS) Compliance

Westchester County and surrounding jurisdictions have been steadily meeting the objectives of NIMS in order to build a consistent operational framework for incidents of any scope or magnitude. NIMCAST is the preferred tool for use by states and local jurisdictions to assess NIMS compliance, and WCES and WCOEM is encouraged to continue to utilize this effective tool. Other independently developed electronic tools may be used for this purpose, as long as those tools are able to replicate the same questions and metrics that NIMCAST will assess.

The FY07 and FY08 NIMS requirements have been listed here to reflect the transition from the self-certification process of past years to specific performance-based metrics (see list below). The requirements listed below describe the necessary actions for Westchester County to be compliant with NIMS in FY08 (Must be completed and documented prior to September 30, 2008).<sup>36</sup>

- Designate a single point of contact within the agency (1 WCES, 1 for each EMS Organization) and within the County to serve as the principle coordinator for NIMS implementation.
- Manage all emergency incidents, preplanned (recurring/special) events, and exercises in accordance with ICS organizational structure, doctrine, and procedures, as defined by NIMS. ICS implementation must include the consistent application of Incident Action Planning (IAP) and Common Communications Plans (CCP), as appropriate.
- Coordinate and support emergency incident and event management through the development and use of integrated multi-agency coordination systems (i.e. Incident Command Posts, 9-1-1 Center, Emergency Operations Centers) for large-scale emergency incidents, preplanned events, and exercises.

<sup>&</sup>lt;sup>34</sup> *Tactical Interoperable Communications Scorecard.* 2007, U.S. Department of Homeland Security.

<sup>&</sup>lt;sup>35</sup> *Tactical Interoperable Communications Scorecard*. 2007, U.S. Department of Homeland Security.

<sup>&</sup>lt;sup>36</sup> FY 2008 NIMS Compliance Objectives and Metrics for Local Governments. 2008 FEMA NIMS Integration Center.

- Implement processes, procedures, and/or plans to communicate timely, accurate information to the public during an incident through a Joint Information System (JIS) and Joint Information Center (JIC). Ensure that the Public Information System can gather, verify, coordinate, and disseminate information during an incident and exercises.
- Revise and update plans and SOPs to incorporate NIMS components, principles, and policies, to include planning, training, response, exercises, equipment, evaluation, and corrective actions.
- Participate in and promote intrastate and interagency mutual aid agreements (to include agreements with private sector and non-governmental organizations).
- Complete NIMS training (as described in the training section of this report).
- Incorporate NIMS/ICS into all local and regional training and exercises.
- Participate in an all-hazard exercise program based on NIMS that involves responders from multiple disciplines and multiple jurisdictions.
- Incorporate corrective actions into preparedness and response plans and procedures.
- Inventory response assets to conform to Homeland Security resource typing standards.
- Ensure that relevant national standards and guidance to achieve equipment, communication, and data interoperability are incorporated into local acquisition programs.
- Validate that the inventory of response assets conforms to Homeland Security resource typing standards and provide to the state as required.
- Utilize the state response asset inventory for Intra-State Mutual Aid requests, exercises, and actual events.
- Continue to apply standardized and consistent terminology, including the establishment of plain language communications standards across public safety sector. Develop systems, tools, and processes to present consistent and accurate information to incident managers at all levels.
- Complete ICS-400 Advanced ICS training or equivalent by appropriate personnel (as identified in the Five-Year NIMS Training Plan, February 2008).
- Complete Emergency Management Framework Course—Awareness Training (as identified in the Five-Year NIMS Training Plan, February 2008).
- Include preparedness organizations and elected and appointed officials in the development of emergency operations plans (EOPs).
- Plan for special needs populations in the development of EOPs (to include, but not limited to, individuals with limited English language proficiency; individuals with disabilities; children; the aged, etc.).
- Include NGOs and the private sector in an all-hazards exercise program, when appropriate.
- Promote the integration of Incident Command, Multiagency Coordination System, and Public Information into appropriate exercises and evaluate against associated target capabilities (refer to HSEEP Volume III and the Exercise Evaluation Guides).

- Institute procedures and protocols for operational and information security during an incident/planned event.
- Institute multidisciplinary and/or multi-jurisdictional procedures and protocols for standardization of data collection and analysis to utilize or share information during an incident/planned event.
- Develop procedures and protocols for communications (to include voice, data, access to geospatial information, Internet/Web use, and data encryption), where applicable, to utilize or share information during an incident/planned event.
- Institute policies, plans, procedures and protocols to prevent spontaneous deployment of resources/personnel and/or responding to a request that bypassed official resource coordination processes (i.e., resources requested through improper channels).
- Institute mechanisms to deploy, track, recover, demobilize, and to provide reimbursement for resources utilized during response and recovery.
- Utilize access control measures during an incident, as appropriate.

# Pandemic Influenza and Public Health Emergency Planning & Operations

Pandemics have occurred intermittently over centuries. The last three pandemics, in 1918, 1957, and 1968, killed approximately 40 million, 2 million and 1 million people worldwide, respectively. Although the timing cannot be predicted, history and science suggest that we will face at least one pandemic in this century. The current pandemic threat stems from an unprecedented outbreak of avian influenza in Asia and Europe, caused by the H5N1 strain of the Influenza A virus. While traditional control measures have been attempted, the virus is now endemic in Southeast Asia, present in long-range migratory birds, and unlikely to be eradicated soon. A notable and worrisome feature of the H5N1 virus is its ability to infect a wide range of hosts, including birds and humans. As of the date of this document, the virus is known to have infected 385 people worldwide, resulting in 243 deaths over the past five years. Although the virus has not yet shown an ability to transmit efficiently between humans, as is seen with the annual influenza virus, there is concern that it will acquire this capability through genetic mutation or exchange of genetic material with a human influenza virus.

It is impossible to know whether the currently circulating H5N1 virus will cause a human pandemic. The widespread nature of H5N1 in birds and the likelihood of mutations over time raise our concerns that the virus will become transmissible between humans, with potentially catastrophic consequences. If this does not happen with the current H5N1 strain, history suggests that a different influenza virus will emerge and result in the next pandemic.

One of the biggest challenges of a rapidly developing and sustained influenza pandemic is its capacity to disrupt the essential services of society's critical infrastructure. EMS personnel will be on the front lines during a pandemic event. A recent survey in New York City

revealed that 48% of healthcare workers indicated that they would be unwilling to work during a SARS outbreak,<sup>37</sup> and there is no reason to expect any difference in those statistics if the outbreak is H5N1 or in a different locale. The major concern is personal safety and safety of family members.

Westchester County must continue to work aggressively on planning for this inevitable event. Using national estimates and demographic information for Westchester County, over 300,000 people in the County will become infected with the virus and require treatment over the course of twelve to eighteen months. Estimates place the number of deaths near 190,000 during the same period. In order to draft useful and realistic plans for confronting the challenge of a pandemic event, Westchester County does not need to "reinvent the wheel." There are numerous planning guidance documents and templates available for reference as WCES develops their plan. WCES is strongly encouraged to dedicate personnel to make development of this plan a priority. Several guidance documents and planning tools are attached to this report to assist WCES through this process.

## **Recommendation:**

• WCES is strongly encouraged to dedicate personnel to develop a pandemic flu plan based on available planning guidance documents and templates. Development of the plan must be a priority.

## **Continuity of Operations Planning**

Westchester County, including WCES, should have the overarching goal of implementing a comprehensive and effective program to ensure continuity of operations of local and County government under all circumstances. As part of this effort, WCES is encouraged to further develop and maintain a viable plan that ensures continuity of operations through a full range of potential emergencies. The plan should be based on the following:

- Continuing a continuity of operations mindset;
- Identifying critical and essential activities and functions of WCES that must continue no matter what events are occurring;
- Determining vital records, systems, and equipment and a process to safeguard and update these items;
- Evaluating needs and selecting alternate work sites and relocation activities;
- Creating a procedure for reconstitution in the event of catastrophic losses;
- Preparing for the well-being of families;
- Testing and executing the continuity of operations plan and revising it periodically as part of the overall exercise program as necessary.

<sup>&</sup>lt;sup>37</sup> Qureshi, e.a., *Healthcare Workers' Ability and Willingness to Report to Duty During Catastrophic Disasters*. Journal of Urban Health, 2005. **82**(3): p. 378-388.

In order to draft a useful and realistic continuity of operations plan, WCES may take advantage of their hazard risk and vulnerability assessments (see Section 1) to determine which systems require backup. There are numerous planning guidance documents and templates available for reference as WCES further refines their continuity of operations plan. WCES is strongly encouraged to dedicate personnel to make development of this plan a priority. Several guidance documents and planning tools are attached to this report to assist WCES through this process.

## **Recommendation:**

• WCES is encouraged to further develop and maintain a viable continuity of operations plan that ensures continuity of operations through a full range of potential emergencies.

## Summary of Homeland Security and Preparedness

This assessment has revealed that WCES has demonstrated a commitment to Homeland Security preparedness and the overarching goal of maintaining an EMS system that is responsive to the growing demands of a changing threat environment. The recommendations listed in this report, if followed, will further enhance the capability of Westchester County and the EMS system to maintain an emergency medical service system that is consistent with the best practices for Homeland Security preparedness and response. The leadership of WCES is strongly encouraged to continue their dedication to maintaining an agency and a system that meets the challenges and opportunities of a prosperous, growing community.
# Map of EMS Districts







# Map of Population Density





Appendix 8 – Map of Population Density

# Map of Median Income







### **Map of EMS Station Locations**



#### Appendix 10 – Map of EMS Station Locations



**EMS Stations** 

#### Westchester EMS Paramedic Intercept Service Area





Appendix 11- Westchester EMS Paramedic Intercept Service Area

### Map of Area Hospitals





#### Appendix 12- Map of Area Hospitals

### **County Traffic Volume**







### **Map of Senior Centers**







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# Map of Hazardous Waste Sites







# Map of Indian Point 10 Mile Radius





Appendix 16 – Map of Indian Point 10 Mile Radius

Map of Indian Point Evacuation Routes





Appendix 17 – Map of Indian Point Evacuation Routes

# Map of Historical Hurricane Events





Appendix 18 - Map of Historical Hurricane Events

### Map of Storm Surge Zones





Appendix 19 - Map of Storm Surge Zones

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Map of Hurricane Evacuation Zones





#### Appendix 20 – Map of Hurricane Evacuation Zones

Westchester County, New York Emergency Medical Services System Evaluation