
# NAVAL POSTGRADUATE SCHOOL

**MONTEREY, CALIFORNIA**

# THESIS

**EMS RESPONSE TO MASS CASUALTY INCIDENTS: THE CRITICAL IMPORTANCE OF AUTOMATIC STATEWIDE MUTUAL AID AND MCI TRAINING**

by

Cheryl Hill

September 2008

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Incidence of natural and man-made disasters are increasing and expanding in scope. While these events may cause mass injuries, the pre-hospital emergency medical services (EMS) community is left out of the preparedness equation by virtue of being underrepresented on planning committees, not privy to disaster training, nor on the receiving end of preparedness funding. Additionally, for many states, outside standard mutual aid agreements a disaster declaration is required prior to other types of medical aid arriving on scene to render assistance creating a gap in response. This thesis answers the following research question: have or how have other states and jurisdictions incorporated their EMS communities in disaster planning and response and what can be learned in order to create this process elsewhere? Two case studies are reviewed to ascertain lessons learned on how other states and communities have incorporated their EMS communities into the disaster planning and response framework. Adopting automatic statewide mutual aid, supported by EMS involvement in incident pre-planning, training and exercises, will allow responders to immediately deploy upon request and close the gap in response resulting in positive outcomes for victims of the incident.

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# EMS RESPONSE TO MASS CASUALTY INCIDENTS: THE CRITICAL IMPORTANCE OF AUTOMATIC STATEWIDE MUTUAL AID AND MCI TRAINING

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# ABSTRACT

Incidence of natural and man-made disasters are increasing and expanding in scope. While these events may cause mass injuries, the pre-hospital emergency medical services (EMS) community is left out of the preparedness equation by virtue of being underrepresented on planning committees, not privy to disaster training, and not on the receiving end of preparedness funding. Additionally, for many states outside standard mutual aid agreements, a disaster declaration is required prior to other types of medical aid arriving on scene to render assistance, creating a gap in response. This thesis answers the following research question: Have — or how have — other states and jurisdictions incorporated their EMS communities in disaster planning and response, and what can be learned in order to create this process elsewhere? Two case studies are reviewed to ascertain lessons learned on how other states and communities have incorporated their EMS communities into the disaster planning and response framework. Adopting automatic statewide mutual aid, supported by EMS involvement in incident pre-planning, training and exercises, will allow responders to immediately deploy upon request and close the gap in response, resulting in positive outcomes for victims of the incident.

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Fellow Cohorts members from 0701 and 0702, I appreciate all of your unique perspectives brought to this great learning and bonding experience.

Lastly, to members of my community, I pledge ethical, competent performance and a commitment to preparing this great nation to respond to forthcoming disasters the country may face.

# I. INTRODUCTION

Incidence of disaster is increasing and expanding in scope. According to the IEG World Bank, "on aggregate, the reported number of natural disasters worldwide has been rapidly increasing, from fewer than 100 in 1975 to more than 400 in 2005."[1] The events of the Oklahoma City Bombing, those of September 11, 2001, and the anthrax attacks through the postal service in the fall of 2001 also demonstrate the threat and reality of terrorism incidents on U.S. soil in any community. These events along with the botched response to Hurricane Katrina and the threat of avian flu have driven a wave of disaster preparedness capability needs that challenge local, state, and federal disaster preparedness partners. While emergency management, fire, law enforcement, hospitals, public health departments, and others have made progress in preparing for these catastrophes, the pre-hospital emergency medical services (EMS) community that feeds the hospital system is largely left out of the preparedness equation being underrepresented on planning committees, not privy to disaster training, nor on the receiving end of preparedness funding. This is a critical failure as they will be the ones to perform on-scene disaster triage, treatment, and transport at these incidents that may cause significant numbers of casualties. Many states and localities have not fully considered how they can integrate their EMS communities into the disaster preparedness and response framework. Although EMS services are delivered at the local level, state boards of EMS set the parameters for EMS initial and recertification, have the ability to require or recommend trainings to fulfill education requirements, and can lead efforts at other courses of action at the state level that will support EMS preparedness for mass casualty response with the inclusion of other required agencies such as state departments of health, state emergency management agencies, and state fire chiefs associations.

The Institute of Medicine report, *Emergency Medical Services: at the Crossroads*, recognizes lack of readiness for disasters as a current problem in the EMS community, and that early attempts toward an integrated, coordinated, regionalized emergency care

[1] IEG World Bank, "Development Actions and the Rising Incidence of Disasters," *Evaluation Brief 4*, (Washington, D.C.: World Bank, 2007) http://www.worldbank.org/ieg/docs/developing_actions.pdf, 1.

system have been derailed over the years due to deeply entrenched political interests and cultural attitudes in addition to funding cutbacks and practical impediments to change. [2]

This should not prevent preparedness efforts from continuing. Effective disaster response, whether the disaster is natural or man-made, needs pre-incident planning. Many forms of medical aid are available, but have significant response times, which creates a gap in response from the time an event occurs until sufficient medical resources can arrive on scene to assist. In man-made intentional, accidental, or natural disaster incidents mass casualties may be the result, and the event may or may not occur with prior warning. In such cases the emergency medical services (EMS) community will be a critical asset to affect pre-hospital triage, treatment, and transport of injured victims. Both the public and private EMS communities have significant assets that can be utilized when considering response to disaster and most are willing to participate. Potential disaster scenarios are extending beyond natural events. While these man-made incidents are of low probability they are also of high consequence that command attention.

## A. RESEARCH QUESTIONS

This thesis answers the following research questions: Have — or how have — other states and jurisdictions incorporated their EMS communities in disaster planning and response, and what can be learned in order to create this process elsewhere? What are specific elements that need to be included or considered for the EMS community to be included into a newly developed disaster response structure?

## B. SPECIFIC RESEARCH OBJECTIVES

Specific research objectives are aimed at examining methods to fill the gap in EMS response from the point where standard mutual aid agreements are executed to the point where additional resources can be brought to the scene of an incident, and assessing needed actions for the EMS community to successfully participate in disaster preparedness and response. Two case studies are chosen to evaluate methods utilized by

[2] Institute of Medicine, *Emergency Medical Services: at the Crossroads* (Washington, D.C.: National Academies Press, 2006), 6.

other jurisdictions to fill this gap. Mutual Aid Box Alarm System of Illinois (MABAS-Illinois) utilizes statewide automatic mutual aid and Hampton Roads Virginia has developed the Hampton Roads Metropolitan Medical Strike Team. Both are considered leading role models in their fields and subject of various studies and articles.[3] The resulting analysis is meant to create discussion on the adequacy of current response structures and propose possible solutions to fill the current gap. Implementation or program adoption decisions cannot be made on the information presented in this thesis alone. Deliberation among stakeholders and possible further research on this issue is the expected outcome.

## C. ARGUMENT

For many states, outside standard mutual aid agreements, a disaster declaration is required prior to other types of medical aid rendering assistance. This structure results in long turn around times and creates a gap in the ability to provide immediate assistance to a jurisdiction in need. Adopting automatic statewide mutual aid, supported by EMS involvement in incident pre-planning, training, and exercises, will allow responders to immediately deploy upon request and close the gap in response resulting in positive outcomes for victims of the incident. Improving jurisdictions' abilities to immediately deploy medical assets to the scene of disasters or terrorist attacks will decrease the incidence of human suffering and reduce the rate of morbidity and mortality during disaster.

States currently working on or needing to work on developing or strengthening intrastate mutual aid include Michigan, Kansas, South Dakota, New Hampshire, and

[3] Federal Emergency Management Agency, "Developing and Sustaining an Effective MMRS Regional System Hampton Roads, Virginia," *FEMA Smart Practices Spotlight*, October 15, 2003, SmartPractices@fema.gov (accessed August 27, 2008); Colleen Finkl, "Federal Emergency Management Agency National Response Framework (NRF)" (presented by at the 2008 MABAS Conference, February 24, 2008).

others.[4] Even with intrastate mutual aid development states can learn how to enhance mass casualty response by considering automatic statewide mutual aid as a supplement to traditional response structures.

## D. METHODOLOGY

A research design using case studies will be used in this thesis; it consists of an analysis of two model response structures including the response structure itself and an execution of a response to a mass casualty incident for each case. Authored in *Practical Research Planning and Design*, Paul D. Leedey and Jeanne Ellis Ormond put forth a logical sequence for research presentation that this thesis will follow. Elements include a rationale for studying the case(s), a detailed description of the facts of the case, a description of the data collected, a discussion of patterns found, and the connection to the larger scheme of things. [5] The first three of these four elements will be discussed in depth for each case in Chapters V and VI, with the connection to the larger scheme of things discussed in the concluding chapter. The case study methodology was chosen because it allowed the viewing and assessment of information in a logical sequence from program inception to execution at an incident while extracting information relevant to the evaluation criteria.

Based on comprehensive research and the literature review the most common methods for enhancing response capability to acute mass casualty incidents include developing regional or statewide automatic mutual aid agreements and assembling and training medical response teams. Given this information, the case studies chosen for review include one system where statewide automatic mutual aid is used and another where a medical response team is used. The intent of the evaluation criteria is to compare strategic level issues including costs (in money and time) and benefits of each along with attention to legal issues, ease of implementation, and improvability. The evaluation

[4] International Association of Fire Chiefs, "National Fire Service Mutual Aid System Task Force," *IMAS Development Plan*, http://www.iafc.org/associations/4685/files/downloads/MASTF/mtlAid_IMASdevelopmentPlan.pdf (accessed August 27, 2008).

[5] Paul D. Leedy and Jeanne Ellis Orland, *Practical Research Planning and Design*, 8th Ed. (Upper Saddle, .New Jersey: Pearson-Merrill Prentice Hall.2005), 136.

criteria adopted are from suggested evaluative and practical criteria from Eugene Bardach's *A Practical Guide for Policy Analysis: The Eightfold Path to More Effective Problem Solving*.[6]

The first case is the Hampton Roads Metropolitan Medical Strike Team and their response during Operation Chain Reaction, an exercise that tested response to a simulated explosion of a radiological dispersal device during a musical event at the Virginia Beach Amphitheatre. The second case study is Mutual Aid Box Alarm System (MABAS) Mutual-Aid Statewide (MABAS- Illinois), an Illinois Fire Chiefs' Association and Illinois Emergency Management initiative, and their response to the Northern Illinois University shooting. Both are considered model practices in their field and have been the subject of articles and research by others. MABAS has been providing automatic mutual aid for forty years and the Hampton Roads Metropolitan Medical Strike Team has built in sustainability by each member jurisdiction contributing twenty percent per capita toward team expenses. Information reviewed on the two case studies chosen for research includes qualitative interview of program administrators and participants, response plans, procedures, news articles, after action reports, legal documents, and other supporting documentation provided by interviewees and their respective web site's online sources.

The intent of the interviews was to ascertain information about the structure and response system supports in place that need to exist, but are not apparent in plans for responses to be executed properly. The findings will be presented in an individual evaluation matrix against the evaluation criteria for each case then compiled into a comprehensive matrix so results may be compared. Evaluation and analysis follows each section and cumulates in recommendations and conclusions.

## E. THESIS ROADMAP

Chapter II contains the literature review that discusses disaster response assets, response structures, response plans and agreements at all levels (local, regional, state and

[6] Eugene Bardach, *A Practical Guide for Policy Analysis: The Eightfold Path to More Effective Problem Solving* (Washington, D.C.: CQ Press, 2005), XIV, 25-30.

federal) that are available to states for assistance during disaster where medical assets are required to mitigate the incident. In addition, literature assessing EMS preparedness and federal planning documents are reviewed.

Chapter III discusses overview of disasters and threats to the United States, EMS and disaster preparedness, current response structures, and concludes with the case laying out the need for change.

Chapter IV presents evaluation criteria and logic used to evaluate the two case studies. The criteria are intended to review strategic level issues that should be considered in evaluating feasibility of changing or enhancing current EMS/first response structures. They include costs (time and money) and benefits to each program, important legal issues, and ease of implementation for each case. Limitations on chosen criteria are also explained.

Chapter V describes the reason for choosing to evaluate the Hampton Roads Metropolitan Medical Strike Team and provides a case overview of the incident to which the team responded, Operation Chain Reaction. Research biases are explained. The case is then put through the evaluation criteria and assigned a grade of “meets” or “exceeds” standards or expectations as appropriate to each case. The logic behind grading is discussed in the narrative section following discussion of the case. The chapter concludes with an analysis of the case.

Chapter VI describes the reason for choosing to evaluate MABAS Illinois, provides a case overview and describes an incident in which MABAS was used in response, the Northern Illinois University shooting. Research biases are explained. The case is then put through the evaluation criteria and assigned a grade of “meets” or “exceeds” standards or expectations as appropriate to each case. The logic behind grading is discussed in the narrative section following discussion of the case. The chapter concludes with an analysis of the case.

Chapter VII discusses research findings, ties it altogether, proposes recommendations, and provides conclusions for future actions based on research findings that are appropriate for states and other jurisdictions.

Many states have made progress in preparing response to disaster and work must continue. Both natural and man-made incidents may cause acute mass casualties. This thesis raises the question of adequacy of current response structures to this type of incident and the current status of the EMS community to be effectively integrated into both response and preparedness planning. The chosen case studies are two methods other jurisdictions are using to address this gap. The recommendations are meant to create dialogue on the questions raised as further research is required to consider any part of them for adoption. The following chapter evaluates the literature surrounding EMS current status and preparedness. The review also explores mutual aid agreements; state response plans; medical assets available at the local, regional, state, and federal levels; and includes a discussion on relevant federal planning documents.

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# II. LITERATURE REVIEW

The literature review will seek to explore existing writings surrounding the EMS community; types of mutual aid agreements currently in use; and medical response assets available at the local, regional, state, and federal levels and the process to access them. The intent is to examine the current status regarding these items along with exploring what other states are doing regarding disaster response. One of the goals of the literature review is to explore which options are available and being used by other states.

The review begins with information regarding the current state of the EMS community then flows into types of mutual aid agreements in use beginning at the local level, regional, intrastate, and interstate levels. Efforts at enhancing intrastate and interstate mutual aid by the International Association of Fire Chiefs are also discussed. The review then flows into state response structures and plans. Next, medical response assets are reviewed at the local, regional, state, and federal levels. The FEMA contracts with private EMS agencies are discussed in this section and will add another federal medical response asset available to a jurisdiction in need. Lastly, federal planning documents are discussed including the National Preparedness Guidelines, National Planning Scenarios, and the 2007 Target Capability List.

## A. EMS CURRENT STATUS

The following section discusses literature involving the current status of the EMS System, its interdependency with hospitals, and documents making recommendations for the future of EMS.

There is quite a bit of literature discussing the current status of the Emergency Services System (EMS). According to the Institute of Medicine, "hundreds of thousands of EMS personnel provide more than sixteen million medical transports each year" to the emergency room (ER), and "in 2002, 43 percent of all hospital admissions in the U.S. entered through the ER."[7] Over one third of the EMS professional workforce is volunteer

[7] Institute of Medicine, Emergency Medical Services, 1, xiv.

with half of the EMS systems based out of fire departments while the other half are private ambulance companies, operate out of hospitals, or are run by county or municipal governments.[8] The facts above coupled with a decline in federal funding since the 1980's has created a lean, diverse EMS community. As a result, the Institute of Medicine identifies EMS system problems even with the ability of 911 systems to link almost all Americans to immediate medical care delivering life-saving procedures, which results in outcomes unprecedented in prior years.[9]

Some of the problems identified are disparities in response times; insufficient coordination amongst various EMS providers within a common population that do not work together in a unified fashion; an uncertainty in quality of care due to lack of national standards of EMS quality with no accountability for performance; lack of readiness for disasters; a divided professional identity (being a profession that is both medical care and public safety); and a limited evidence base or research support for procedures delivered.[10] Facts regarding the EMS system are important to understand the environment in which they work to help determine if utilizing them in mutual aid is realistic and if the proposal will benefit the EMS community, victims of disaster, and the general population.

As the above statistics reveal, the EMS system is dependant on the hospital's emergency department (ED) for the patient to receive the continuum of care required to heal from injury or other medical condition. According to the National Report Card on the State of Emergency Medicine, "The results are sobering. The national emergency health care system is in serious condition."[11] According to the report, emergency department visits are continuing to increase; there were almost 114 million patient visits in 2003, while the overall capacity of the nation's emergency systems has decreased by

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[8] Institute of Medicine, *Emergency Medical Services*, xvii, 2.

[9] Ibid., 3.

[10] Ibid., 3-4.

[11] American College of Emergency Physicians, "The National Report Card on the State of Emergency Medicine," NEMSIS Technical Assistance Center, (January 2006), http://www.nemsis.org/media/pdf/2006-NationalReportCard.pdf (accessed November 4, 2007), 1.

14 percent since 1993. [12] The report goes on to say that hospital emergency departments are under a federal mandate to stabilize all patients, regardless of their ability to pay, and increasing numbers of uninsured patients go to emergency departments for medical care.[13] As a result, a large number of people do not pay for their care, stressing the entire system. [14] The study graded all fifty states on their emergency medicine system using four criteria: access to emergency care, quality and patient safety, public health and injury prevention, and the medical liability environment. The study attempted to include statistics on diversion status of hospitals, but found that only ten states collect this data. Thus the survey question became, "are hospitals required to submit data on diversions?" Diversion status is when a hospital ER declines to take incoming patients by ambulance due to overcrowding of the ER, thus ambulances are on "diversion" to the next appropriate facility. The report card calls diversion a "rapidly growing symptom of the gridlock in emergency departments."[15]

According to the Institute of Medicine, their vision of a twenty-first century emergency care system, "dispatchers, EMS personnel, medical providers, public safety officers, and public health officials will be fully interconnected and united in an effort to ensure that each patient receives the most appropriate care, at the optimal location, with the minimum delay."[16] While the report recognizes that its objectives involve substantial change, the authors believe it can be done and that early attempts toward an integrated, coordinated, regionalized emergency care system have been derailed over the years due to deeply entrenched political interests and cultural attitudes, in addition to funding cutbacks and practical impediments to change.[17] The report calls for a lead federal agency responsible for trauma and emergency care. Other recommendations include

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[12] American College of Emergency Physicians, "The National Report Card on the State of Emergency Medicine," NEMSIS Technical Assistance Center (January 2006), 2, http://www.nemsis.org/media/pdf/2006-NationalReportCard.pdf, (accessed November 4, 2007).

[13] Ibid.

[14] Ibid.

[15] Ibid.

[16] Institute of Medicine, *Emergency Medical Services,* 5.

[17] Ibid., 6.

improvements and support for system finance, regionalization, national standards for training and credentialing, certified medical direction, coordination, enhanced communication and data systems, regulation for air medical services, performance accountability, disaster preparedness through funding and training, and research as recommendations to achieve the author's vision of a twenty-first century emergency care system.

## B. MUTUAL AID

This section of the literature review assesses mutual aid agreements , including standard mutual aid agreements, regional mutual aid agreements that are found in some states, Intrastate Mutual Aid Compacts (IMAC), Ohio Revised Code 9.60 that supplements Ohio's IMAC for its Ohio Fire Service Emergency Response Plan, the Emergency Management Aid Compact, and Mutual Aid Box Alarm System- Illinois that is an automatic mutual aid agreement across Illinois and jurisdictions within four contiguous states to Illinois. This section also includes a review of work being done by the International Association of Fire Chiefs to enhance intrastate and interstate mutual aid agreements.

Sources estimate that there are roughly eight hundred thousand emergency medical service technicians in the United States that operate through the fire service, municipal service delivery, private companies, and hospital based EMS systems.[18] Of these diverse systems, some of them serve single jurisdictions with pre-established mutual aid agreements to enter neighboring partner's borders when requested. Others serve within counties and across city, township, and village lines within that county as needed. Others in rural areas have formulated joint ambulance districts or joint emergency medical services districts. Private ambulance companies follow a similar design with some large enough to cover an entire region or more within states. Both

[18] C.W. Burt, L.F. McCaig, and R.H. Valverde, *Analysis of Ambulance Transports and Diversions among U.S. Emergency Department* (Hyattsville, MD: National Center for Health Statistics, 2006); A. M. *Lindstrom.,* "JEMS Platinum Resource Guide," *Journal of Emergency Medical Services,* 31(1): 2006, 42–56, 101; G. Mears,.*2003 Survey and Analysis of EMS Scope of Practice and Practice Settings Impacting EMS Services in Rural America: Executive Brief and Recommendation*,(Chapel Hill, NC: University of North Carolina at Chapel Hill Department of Emergency Medicine, 2004); Institute of Medicine, *Emergency Medical Services: at the Crossroads* (Washington, D.C.: National Academies Press, 2006), 15.

public and private EMS agencies have also come together to service medical needs on a regional basis is some areas as well. Most private ambulance companies transport patients from one healthcare facility to another in addition to responding to emergency calls. Emergency Medical Services vehicles routinely cross jurisdictional lines on a daily basis where pre-arranged agreements exist for the handling of routine emergency call volume.

Additionally, each agency or EMS district employs a medical director to establish treatment protocols and drug administrations based on the nature of the call and skill level of the EMS professional. Treatment protocols are generally not consistent within the state or across jurisdictional lines, but pre-arranged agreements establish which treatment protocols will be rendered when mutual aid is requested. This information provides background on the current state of standard mutual aid agreements for EMS.

In one example, Northern Virginia includes Arlington County, city of Alexandria, city of Fairfax, Fairfax County, Fort Belvior, Metropolitan Washington Airport Authority, and Prince Williams County in their Regional Rapid Intervention Team Command and Operational Procedures. The region has pre-identified resources that can be called for immediately by incident command. For example, if the first unit arriving on-scene realizes that they have a mass casualty event, not dispatched as such, command can request an "EMS Task Force" thorough dispatch that will automatically send four paramedics, a mass casualty unit, and an EMS chief. [19] These resources will be deployed from the closest available resources within the region. Other resources not responding will fill in and assume larger districts to cover other standard calls as they come in while the task force is sent to the scene. Northern Virginia does not have private ambulance companies. This regional collaboration allows for most efficient use of resources across the area and beyond their jurisdictional boundaries. This is an important example that shows agreements can be made on a regional basis even if not agreed upon at the state level. Progress can still be made to fill immediate response needs to disaster and for every day call volume.

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[19] County of Arlington, Virginia, *Rapid Intervention Team Command and Operational Procedures*, (Arlington, VA: Fire and Rescue Departments of Northern Virginia and Arlington County, 2002).

Many states have an Intra-State Mutual Aid Compact (IMAC). The IMAC agreement allows for the sharing of resources upon request. For most states, acquiring resources through their IMAC requires a formal declaration of emergency by a participating political subdivision. These documents provide the legal basis for mutual aid but require a formal declaration for disaster before being activated. An IMAC is important because it allows sharing of resources between jurisdictions based on disaster declaration; identifies whether the responding or requesting jurisdiction is responsible for liability and reimbursement for costs incurred by the responding agency; identifies whether the provider or receiver of assistance is responsible for workers compensation of aid granting employees; and describes procedures for requesting resources and obtaining reimbursement. While this legislation is in place, there is still a gap in response between when the incident occurs and when resources are able to arrive on-scene and assist (due to time delays waiting for a disaster declaration).

Ohio Revised Code 9.60 is one example of how Ohio supplements the state's IMAC agreement. Section 9.60 of the Revised Code of the State of Ohio states:

> Any firefighting agency of this state or any private fire company may provide fire protection to any state agency or instrumentality, county, or political subdivision of this state, or to a governmental entity of an adjoining state, without a contract to provide fire protection, upon the approval of the governing board of the firefighting agency or private fire company and upon authorization of an officer or employee of the firefighting agency providing the fire protection designated by title of their office or position pursuant to the authorization of the governing board of the firefighting agency.[20]

This allows public and private fire and EMS agencies within the state to become part of the Ohio Response Plan on the condition that each local agency obtains approval from the jurisdictional governing board through legislation. This is important as it allows for agencies that traditionally act as first response agencies and others whose primary missions are different come together to provide community support during disaster.

[20] *Ohio Revised Code 9.60*, http://codes.ohio.gov/orc/gp9.60.

Receivers of aid do not need to be a part of the plan, but grantors of aid must be signed members through local legislation. Furthermore, the requesting of resources through this plan does not require a disaster declaration.

The Emergency Management Assistance Compact is an interstate agreement that enables entities to provide mutual assistance during times of need. Since being ratified by Congress and signed into law in 1996 (Public Law 104-321), fifty states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands have enacted legislation to become members of EMAC. [21] Although not pertinent to intrastate response, the agreement is important when incidents exceed state resources and neighboring states are able to provide aid.

MABAS stands for Mutual Aid Box Alarm System based out of Illinois. It is a multi-state mutual aid organization that has been in existence since the late 1960s. The compact includes almost 1,300 member agencies organized within 63 divisions. MABAS divisions geographically span most of Illinois, and counties within Wisconsin, Indiana, Missouri, and cities within Iowa. MABAS member agencies are able to work together at any emergency scene due to the use of a common response/deployment procedure, incident command that reinforces scene integration, an accountability procedure, and utilization of common radio frequencies despite jurisdictional origin. MABAS can be activated without disaster declaration. This information is important. It demonstrates how numerous fire and EMS resources can be easily dispatched through mutual aid contracts within and across state lines automatically when requested. Other state response plans operate within individual states. According to Carl Adrianopoli, Field Supervisor and Regional Emergency Coordinator for DHHS, Region V, Office of the Assistant Secretary for Preparedness and Response, MABAS is expanding most of HHS Region V and entering Region VII.[22]

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[21] Ohio Fire Chief's Association. "EMAC Facts," Ohio Fire Chief's Association (2007), http://www.ohiofirechiefs.com.

[22] Carl Adrainopoli, Field Supervisor and Regional Emergency Coordinator, Department of Health and Human Services, Region V, Office of the Assistant Secretary for Preparedness and Response, phone interview with author, November 26, 2007.

The International Association of Fire Chiefs entered into contract with the Department of Homeland Security's National Integration Center in 2005 to assist with developing and enhancing intrastate and interstate mutual aid plans. Spawned from this effort is the Mutual Aid System Task Force (MASTF), which concentrates on interstate mutual aid and the National Fire Service Intrastate Mutual Aid System (IMAS), which in turn supports intrastate mutual aid development. These efforts led to document and plan development. According to the written statement of Chief Steven P. Westermann, CFO of the International Association of Fire Chiefs (IAFC), to the Subcommittee on Emergency Communications, Preparedness, and Response of the Committee on Homeland Security within the U.S. House of Representatives, the IAFC is helping all fifty states develop mutual aid systems as part of a three year program and is using the anchor states of California, Illinois, Ohio and Florida as models.[23] The IAFC recommends implementation of the National Incident Management System, resource typing, a statewide list of recognized resources categorized by type, a system for ordering resources, resource tracking, communications capability, personnel credentialing, a reimbursement plan, and agreements that cover legal issues for effective intrastate mutual aid plans.

The intrastate mutual aid concept is designed to tie into the National Mutual Aid System as an annex to EMAC based on FEMA regions with the goal of receiving interstate assistance within twelve hours of request.[24] The National Mutual Aid System for the Fire Service: Strategic Plan recommends designating FEMA Region offices as the national point of contact for interstate deployments and maintenance of the system; developing policies for interstate deployment within twelve hours of the request emphasizing the integration of NIMS for command and control and resource typing; self-sustainability for a designated operations period; education, training, and exercising the system; ensuring linkages with other agencies will support the network; and suggests who is responsible for funding the development, monitoring, and support of the system. This

[23] Steven P. Westermann, "Leveraging Mutual Aid for Effective Emergency Response," written statement to Subcommittee of the U.S. House of Representatives, Washington, D.C., November 15, 2007, 3.

[24] Ibid., 5.

information is important because it demonstrates strides and significant efforts to enhance mutual aid response within and between states. The intent is to better provide assistance to jurisdictions in need once local resources are overwhelmed.

## C. STATE RESPONSE PLANS

Mutual aid agreements provide the legal basis for resource sharing. State response plans establish the vehicle by which resources are deployed. This section reviews three of four portions of the anchor state response plans discussed above, Ohio, Florida, and California.

The Ohio Fire Service Emergency Response Plan (draft), supported by Ohio's IMAC and Ohio Revised Code 9.60 discussed in the previous section, provides a vehicle for incident command (IC) or county EOC to request specific resources from neighboring jurisdictions after local resources and standard mutual aid agreements are exhausted.[25] Incident command requests resources through its dispatcher who then requests these resources through central dispatch at Columbus, Ohio Fire. Central dispatch then contacts the closest neighboring jurisdictions surrounding the incident site and works outward until all requests can be honored. Fire jurisdictions list available resources on a computer system that central dispatch can view prior to making contact with the neighboring jurisdiction and requesting the resource(s). The plan allows for standard deployment and a "scramble" response. For a standard deployment resources are expected in three hours from request from central dispatch with an operational period ranging from twenty four to seventy two hours. The expectation for a scramble response is as soon as possible and preferably within thirty minutes of request from central dispatch with an operational period under twenty four hours. The plan allows for mobilization of resources upon request and prior to disaster declaration. Significant work by many has been invested in developing the plan and response structure and it has had successes in deployment during large scale events.

[25] Ohio Fire Chief's Association. *Ohio Fire Service Emergency Response Plan, Version 2.0*. draft, (Columbus, Ohio: Ohio Fire Chief's Association 2007).

Other states have response plans as well. Florida, for example, has a similar response plan design to the Ohio Plan but incorporates more available resources for response. Some of them include incident management teams, communications strike teams, and mechanics. [26] Additionally, the state's disaster history has strengthened relationships allowing for greater collaboration amongst planning and response partners. For example, the plan incorporates members from forestry, public information professionals, and a representative from the State Bureau of Emergency Services.

California has its *California Disaster Medical Operations Manual*. According to this robust plan, "the system as a whole must standardize and enhance its level of performance to ensure that critical medical resources respond as rapidly as possible, are applied where they do the most good, and are provided at sufficient levels to meet the needs of disaster victims." [27] This plan describes how all available medical assets will be coordinated in response to a large-scale mass casualty event. Specifics include response personnel and resources including alternate care sites, ambulance strike teams, California medical assistance teams, medical volunteers, casualty receiving and distribution points, nerve agent antidotes, and many other assets from the four pages of available assets listed. Again, California's history in response to disaster has created robust regional response structures and allowed significant collaboration amongst planning and response partners.

## D. MEDICAL RESPONSE ASSETS

This section of the review examines the Medical Reserve Corps (MRC), regionally and state developed medical and specialty response teams, federal medical response teams, and the new FEMA contract that will supplement the federal response to mass casualty incidents and other large disasters utilizing private EMS assets.

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[26] Florida Fire Chief's Association, *Florida State Wide Emergency Response* (Ormond, Florida: Florida Fire Chief's Association, 2007).

27 California Emergency Medical Services Authority, *California Disaster Medical Operations Manual* (Sacramento, California: California Emergency Medical Services Authority, 2007), 7.

Medical Reserve Corps Units are local initiatives to be activated locally in response to a local disaster. At the time of this writing, many states do not have formal state plans to activate MRC Volunteers within or across states. The request for volunteers from one county to the next will most likely occur on an as needed basis. Furthermore, in some areas when volunteers agree to mobilize within or outside their own county, they must respond to a volunteer reception center for processing before being released on assignment. Also, in many states Medical Reserve Corps volunteers can only activate after a declaration of disaster has occurred.

A unique American Red Cross Medical Assistance Team (MAT) exists in Cincinnati and serves the tri-state area of southern Ohio, northern Kentucky, and southeastern Indiana. They were formed back in the 1970s to respond to incidents at the Cincinnati Airport and King's Island theme park. As the American Red Cross mission was re-focused on providing mass care and sheltering narrowing their scope of practice due to high liability costs, the MAT was "grandfathered in" with an addendum to maintain their team and scope of practice to provide on-scene triage and treatment of victims in a mass casualty event. This is an important resource for Cincinnati and the tri-state area as the team is deployable at the request of incident command and their deployment is not dependant on disaster declaration. Additionally, the American Red Cross provides volunteer liability and workers compensation.[28]

Each state has a National Guard Weapons of Mass Destruction Civil Support Team that may be available at the request of incident command, state or federal government to assist responders in mitigation of a terrorist incident if weapons of mass destruction are used to injure civilians. Teams augment local resources with enhanced capabilities as the first military responder. Their role is to assist with identifying agents, assessing current and projected consequences, advising on response measures, and assisting with appropriate requests for state support.

Some states and intrastate regions have developed medical response teams. Examples are California's Medical Assistance Team (CALMAT), Illinois Medical

28 Thomas Robin, Chief Nurse, Office of Emergency Services, Cincinnati Chapter, American Red Cross, phone interview with author, November 28, 2007.

Emergency Response Team (IMERT), and Hampton Roads Virginia's Metropolitan Medical Response Strike Team (HRMMST). These teams are primarily made up of medical and other first responders who are able to deploy during disaster to assist with patient triage and treatment, agent identification and containment, and patient decontamination if warranted. These are important resources to these communities as they train together and bring specialized skills to an incident that reduce the incidence of human suffering after disaster strikes their communities.

The National Disaster Medical System (NDMS) consists of three levels of preparedness. First is Disaster Medical Assistance Teams (DMAT). They represent sixty six of the of the one hundred six federal response teams. Other teams include Veterinary Medical Assistance Teams, Disaster Mortuary Operational Response Teams, radiation response teams, surgical teams, and other specialty response teams.

Next is "Forward Motion." The federal government has seventy-two federal coordination centers either at or near airports, run by the Veterans Administration, to assist with the forward movement of patients from the scene of an incident to an appropriate, available hospital bed. Last is the database whereby NDMS hospital members post their daily or weekly hospital bed availability, which can be accessed by others online. If a disaster occurs, this database helps response team members identify where victims of the incident needing definitive care can be sent for treatment. These assets are important as they are comprised of large numbers of volunteers and equipment with critical, specialized skills that can be utilized in response to a large-scale mass casualty event. The draw back it that their activation has to be approved by the President and that they are not immediately available.

Private ambulances companies have significant assets. Many have more than the public sector. So much more that the Federal Emergency Management Agency is contracting with them in the amount of 500 million dollars to provide for each zone (a total of four, but each contract is for two zones), to have the capability to deploy a minimum of one hundred ground ambulances (twenty strike teams) and/or twenty-five air ambulances within six hours after request, and have the capability to deploy para-transit

vehicles to transport a minimum of 3,000 patients within six hours of request.[29] This future asset demonstrates the federal government's commitment to enhance EMS system response capability during disaster and include private sector resources into the response equation.

## F. FEDERAL DOCUMENTS

The last section reviews federal disaster planning documents including the National Preparedness Guidelines, the Fifteen National Planning Scenarios, the Target Capabilities List (TCL) and the Emergency Triage and Pre-Hospital Treatment section of the TCL.

As a result of the terrorist attacks of September 11, 2001, President Bush reorganized the federal government and created the U.S. Department of Homeland Security, which produced the National Strategy for Homeland Security as its first publication. The strategy yielded several Homeland Security Presidential Directives, including HSPD-8 that required the development of the National Preparedness Guidelines that define what it means for the nation to be prepared. In addition to establishing preparedness priorities, the four critical elements of the guidelines are the National Preparedness Vision, the National Planning Scenarios, the Universal Task List, and the Target Capabilities List. The national preparedness vision is "A NATION PREPARED with coordinated capabilities to prevent, protect against, respond to, and recover from all hazards in a way that balances risk with resources and need."[30]

The National Planning Scenarios (discussed in the next section) are the catastrophes identified by the federal government for which the nation needs to be prepared to protect against, respond to, and recover from. The Universal Task List (UTL) is the catalogue of tasks that may need to be performed by governmental, non-governmental, private-sector organizations, and the general public needed to prevent,

29 Federal Emergency Management Agency, Solicitation No. HSFEHQ-07-R-0069 (Washington, D.C.: Department of Homeland Security, 2007.

30 U.S Department of Homeland Security, *National Preparedness Guidelines*, (Washington D.C.: 2007), 1.

protect against, respond to, and recover from the range of threats and hazards identified in the National Planning Scenarios. The Target Capability List (TCL) was derived from the UTL's listing of tasks, consists of thirty seven core capabilities, and is the document used by planners to assess preparedness across the four mission areas (prevent, protect, respond, and recover). The National Preparedness Guidelines/Priorities include: the Overarching Priorities of Expand Regional Collaboration, Implement the National Incident Management System and the National Response Framework, and Implement the National Infrastructure Protection Plan. Capability Specific Priorities include Strengthen Information Sharing and Collaboration Capabilities, Strengthen Communications Capabilities, Strengthen CBRNE Detection, Response, and Decontamination Capabilities, Strengthen Medical Surge and Mass Prophylaxis Capabilities, and Strengthen Planning and Citizen Preparedness Capabilities. The National Planning Scenarios yielded from the guidelines put forth non-traditional incidents that the nation and EMS professionals may encounter and need to prepare for. Based on this information, traditional EMS response arrangements are adequate for day-to-day operations but inadequate to mitigate mass casualty incidents or those of national significance.

The Fifteen National Planning Scenarios describe threats or hazards of national significance and provide structure for the development of national preparedness standards from which preparedness capabilities can be measured.[31] The National Planning Scenarios are: Improvised Nuclear Device, Aerosol Anthrax, Pandemic Influenza, Plague, Blister Agent, Toxic Industrial Chemical, Nerve Agent, Chlorine Tank Explosion, Major Earthquake, Major Hurricane, Radiological Dispersal Device, Improvised Explosive Device, Food Contamination, Foreign Animal Disease, and Major Cyber Attack. [32] The document provides for each scenario a scenario overview, planning considerations for each incident, implications of the incident including secondary hazards, number of fatalities and injuries, estimated service disruption, economic impact,

31 U.S Department of Homeland Security, *National Planning Scenarios*, (Washington D.C., Department of Homeland Security, 2005),ii.

32 Ibid., i.

and long-term health issues. While none of these scenarios may be realized, ensuring preparedness for these catastrophes will make the nation more capable to mitigate other smaller scale disasters and everyday events. The document is a good tool for planers to review to understand the magnitude and complexity of response involved.

The 2007 version of the TCL contains thirty-seven core capabilities that describe and set targets for assessing preparedness across common capabilities and the four mission areas of prevent, prepare, respond, and recover for major all-hazard events. According to Michael Chertoff, "The Guidelines will serve as a framework to guide operational readiness planning, priority-setting, and program implementation at all levels of government."[33] Each of the thirty-seven capabilities contains a definition, an outcome, preparedness and performance activities, tasks, and measures. The TCL is a tool for guiding preparedness activities and setting benchmarks for specific performance tasks required to prepare for, respond to and recover from the disasters identified in the National Planning Scenarios. The capability definition for Emergency Triage and Pre-Hospital Treatment is:

> Emergency Triage and Pre-Hospital Treatment is the capability to appropriately dispatch emergency medical services (EMS) resources; to provide feasible, suitable, and medically acceptable pre-hospital triage and treatment of patients; to provide transport as well as medical care en-route to an appropriate receiving facility; and to track patients to a treatment facility. [34]

Sub-capabilities include develop plans, procedures, policies, and systems for triage and pre-hospital treatment; develop training and exercise programs for triage and pre-hospital treatment; direct and coordinate triage and pre-hospital treatment operations; activate triage and pre-hospital treatment operations; conduct triage; provide pre-hospital treatment; and transport patients treated by EMS. The preparedness measures provide metrics or performance benchmarks to obtain for specific activities within the sub-capabilities. While many of these performance measures do not apply to the evaluation criteria chosen for the paper, where appropriate some of these standards will be utilized

33 U.S Department of Homeland Security. *Target Capabilities List, A Companion to the National Preparedness Guidelines* (Washington D.C.: DHS, 2007), iii.

34 Ibid., 437.

to assess the case studies. Evaluation criteria are aimed at strategic level issues including costs and benefits, legal issues and ease or difficulty of implementation. These specific measures are not addresses in the Target Capabilities List.

## F. CONCLUSION

There is some academic literature regarding how the EMS community should prepare an all-hazards approach to disaster preparedness. The literature review revealed a lack of readiness for disasters as a current problem in the EMS community and identified that early attempts toward an integrated, coordinated, and regionalized emergency care system have been derailed over the years due to deeply entrenched political interests and cultural attitudes, in addition to funding cutbacks and practical impediments to change.[35] Additionally, the Institute of Medicine recommends disaster preparedness through funding and training and other courses of action.

While mutual aid agreements exist and are in use at all levels of government throughout the country, the most comparable to the EMS community for disaster response include those at the regional or state level that have accompanying response plans. Other forms of medical aid are available at the local, regional, state, and federal level, but require significant turn-around time prior to being able to mobilize on-scene and require disaster declaration prior to activation, as in the case of the Medical Reserve Corps volunteers or DMAT assets. As a result of the literature review the two response structures most applicable to EMS systems include MABAS-Illinois and regionally based medical response teams. Chapter III reviews history of disasters and disaster threats to the nation, assesses EMS disaster preparedness, reviews standard incident response structures, and proposes the need for change. Chapter IV lays out the evaluation criteria used to asses each case study in Chapters V and VI.

[35] Institute of Medicine, *Emergency Medical Services*, 6.

# III. BACKGROUND AND OVERVIEW

## A. OVERVIEW OF DISASTERS IN AND THREATS TO THE U.S.

From the time period of January 2000 to March 2007, there have been 377 Presidential Disaster Declarations in the United States. Severe storms led with 191, floods came in second at 62, and hurricanes in third at 35 — representing over half of the total declarations. [36]

Other types of hazards and disasters recognized by FEMA include chemical or hazard material incidents, dam failure, earthquakes, fires and wild fires, thunderstorms, tsunamis, volcanoes, winter storms, heat, landslides, nuclear power plant emergencies, and terrorism. [37] Any one of the disasters mentioned above or incidents in other forms, such as the I-35 Bridge Collapse in Minnesota or Virginia Tech shooting, may cause mass casualties. Terrorism incidents are designed to cause mass fatalities and injures and this is the reason terrorists choose weapons of mass destruction: chemical, biological, radiological, nuclear, and explosive (CBRNE) as their method of attack. Experts debate on the likelihood and probability of terrorists acquiring and using any one of these weapons and the weapons' success rate. Yet in terrorism incidents, explosives are the number one weapon used.

The National Planning Scenarios were discussed in the previous section. While each has the potential to create mass casualties, perhaps the most devastating are a nuclear detonation, contagious biological as in pandemic flu, a major earthquake, or hurricane. These incidents could extend from days to weeks in response and years in recovery. At the same time, smaller scale incidents that overwhelm local EMS capacity must be considered. In most areas, requesting additional assets beyond standard mutual aid agreements causes delays in response. This is unacceptable as "the speed and quality

36 Federal Emergency Management Agency, *Presidential Disaster Declarations Jan 3, 2007 – March 3, 2007*, Federal Emergency Management Agency, http://www.fema.gov/pdf/hazard/map/declarationsmap2000_07.pdf (accessed August 27, 2008).

37 Federal Emergency Management Agency, *Different Types of Disasters and Hazards,* Federal Emergency Management Agency, http://www.fema.gov/hazard/index.shtm (accessed August 27, 2008).

of EMS services are critical factors in a patient's ultimate outcome." [38] Automatic statewide mutual aid allows for immediate deployment of resources upon request, which allows for resources to arrive on scene sooner than traditional response structures that can have a positive affect on victim outcome.

## B. EMS AND DISASTER PREPAREDNESS

According to the Institute of Medicine "most EMS personnel have received little or no disaster response training for terrorist attacks, natural disasters, or other public health emergencies**,** have only received a tiny portion of the massive amount of federal funding directed to homeland security," and "EMS providers and state and local EMS directors are often excluded from critical disaster planning efforts." [39] Reasons discussed in the report include that often EMS is considered an extension of the fire service and has access to funding, equipment, and training through this affiliation. Another reason discussed is that many EMS providers are voluntary in nature. Some fear requiring too much from them may drive the volunteers away from service.

The Institute of Medicine report also mentions that "fewer than 33 percent of EMTs and paramedics have participated in a drill during that past year simulating a radiological, biological or chemical attack."[40] Even beyond an agent specific drill, many EMS professionals have had little exposure to mass casualty incident training where patient triage, treatment, and transport is performed. Additionally, many private EMS systems are not under requirements to receive National Incident Management System (NIMS) training as are their public counterparts. Thus, if used during mass casualty incidents their success at incident integration is questionable.

Furthermore, the report states "there are no EMS-specific standards and guidelines for the training and equipment necessary to respond effectively to a terrorist

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38 Institute of Medicine, *Emergency Medical Services*, 2006, 1.

39 Center for Catastrophe Preparedness and Response NYU, *Emergency Medical Services: The Forgotten First Responder—A Report on the Critical Gaps in Organization and Deficits in Resources for America's Medical First Responders.* (New York: Center for Catastrophe Preparedness and Response, New York University, 2005) quoted in Institute of Medicine *Emergency Medical Services: at the Crossroads* (Washington, D.C.: National Academies Press, 2006), 4, 176.

40 Ibid., 200.

attack or disaster."[41] This issue has been debated in disaster planning circles. Some feel each EMS provider needs to have individual equipment issued. Others feel it is appropriate to have equipment available in caches that can be brought to the scene if needed. Either way EMS systems need access to this equipment and need training in its use. Different scenarios will create various hazards in which EMS providers need to be protected.

## C. STANDARD INCIDENT RESPONSE

For incidents that occur, the first level of response will be from the jurisdiction where the incident occurred with the execution of standard mutual aid agreements. Some areas have access to deployable medical response teams that may or may not have be requested through a local or county emergency operations center (EOC) .The incident commander then has the ability to request additional resources through the local or county emergency operations center. These requests then go to state emergency management agencies that fulfill the request. Within some states, command has immediate access to additional fire and EMS resources upon request that do not require a declaration to obtain. In many states, all other requests for personnel to deploy on scene to assist require differing levels of disaster declaration. This includes additional first response assets, Medical Reserve Corps volunteers in some areas, and Disaster Medical Assistance Teams.

Even communities that border state lines may not have access to resources that may be closer in neighboring states then resources within their own states due to lack of reciprocity agreements between states and cross-border assets needing request through EMAC. The gap in response to mass casualty incidents is the point where standard mutual aid agreements are exhausted and when additional resources can arrive on scene due to lack of or delayed disaster declaration. Other states and jurisdictions have filled this gap by creating and pre-planning local or regional medical response teams, such as the Hampton Roads Metropolitan Medical Response Team or the San Francisco

41 Institute of Medicine, *Emergency Medical Services*, 176.

Metropolitan Medical Task Force, or by creating automatic state-wide or region-wide mutual aid, as MABAS in Illinois and the Northern Virginia Response Agreement.

The initial shortfall with the status quo is the declaration requirement that slows deployment of resources. Second is the lack of consideration of all types of EMS resources for integration into response structures. Entities that do not regularly respond to alarm calls should be considered in disaster preparedness along with EMS response agencies. Third is the lack of training and exercises completed by EMS professionals. While speed of response and timely patient care is critical to patient outcome, if personnel can not integrate effectively into the scene, then this will only create confusion and hamper scene efficiency and effectiveness. Fourth, without exercises, training is not reinforced and learning that translates into effective performance is questionable. Fifth, communities that border other states may wait longer for in-state assets then they would from closer communities across state borders if reciprocity agreements were in place. Lastly, asset response is not pre-planned. High hazard venues should have apparatus that will automatically be deployed upon an incident such as a shooting incident at a local university or high school.

## D. THE NEED FOR CHANGE

Incidents that require fire and EMS response can be broken down into three categories or "tiers," whether caused by terrorist acts or by natural causes. The *California Disaster Medical Operations Manual* (prior version) identifies three levels of medical incidents. The first, Level I Medical Incident, is the incident that can be mitigated by departmental resources with the assistance of standard mutual aid agreements if needed. A Level II Medial Incident is the incident that overwhelms local resources and requires resources from a regional response and perhaps single state resource. A Level III Medical Incident requires larger than a regional response, and involves state and perhaps federal resources. For most municipalities the Level II and III incident types represent the gap in response to mass casualty incidents that overwhelm local standard mutual aid agreements. The Level II category may or may not obtain disaster declaration status.

Level III is an incident large enough in scale to warrant disaster declaration status. Furthermore, as incident jurisdictional resources are responding to the incident, regular service delivery still needs to occur.

Terrorism incidents cannot be predicted with any certainty. Additionally, the attacks executed by Timothy McVeigh and Eric Rudolph further demonstrate that terror attacks are not limited to New York City nor only executed exclusively by Islamic extremists. The university shootings at Northern Illinois University and Virginia Tech reveal a disturbing trend. The I-375 Bridge Collapse reveals fallibility in the nation's infrastructure. Many are injured annually as a result of tornadoes and flooding as in the recent flooding in Iowa. Other states can become victims as well to mass casualty events, regardless of origin. With disasters increasing in frequency and expanding in scope, EMS agencies need to continue to work toward integration and planning for Level II and Level III type events and other disasters.

Table 1 suggests the number of EMS professionals required to mitigate terrorism incidents where chemical, biological, radiological, nuclear, and explosives (CBRNE) were used as the weapon of choice. These figures were taken from the September 2007 version of the Target Capabilities List from the Emergency Triage and Pre-Hospital Treatment section.

**Table 1. CBRNE Events and EMS Needs.**

| Type of Event | Snapshot of Ambulance Needs (2 EMS Personnel per transport vehicle) | Time Frame |
|---|---|---|
| Biological (Communicable) | -20-30% of population affected. 50% of sick requiring transport. | Days-months |
| Biological (non-Communicable) | -4% exposed become infected, 25% of them require transport. | Days- weeks |
| Chemical | -25% exposed require transport | Hours-days |
| Explosive | -100 fatalities/500 injured – 50% require transport (approximately 125 ambulances each reporting twice) | First hours |
| Radiological Dispersal Device | -180 fatalities, 270 injuries, up to 20,000 exposed, 50% requiring transport. 135 ambulances, one transport. | Hours |
| Nuclear | -Tens of thousands. | Hours to days. |

Respond Mission: Emergency Triage and Pre-Hospital Treatment [42]

In revisiting the Institute of Medicine's vision of a twenty-first century emergency care system, "dispatchers, EMS personnel, medical providers, public safety officers, and public health officials will be fully interconnected and united in an effort to ensure that each patient receives the most appropriate care, at the optimal location, with the minimum delay."[43] While victims of mass casualty incidents are subject to altered standards of care due to available resources, the goal is still to assist as many victims as possible to increase chances of favorable outcomes. The best way this can occur is to swiftly integrate the appropriate number of EMS personnel and other first responders into the scene. The Federal Emergency Management Agency considers the terrorism threat serious enough to contract with private ambulances to provide the capability to deploy a minimum of 100 ground ambulances (20 strike teams) and/or 25 air ambulances within six hours of request and have the capability to deploy para-transit vehicles to transport a minimum of 3,000 individuals within six hours of request.[44] This EMS support resource

[42] U.S Department of Homeland Security, *Target Capabilities List, A Companion to the National Preparedness Guidelines*, (Washington, D.C., Department of Homeland Security, 2007), 446, 447.

43 Institute of Medicine, *Emergency Medical Services: at the Crossroads*,5.

44 Federal Emergency Management Agency, Solicitation No. HSFEHQ-07-R-0069, Washington, D.C.: FEMA, 2007.

will be critical during extended and multiple operational periods. However, incidents in Level II Medical category still need to be addressed.

The potential for disaster is clear whether natural or man-made in nature. The discussion of EMS planning shows a lack of readiness for disasters as a current problem in the EMS community due to lack of: training and exercises, full integration into disaster preparedness, and access to personal protective equipment accompanied with training. At the same time, standard response structures are inadequate for the disaster scenarios faced by communities today. The following chapters examine in detail how other states have addressed the gap in mass casualty response. Chapter IV discusses the evaluation criteria used to examine both case studies presented in Chapters V and VI.

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# IV. EVALUATION CRITERIA

The criteria chosen is aimed at overarching strategic issues for decision makers to review and consider the feasibility of adopting one or more portions of the evaluated response/mass casualty response structures and methods. The criteria adopted are from Eugene Bardach's suggested evaluative and practical criteria. [45] These include costs and benefits (or efficiency), legality, political acceptability, improvability, and robustness (success at implementation). Based on the author's experience in policy and program development, these measures are commonly deliberated upon prior to and during program development and adoption. Adopting performance measures and metrics form the Target Capability List, Emergency Triage and Pre-hospital Treatment for case study evaluation criteria was used where appropriate.

The Target Capability List identifies specific capabilities required to prevent, protect against, respond to, and recover from disasters identified in the 15 National Planning Scenarios, spawned from the National Preparedness Guidelines that define what it means for the nation to be prepared for the next catastrophe. However, many of these metrics are vague in some areas and too specific in others. For example, one of the preparedness measures for Emergency Triage and Pre-hospital Treatment states, "written mutual aid protocols and procedures for EMS support are in place" with the metric "Yes" or "No."[46] This measure is not specific enough and leads to the question to what degree? Should mutual aid protocols and procedures for EMS support be considered at the local, regional, or state level? At the same time, these measures can also be too specific in other areas for the purpose of evaluating response structures at the strategic level to consider for adoption. Furthermore, critical measures such as financial costs involved for program development are not considered in the Target Capability List metrics. Thus the criteria

45 Eugene Bardach, *A Practical Guide for Policy Analysis, The Eightfold Path to More Effective Problem Solving* (Washington D.C., CQ Press, 2005), XIV, 25-30.

46 U.S Department of Homeland Security, *Target Capabilities List, A Companion to the National Preparedness Guidelines* (Washington, D.C., DHS), 438.

chosen for review include benefits, costs of both money and time, legal issues, and ease/difficulty in implementation for each case study.

After an overview, each case study is given a score against each of the criteria of "meets" or "exceeds standards or expectations." Each case study criterion will be measured against a standard where a standard is available. If a standard is not available the criterion will be measured against what would be reasonable expectations for each measure. For example, it is reasonably expected that individuals and agencies will initially resist change when introduced. For this resistance to prevent change, however, would not be reasonably expected. While expectations may be different for different individuals, the narrative section provides supporting information for the assigned score, with which readers are welcome to disagree.

For items such as costs, only readers can decide whether the associated cost outweighs the benefits of program implementation. In this case, costs would "exceed expectations" considered for program implementation. Does the dollar amount to adopt and implement the program outweigh the benefits of automatically deploying EMS resources to the scene of a mass casualty incident with the assumption that the decrease in response time will improve patient outcome? The narrative discussing the score will give information from the case study on the specific measure. From this information reviewers can decide if the criterion meets or exceeds standards or expectations. The analysis section for each case will based on the data discussed and the authors perspective and experience.

Two alternate methods states are using to fill the gap in response from when standard response is deployed to when state and federal aid can arrive for acute mass casualty events are adopting statewide or region-wide automatic mutual aid and developing medical response teams. The two case studies chosen are MABAS Illinois, which utilizes statewide automatic mutual aid, and the Hampton Roads Metropolitan Medical Strike Team. Both were chosen because they are considered best practices in their field. Hampton Roads was able to pass legislation to ensure funds for sustainability and have a well-thought-out training and response plan. MABAS-Illinois has been in

existence for forty years and successfully responds to over 850 incidents a year that include both everyday incidents and disasters. Additionally, the incident reviewed for the MABAS case study is the successful response to the Northern Illinois University shooting, which could occur anywhere, an example for mutual aid pre-planning for mass casualty incidents whether created by terrorists or otherwise.

The metrics chosen are aimed at overarching strategic issues for decision makers to review and consider the feasibility of adopting one of or portions of the evaluated mass casualty response structures and methods. The resulting analysis is meant to create discussion on the adequacy of current response structures and propose possible solutions to fill the current gap. Implementation or program adoption decisions cannot be made on the information presented in this thesis alone. Deliberation among stakeholders and possible further research on this issue is the expected outcome.

The information obtained for each case study involved online web sources and news articles (where appropriate), after action reports, and interviews with those involved in each program who were able to provide additional information and perspective in each case. Interviewees provided additional documentation when requested. Findings will be elaborated upon in the narrative section of Chapters V and VI. The following section describes the evaluation criteria in greater depth.

## A. EVALUATION CRITERIA

This section gives an in depth discussion of the criteria chosen followed by a table for review. The end of the section discusses the limitations on the chosen criteria.

### 1. Benefits

In the case of emergency, the time EMS arrives on scene to render triage, treatment, and transport of victims to hospitals where definitive care can be delivered has a direct positive affect on patient outcome, particularly in the case of trauma injuries.

> The Golden Hour is defined as the time period of one hour in which the lives of a majority of critically injured trauma patients can be saved if definitive surgical intervention is provided. Sixty minutes from the moment of injury to notify the police; dispatch an ambulance to the scene;

> transport the victim to a hospital; summon the appropriate surgical and support staff; and perform the necessary life-saving surgery.[47]

Additionally, "the speed and quality of EMS services are critical factors in a patient's ultimate outcome." [48] Depending on the type of natural or man-made disaster or weapon used by terrorists, mass casualties may be the result. In the case of terrorism, however, explosives are the number one weapon used designed to create mass fatalities and injuries due to desired effect, low cost, and availability.[49] This being the case, all victims may not survive the attack nor have critical injuries that need definitive care for survival. The measure of time from the attack to when EMS resources arrive on scene is not a guarantee of patient survival, but does provide a useful measure that better predicts a positive outcome for the patient than if longer times exist before victims receive treatment. Time from initial injury to treatment can also have a positive affect on patient outcome after a chemical attack, trauma related injuries from nuclear or radiological "dirty bomb," or improvised explosive device attack. The standard used for this measure is adopted from the Target Capabilities List. The time in which sufficient and appropriate medical equipment and supplies are readily available to on scene personnel is within 2 hours from initial units arriving on scene. [50] Thus, the standard used will be 2 hours.

There is no specific standard for the impact on patient or victim outcome after a mass casualty event. Optimally, the goal is to provide pre-hospital treatment appropriate to the nature of the incident and number of injured victims to reduce fatalities and the incidence of human suffering. [51] Standards identified in the TCL appropriate for this measure include: the time in which injured patients receive initial treatment by appropriately credentialed on scene medical personnel- within 30 minutes from initial

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47 The University Hospital of Medicine and Dentistry of New Jersey, "The Golden Hour," University Hospital, http://www.theuniversityhospital.com/trauma/gold.htm (accessed July 13, 2008).

48 Institute of Medicine, *Emergency Medical Services*,1.

49 U.S. Department of Homeland Security, Office of Domestic Preparedness, *WMD Hazardous Materials Technician Training Manual* (Anniston, Alabama: Center for Domestic Preparedness, 2003), THR-28.

50 U.S Department of Homeland Security, *Target Capabilities List, A Companion to the National Preparedness Guidelines*, (Washington, D.C., Department of Homeland Security), 440.

51 Ibid., 441.

units arrival on scene, the percent of patients transported in vehicles appropriate to each patient's conditions and the nature and magnitude of the incident- 100 percent, the time in which patients are transported-within 2 hours from initial units arrival on scene, and the time in which mass casualty patient transport is coordinated with the appropriate treatment facility- within 30 minutes from EMS Transportation/ Communications Officer arrival.

Within the profession of EMS, response time intervals (from the call arriving at dispatch to unit arrival on scene) are one of the most common and most evaluated indicators of quality. There is no accreditation standard for EMS units to arrive on scene to a response call. Agencies establish their own parameters, and if accredited, the agency established standard will partially be what the accrediting body judges "success of service delivery" against. Consequently, there is no response standard for mass casualty incidents but time measures for response and initial treatment are reasonable measures for this criterion. Thus, the following four standards discussed above will be utilized to judge the impact on patient/victim outcome for both cases studies.

Although there is no standard for success on how many victims transported by EMS from the scene to the hospital perish once they leave EMS care, this outcome should also to be considered. Victims of any mass casualty event have a better chance of survival to due EMS care than they would otherwise. Without care these patients may perish on scene. There are many factors that affect patient outcome; type of injury to the patient, if all critically injured patients received ALS care, if patients were properly triaged, if there were enough available resources at the hospital to attend properly to patient needs, or if the receiver of victims had to triage medical resources as well toward the most critically ill patients. All of these other factors are variable and can affect patient outcome. Although important to consider, victim deaths after transfer to the hospital will not be measured.

Political resistance is intended to measure the degree of public/ political negativity or internal resistance to program adoption and implementation in its beginning stages. There is no standard to measure political resistance, but this must be taken into account when considering adopting in new program. The narrative section following each

case will discuss challenges each program administrator faced when developing his or her programs. It will be up to the reviewer of the information to decide whether the level of political resistance meets or exceeds standards. The resistance or negativity can be the result of trying to implement a new program, as in the case of Hampton Roads developing a medical response team, or be the result of an effective or ineffective response to an incident. This measure can gage the resistance to change or pressure for change against the status quo. The limitation of this measure is that comprehensive surveys of the public or program members for each evaluated system were not conducted to better answer this question. The answer to this criterion is derived though interviews with a convenient sample of experts, practitioners, and news articles (where appropriate).

Does the program add to public value; are communities better off than they were before? The degree that other states and jurisdictions have developed special medical response teams or enhanced existing mutual aid agreements suggests that these changes have added public value by providing an enhanced or more efficient means of response, and these communities are better off than they were before at both the providing and receiving end of services. The measure here is the extent that government players affected by the change support and willingly become a part of the program. Since there is no standard to measure public value or the degree to which government entities affected by the change support the change, the assigned grade of meets or exceeds expectations will be supported by evidence in the narrative section. Entities engaging in the program demonstrate they are in a better position to provide the same or more enhanced services to their communities otherwise they would opt out of the program.

**2. Costs**

Costs involved can be broken down into monetary, initial/start-up, ongoing/operational, and time investment in manpower and personnel training for each program. Dollar figures will be provided where available while other costs need to be inferred. For example, for MABAS Illinois all jurisdictions involved in the program have a special radio for dispatch tuned to a primary state-wide channel that alerts when assistance is summoned. In this example, one of the initial costs will be the cost of the radios while the ongoing/operational cost will include radio maintenance and user fees.

While a dollar figure will not be attached to this cost, the amount can be inferred and readers need to decide if these costs meet or exceed expectations. The author's judgment is provided with supporting evidence in the narrative section. An overview of costs involved will be explained in more detail for each case study. Actual dollar figures attached to costs would provide a more compelling argument, but these costs can be obtained in the future if decision makers want to consider pursuing one of or a part of one of these system options.

Both time criteria, time for program maintenance and time for personnel training, will be measured in a similar fashion. Aggregate activities that require manpower to maintain each program will be discussed along with associated training requirements. As there is no established standard related to each task for the amount of time it will take to develop either program, the findings will be ranked against expectations. Explanation of time requirements for each case will be reflected in the narrative section for each case study. This measure could also attach estimated dollar figures, but will be left for further research if considered for implementation.

### 3. Legal

The National Emergency Management Association's Model Intrastate Mutual Aid Legislation Document was reviewed to extract critical elements that should be stated in any mutual aid agreement and used as the standard against to measure both case studies. These elements include who is responsible for grantor of aid employee liability for scope and quality of practice performed; compensation should the grantor of aid's employee get injured; a process and payment for damaged equipment; how to activate aid request and a process or procedure for resource integration into the requestor's incident; a procedure for dispute resolution; reimbursement procedures for aid rendered; and a procedure if resources not requested arrive at the disaster site. Legal issues addressed in pre-planning incident response through pre-arranged signed agreements by involved parties establish expectations and facilitate resource requests and response. If not specifically stated in a mutual aid agreement the information was sought in established response plans.

### 4. Implementation

The implementation criterion is intended to measure the challenges for implementation for the response structures evaluated. Each system had a number of tasks with associated challenges or barriers that had to be overcome in order for the final product to emerge and become a workable system. The number of tasks and associated challenges need to be taken into consideration when evaluating the system. Perhaps the challenges outweigh the benefits of the system. Or, certain aspects of either system can be considered while not others because of the challenges that need to be overcome prior to full system adoption. The intent of the measure is to answer the question what will it take and how difficult will it be to make it happen? This information is obtained by interviews from program leaders and participants. As there is no standard to gauge difficulty or ease of implementation, only readers can make this assessment and weigh this against program benefits; thus, the mark here will be assigned against expectations with an explanation of the author's judgment.

The presented evaluation criteria is intended to give decision makers an overview of enhanced methods for disaster response that are used by other states and jurisdictions and their associated costs and benefits to implement. While a decision to adopt all of or a part of either system may not be made based on the findings in this thesis, the results may prompt further inquiry into these systems that may be more effective than the current system that exists for mass casualty response. Perhaps current legal structures in states for disaster response will render either of the reviewed systems useless. In the latter case, these options can be considered in the future

See Table 2 on the following page for an itemized listing of criteria. The criteria include benefits, costs of time and money, legal issues, and implementation tasks and barriers. Each will be weighed against a meets or exceeds standards or expectations for each case study.

## B. LIMITATIONS

There are several limitations to the criteria chosen to assess the chosen case studies. The first limitation is the overarching perspective. While intended to provide a

strategic overview, limited information on each system is provided. Further research would need to be conducted to assign actual dollar figures to costs for decision makers to consider plan adoption.

**Table 2. Evaluation Criteria**

E = Exceeds Standards or Expectations, ME= Meets Standards or Expectations

| Criteria | Score |
|---|---|
| **Benefits:** | |
| Time sufficient medical resources on scene | |
| Impact on patient/victim outcome | |
| Political resistance | |
| Public value | |
| | |
| **Costs:** | |
| Financial- initial, start-up | |
| Financial- ongoing | |
| | |
| Time-program maintenance-manpower | |
| Time-program maintenance- personnel training | |
| | |
| **Legal:** | |
| Liability/immunity | |
| Workers comp | |
| Equipment damage | |
| Activation/operational process/procedure | |
| Dispute resolution | |
| Reimbursement | |
| Self deployment | |
| | |
| **Implementation:** | |
| Tasks required | |
| Barriers | |

The second limitation is that two of the benefit measures, time sufficient medial resources on scene and impact on victim/patient outcome do not consider incidents where decontamination would need to be performed prior to patient treatment. It is assumed that triage and decontamination functions would be performed by fire crews on scene before EMS would treat patients if required. This model does not discuss personal protective requirements for EMS personnel responding to incidents requiring higher levels of

protection that go beyond universal precautions. In this case, decontamination requirements may prolong patient treatment and therefore affect patient outcome.

Another limitation in measuring victim survival after leaving EMS care is related triage affects. Due to incident size and limited resources patients that may have survived in a single incident with full pre-hospital attention and emergency care could have been triage tagged as black or expectant although they have not yet perished. With full pre-hospital and definitive care in a single incident causing similar injuries these victims may have survived.

Many variables affect patient outcome: mechanism of injury sustained by the patient, level of care provided by EMS, level of care provided at the hospital due to available resources, etcetera. Basically, regardless of the scope of disaster and available resources victims may or may not have had the chance at survival anyway. While these limitations are realized, creating response structures that allow for the immediate dispatch of sufficient EMS resources to arrive and integrate into mass casualty events can only improve victim survivability and reduce the incidence of human suffering.

The final limitations on the chosen criteria are that political resistance (the degree of public, political, or internal opposition to the program) is estimated through interviews, news articles, and online information. A comprehensive survey of program participants and members of the community would better measure this criterion. Also, the tasks required and barriers to implementation are intended to capture an overarching view instead of being an itemized listing. The findings in this section were derived from interviews of those involved in program management.

Chapters V and VI evaluate both case studies using the criteria presented in this chapter. As discussed, some measures will be judged against expectations as there is no established standard by which to judge the criterion. Each criterion is important to consider when reviewing these cases for possible adoption. However, the discussion following the evaluation will give readers and decision makers more insight to judge for themselves whether the criterion meets or exceeds standards or expectations because

expectations for many of these criteria will be judged differently by different individuals. The author's judgment will follow in the narrative and analysis sections for each case.

The following chapter reviews the Hampton Roads Metropolitan Medical Strike Team and their performance in Operation Chain Reaction, a three part exercise evaluating response to a radiological dispersal device at a musical event at a local theatre. The series began as a table-top exercise, escalated into a functional, and then concluded with a full-scale exercise on three different days.

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# V. CASE STUDY 1: HAMPTON ROADS, VIRGINIA METROPOLITAN MEDICAL STRIKE TEAM

Based on the literature review, one way localities and states have addressed filling the gap in response from executing standard mutual aid agreements to receiving state or federal aid during disaster is to develop local or regional medical response teams. The first case study chosen for review is the Hampton Roads Metropolitan Medical Strike Team (HRMMST). The Hampton Roads Metropolitan Medical Strike Team was selected because it is recognized as a best practice within the Metropolitan Medical Response System community. The HRMMST serves a sixteen-jurisdictional area in the southeast part of Virginia, and is financially sustained through a per capita assessment and programmatically by the Hampton Roads Metropolitan Medical Response System. The Team brings enhanced mass casualty response capability and expertise to incidents of terrorism for the sixteen-jurisdictional district.

## A. HAMPTON ROADS METROPOLITAN MEDICAL STRIKE TEAM

Hampton Roads is one of Virginia's district planning commissions, a regional organization representing sixteen local governments located on the southeast corner of the state. Their purpose is to encourage and facilitate local government cooperation and state-local cooperation in addressing, on a regional basis, problems of greater than local significance.[52] The commission combines four Metropolitan Medical Response System (MMRS) programs in the sixteen jurisdictional regions to become the Hampton Roads Metropolitan Medical Response System (HRMMRS) and is managed by contract with the Tidewater EMS Council. [53] Being within the first groups of MMRS cities, medical response team development was optional under the contract beginning in 1999. The

52 Hampton Roads District Planning Commission, "About Us," Hampton Roads District Planning Commission," Hampton Roads District Planning Commission, http://www.hrpdc.org/AboutUs.asp (accessed July 17, 2008).

53 HRMMRS jurisdictions include the cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg, and the counties of Gloucester, Isle of Wight, James City, Southampton, Surry and York. The HRPDC contracts with the Tidewater EMS Council to manage the activities of the HRMMRS.

Hampton Roads Metropolitan Medical Strike Team (HRMMST) is a 250-member call group (47-member team when activated) designed to respond to and support chemical, biological, radiological, nuclear, and explosive (CBRNE) incidents. [54]

Team mission tasks include conventional mass casualty response, pre-deployment at mass gathering events, response to a hazardous materials release with regional hazmat team integration, chemical, biological, radiological, nuclear, or explosive (CBRNE) release, CHEMPAK operations, intermediate care operations, mass prophylaxis, SNS Distribution, forward movement of patients, and NDMS integration. [55]

Specific team capabilities include medical consultation and coordination; training and providing an HRMMST Liaison; decontamination of victims; warm zone triage; primary EMS/medical care; antidote administration; first responder protection; monitoring and detection for efficacy of decontamination; EMS/medical triage, treatment, transportation and coordination; and coordination of forward movement of patients[56]

### 1. Operation Chain Reaction

Due to lack of HRMMST mass casualty response and available data, a full-scale exercise will be used to assist in evaluating the two benefits criteria, time sufficient medical resources on scene and impact on patient/victim outcome. Operation Chain Reaction was a three-part exercise series conducted by the Hampton Roads Metropolitan Medical Response System (HRMMRS) in cooperation with the Virginia Department of Emergency Management (VDEM) on April 3, 2007.[57] The focus for the information will

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[54] Hampton Roads Metropolitan Medical Response System, "Fact Sheet," Hampton Roads Metropolitan Medical Response System, http://www.rmmrs.org/news%20articles/fact_sheet.htm (accessed May 20, 2008).

[55] Hampton Roads Metropolitan Medical Response System, *Orientation Briefing*, Hampton Roads Metropolitan Medical Response System, http://www.hrmmrs.org/MMRS_Secure/index.html (accessed May 20, 2008).

[56] Ibid.

[57] Hampton Roads Metropolitan Medical Response System, *Operation Chain Reaction Exercise Series Consolidated After Action Report* (Hampton Roads, Virginia: Hampton Roads Metropolitan Medical Response System, July 2007).

be derived from the full scale exercise. The exercise was intended to evaluate response to an explosion of a radiological dispersal device (RDD) at the Virginia Beach Amphitheater during a music performance.

Participants included individuals from multiple jurisdictions and agencies that would have active roles in responding to incidents that create mass casualties as in the case of an RDD explosion. As they would during a real incident, participants performed their regular emergency response roles during the exercise. Players responded to information that resulted in action in relation to the scenario. As a result, player actions drove the exercise as the exercise was evaluated.

Pertinent exercise objectives for the full-scale exercise included: evaluate the capability to implement the Incident Command System (ICS) in response to an RDD incident and the effective transition to a unified command; assess the capability of response personnel to detect, identify, monitor, and respond to the effects of an RDD incident; examine the ability of local response agencies to implement victim, personnel, and equipment decontamination in an RDD incident; assess the ability of the incident commander to activate HRMMST and of HRMMST to assemble and respond with equipment cache to incident; assess the ability of local medical facilities to implement triage, decontamination, treatment, and patient tracking procedures for both transported and self-referral patient.[58]

## B. HAMPTON ROADS METROPOLITAN MEDICAL STRIKE TEAM-EVALUATION

The following section discusses the Hampton Roads Metropolitan Medical Strike Team Evaluation. A comprehensive view of the evaluation can be seen on in Table 3 of this chapter.

[58] Hampton RoadsMetropolitian Medical Response System Opreation Chain Reaction Exercise Series Consolidated After Action Report (Hampton Roads Vriginia: Hampton Roads Medical Response System, 2007).

### 1. Benefits: Time Sufficient Medical Resources on Scene

According to the Hampton Roads Metropolitan Medical Strike Team Activation Guide, the time goal from activation to arrival on scene for the team is two hours.[59] The Target Capability List also recommends the two hour goal be reached to have adequate medical resources on scene during mass casualty events from the time of dispatch to arrival on scene. The actual time for the HRMMST arrival on scene from time of dispatch during the Operation Chain Reaction full-scale exercise was one hour.[60] Although the artificiality of the exercise should be taken into account (participants knew they were going to participate in full-scale exercise on July 9, 2007) the structure of the team calls for a three-deep call list of participants on both sides of the James River as some team members might not have been available the day of the call or access via bridges to the west side of the jurisdiction might not have been accessible at any given time due to vessel passing. Based on the information provided, this category receives exceeds standard rating because they arrived to the scene in half the expected time.

### 2. Benefits: Impact on Patient/Victim Outcome

The exercise utilized four hundred victims (a mix of rescue dummies and live individuals) that were placed at the Amphitheatre.[61] Upon explosion of the bomb and radiological dispersal device from concert speakers, some individuals self-rescued to the hospital while others remained and awaited rescue. Remaining were two-hundred and thirty seven victims, all of whom were rescued and put through gross decontamination within the first half-hour of the incident.[62] First responders utilized their gamma ray detectors and within the first few minutes recognized they would have to operate in a contaminated environment. After gross decontamination, patients were run through portal monitors to ensure complete removal of radiological materials. If radiological particles were detected, patients received technical decontamination then were put through the

[59] William Ginnow, Program Manager, Hampton Roads Metropolitan Medical Response System, phone interview with author, May 16, 2008.

[60] Ibid.

[61] Ibid.

[62] Ibid.

portal monitor a second time to ensure they were free of contamination. This process, from the start of the establishment of gross decontamination to when all the victims were completely decontaminated, took two hours.[63] Patients were then transported to surrounding hospitals via ambulances and busses depending on their level of injury.

Specific measures:

- The time in which injured patients received initial treatment by appropriately credentialed on scene medical personnel- within 30 minutes from initial units arrival on scene, Actual- 4 minutes (decontamination started).
- The percent of patients transported in vehicles appropriate to each patient's conditions and the nature and magnitude of the incident- 100 percent, Actual- 100 percent.
- Time in which patients were transported-within 2 hours from initial units arrival on scene, Actual 2 hours patients were decontaminated then transport began,
- Time in which mass casualty patient transport was coordinated with the appropriate treatment facility- within 30 minutes from EMS Transportation/ Communications Officer arrival. Unclear.

Based on the information above, the category receives a meets standards rating. While three of the four specific standards above are met, the incident also included a radiological dispersal device where victims had to be decontaminated prior to treatment and transportation and this delayed transport operations. Also taken into account is the artificiality of an exercise versus the chaos of a real incident.

### 3. Benefits: Political Resistance

During team origin, Hampton Roads had to spend time convincing participant jurisdictions of the need for the resource. Many believed building the team would be redundant as areas in Virginia have comprehensive regional mutual aid agreements. Additionally, team members would be comprised of fire and EMS personnel from Hampton Roads jurisdictions who may be involved in the incident with their agency making them unavailable for team response.

[63] Ginnow interview.

Today the team is robust with a comprehensive organizational structure and high level of expertise. According to the Operation Chain Reaction After-Action Report, however, "the lack of familiarity with the role of the HRMMST and how to activate it during a response of this magnitude was apparent."[64] This observation proves to be an area of opportunity for the team to educate disaster decision makers on its availability and the value the asset brings to the jurisdiction. Political resistance is anticipated in this example because developing a new medical response team might not be perceived as needed by many. Based on the information provided, political resistance receives a meets expectations rating.

#### 4. Benefits: Public Value

The HRMMST expands medical response capability for mass casualty incidents for the Hampton Roads jurisdiction. The team provides on-scene expertise and resources at mass casualty incidents and maintains redundant response capability of personnel and equipment. The team is a local mutual aid response asset representative of most jurisdictions and many disciplines. Both large and smaller cities and counties within Hampton Roads benefit from the resource and contribute twenty cents per capita toward team and HRMMRS maintenance costs.[65] Although responding agencies need to be made more aware of this asset and its capabilities, the team with its high level of training, expertise and available equipment to assist at mass casualty events adds to public value within the Hampton Roads district. Based on the team maintaining a roster of 250 members representing sixteen jurisdictions for multiple disciplines including fire, hazardous materials, EMS, public health, law enforcement, hospitals, and communications professionals, and that affected jurisdictions contribute .20 cents per capita for sustaining the team suggesting a high level of support for the team, the criterion earns an exceeds expectations rating

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[64] Hampton Roads Metropolitan Medical Response System, *Operation Chain Reaction*, 3.

65 Hampton Roads Metropolitan Medical Response System, "Achieving Preparedness through Regional Cooperation," (presentation to Tidewater EMS Council, Inc., Board of directors, July 19, 2007) Hampton Roads Metropolitan Medical Response System http://www.hrmmrs.org/MMRS_Secure/index.html (accessed May 20, 2008).

### 5. Costs: Financial- Initial

The initial DHHS contract with Hampton Roads was valued at two million dollars.[66] This dollar amount supported both team start-up, equipment purchases, and other MMRS activities for the district. These include pharmaceutical caches; personal protective equipment for public safety agencies, hospitals, public health and medical examiner personnel; decontamination systems for all area hospitals; radiation detectors for fire/EMS and law enforcement vehicles; CBRNE identification equipment for public health and HAZMAT teams; communication equipment for hospitals and public health; medication temperature control equipment for responder vehicles; and supplies/equipment for mass prophylaxis dispensing centers.[67] Team development, sustainability and MMRS activities compliment each other under the jurisdiction's goal to support and enhance Hampton Roads public safety, hospital, public health, and emergency management response capabilities to manage mass casualty incidents during the first 48 hours prior to the arrival of federal assets. It is unclear as to how much of the initial budget went to team development. This amount exceeds expectations for team start-up, meaning that for most jurisdictions, without combining with other jurisdictions and receiving grant funds, developing a medical response team would be cost prohibitive.

### 6. Costs: Financial- Ongoing

Sustainment costs for both the team and other MMRS activities that support their mission are estimated at three hundred thousand dollars annually.[68] This amount supports training and exercises, replacement of expired medications and supplies, plan

66 Hampton Roads Metropolitan Medical Response System, "Achieving Preparedness through Regional Cooperation," (presentation to Tidewater EMS Council, Inc., Board of directors, July 19, 2007) Hampton Roads Metropolitan Medical Response System http://www.hrmmrs.org/MMRS_Secure/index.html (accessed May 20, 2008).

67 Hampton Roads Metropolitan Medical Response System, "Fact Sheet," Hampton Roads Metropolitan Medical Response System, http://www.hrmmrs.org/news%20articles/fact_sheet.htm (accessed May 20, 2008).

68 Hampton Roads Metropolitan Medical Response System, "Achieving Preparedness through Regional Cooperation," (presentation to Tidewater EMS Council, Inc., Board of directors, July 19, 2007) Hampton Roads Metropolitan Medical Response System http://www.hrmmrs.org/MMRS_Secure/index.html (accessed May 20, 2008).

updates, administrative support, HRMMST vehicle maintenance, and HRMMST communications. It is unclear which portion of this amount goes strictly for team maintenance or MMRS activities. As both compliment each other's goal of disaster preparedness, the cost is considered as a whole for program maintenance costs. This sustainment cost is exceeds expectations for a local or regional jurisdiction to incur for medical team sustainment.

### 7. Costs: Time- Program Maintenance- Manpower

Team deployable equipment caches are available in six vehicles. Two are 37-foot gooseneck trailers with a Dodge Crew Cab tow vehicle that carries logistical equipment, personal protective equipment, command and control equipment, a medical equipment cache, monitoring and detection equipment, decontamination equipment, and logistical support equipment. [69] Two other vehicles are two 12-foot, single axle trailers with an available 65-foot communications tower.[70] The final two vehicles are Ford 650's used to assist in moving equipment and personnel.[71] Each cache is identical and contains the radio tower, mobile and portable radios, a generator, and currently a VHF communications system.[72] The six vehicles are located within two different fire departments, one on the north and the other on the south bank of the water. The movement of this equipment from three fire departments to two occurred as the result of Operation Chain Reaction. This equipment needs to be inventoried, maintained, rotated and replaced when expiration dates are met. Additionally, administrative costs are incurred purchasing replacement equipment, maintaining records, recruiting and ensuring training for team members, grant paperwork, and so on. Because of the magnitude of program maintenance involved, this category is assigned exceeds expectations.

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69 Hampton Roads Metropolitan Medical Strike Team, *Activation Guide* (Hampton Roads, Virginia: Hampton Roads Metropolitan Medical Response System, 2007), 3.

70 Ibid.

71 William Ginnow, Program Manager, Hampton Roads Metropolitan Medical Response System. phone interview with author, May 16, 2008.

72 Hampton Roads Metropolitan Medical Response System, "Achieving Preparedness through Regional Cooperation," (presentation to Tidewater EMS Council, Inc., Board of directors, July 19, 2007) Hampton Roads Metropolitan Medical Response System http://www.hrmmrs.org/MMRS_Secure/index.html (accessed May 20, 2008).

### 8. Costs: Time- Program Maintenance- Personnel Training

HRMMST team membership requires comprehensive training and exercises for all members. All two hundred and fifty members are required to take Pre-Deployment Training, Core Component Training, and suggested additional training as available. [73] Standard pre-deployment training that applies to all members regardless of discipline includes Basic Incident Command (IS 100 & 200), NIMS 700, Strike Team Operations Modules- 1 & 2- Concept of Operations, Mass Casualty Management –Awareness, Hazardous Materials Awareness, and Emergency Response to Terrorism- Awareness.[74] Core-component and additional training is discipline and strike team position specific. Disciplines represented on the team include fire, EMS, law enforcement, public health, hospital personnel, communications professionals, and logistical support personnel. Program administration estimates that the team experiences roughly a ten to twenty percent turn-over rate thus replacement team members need to obtain training to become deployable.[75] Additionally, the team holds quarterly hands-on training, two drills per year, and a full scale exercise once a year.[76] Based on this information program maintenance in the area of personnel training exceeds expectations.

### 9. Legal: All Categories

The National Emergency Management Association's Model Intrastate Mutual Aid Legislation Document was reviewed to extract critical criteria used in this category. Based on the team activation guide, mutual aid agreements formulated between Hampton Roads MMRS and governmental jurisdictions and Hampton Roads MMRS and civilian agencies, all critical criteria were met. Critical criteria met include: statement of

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73 Hampton Roads Metropolitan Medical Strike Team, *Hampton Roads Metropolitan Medical Strike Team Training*, Hampton Roads Metropolitan Medical Response System, http://www.hrmmrs.org/training/ (accessed May 20, 2008).

74 Hampton Roads Metropolitan Medical Strike Team, *Annex Q- Training and Exercises to the Hampton Roads Metropolitan Medical Response System Plan- Hampton Roads Metropolitan Medical Strike Team Training Matrix* (Hampton Roads, Virginia: Hampton Roads Metropolitan Medical Response System, 2007), 1.

75 William Ginnow, Program Manager, Hampton Roads Metropolitan Medical Response System, phone interview with author, May 16, 2008

76 Ibid.

responding agency responsible for liability, workers compensation in the event of responder injury, equipment damage, and circumstances when reimbursement costs may be sought. A statement covering dispute resolution by each party waiving any and all claims against all other parties which may arise out of their participation in HRMMST inside or outside of their respective jurisdictions is present. Finally, a team activation, operational process and procedure are in place. This category meets expectations across the board.

### 10. Implementation: Tasks Required

The following is a list of some tasks involved in establishing a medical response team: obtain funding; establish steering and sub-committees; obtain committee membership representative of all jurisdictions and disciplines; obtain support for the project; establish team mission and scope of practice; identify training and equipment needs; select and purchase equipment; inventory, label, and place equipment; recruit membership; provide team membership training; establish memorandums of understanding with respective agencies; develop deployment and activation procedures; drill and exercise team membership and the community on mass casualty response utilizing the team and other response agencies that would be involved in the incident; in the HRMMRS case, develop and pass legislation that assesses sustainment costs on the community; replace expired equipment; and recruit new membership as needed. Although not a comprehensive list, this gives an idea of how time and labor intensive team formation and sustainment may become, spanning several years. Based on this information the implementation category for tasks exceeds expectations.

### 11. Implementation: Barriers

Primary barriers identified were experienced during the start-up phase. The first was convincing stake holders of the need for the resource. Opponents believed developing a medical response team would be redundant as first responders already provided EMS care.[77] Additionally, many agency volunteers were already a part of

77 William Ginnow, Program Manager, Hampton Roads Metropolitan Medical Response System, phone interview with author, May 16, 2008

Urban Search and Rescue Structural Collapse Teams or Disaster Management Assistance Teams. The second was jurisdictional concern about costs involved in sponsoring personnel to become part of another response team.[78] Costs by the jurisdiction could be incurred to provide overtime and backfill to replace personnel on shift who get called out to a scene, training, drills, or exercises. As these initial stumbling blocks were overcome the category is rated meets expectations in terms of implementation barriers.

See Table 3 for a comprehensive view of the Hampton Roads Metropolitan Medical Strike Team evaluation. The HRMMST receives favorable scores an all categories accept for costs, both financial and time commitment, and tasks required to develop the team. For most local and regional areas team development would be costly without the support of state and federal grant funds.

**Table 3. Comprehensive View of HRMMST Evaluation**

E = Exceeds Standards or Expectations, M= Meets Standards or Expectations
Desirable scores are reflected in bold

| Criteria | Score |
|---|---|
| **Benefits:** | |
| Time sufficient medical resources on scene | **E** |
| Impact on patient/victim outcome | **M** |
| Political resistance | **M** |
| Public value | **E** |
| | |
| **Costs:** | |
| Financial- initial, start-up | E |
| Financial- ongoing | E |
| | |
| Time-program maintenance-manpower | E |
| Time-program maintenance- personnel training | E |
| | |
| **Legal:** | **M** |
| Liability/immunity | **M** |
| workers comp | **M** |
| equipment damage | **M** |
| Activation/operational process/procedure | **M** |
| Dispute resolution | **M** |

[78] Ginnow interview.

| | |
|---|---|
| Reimbursement | **M** |
| Self deployment | **M** |
| | |
| **Implementation:** | |
| Tasks required | E |
| Barriers | **M** |

## C. ANALYSIS

The Hampton Roads Medical Strike Team is a diverse multi-disciplined team with a high level of training and expertise bringing an enhanced response capability to the Hampton Roads District. They have proven their ability to be on-scene to assist within the two hour response standard and can activate without a disaster declaration. Their outputs were consistent with improving victim outcome and the team has added public value as all jurisdictions in the district support the team through personnel and financing. All legal criteria are met. The greatest barrier to implementation was concerns about costs incurred by the jurisdiction to replace personnel on shift who get called out to a scene training, drills or exercises. Although still a concern, the barrier was overcome as agencies still support their personnel in being a member of the 250-member team.

On the other hand, start-up costs and maintenance or operational costs in both time and money are expensive and too high for most regions to handle on their own without state or federal support. Another concern is the frequency in which the team has been deployed since inception. The team did have a recent deployment during the tornados in Suffolk but did not perform in their normal operations providing life-saving activities and scene support to incident command. The Hampton Roads Team was chosen because of its strong reputation in the MMRS community as being a model medical team. Although a valuable resource, developing medical response teams to the caliber matching the Hampton Roads Team is costly in both time and monetary terms.

The following chapter evaluates the MABAS-Illinois automatic statewide mutual aid structure and the DeKalb Fire and supporting agency response to the Northern Illinois University shooting. MABAS was used to mitigate the incident which yielded favorable outcomes for the victims.

# VI. CASE STUDY 2: MABAS – ILLINOIS

MABAS – Illinois, which covers several states in the mid-western United States, is a robust organization with a forty-year history of providing automatic mutual aid across both the state of Illinois and the signed jurisdictions in the neighboring states of Indiana, Wisconsin, Missouri, and a few cities within Iowa (although not an official state action) during both day-to-day operations and during disasters. The states of Michigan and Minnesota are also actively pursuing inclusion in MABAS. Illinois recognized early on that communities could best be served through automatic mutual aid response and benefit from the resources of divisions instead of the limited resources of individual jurisdictions. This case was chosen for MABAS reputation as a best practice for automatic statewide mutual aid response.

## A. MABAS

There are two facets of MABAS. The first is MABAS as a statewide automatic mutual aid organization serving the state of Illinois and singed on jurisdictions within Wisconsin, Indiana, and Missouri and several cities in Iowa. The response capability includes almost 1300 member fire departments and other agencies organized into 63 response divisions. [79] Response units (engines, ladder trucks, ambulances, heavy and light rescue squads, water tankers, hazardous materials teams, underwater rescue and recovery teams, trench, building collapse, technical rescue teams, and certified fire investigators) are resource typed and available upon request (Box Alarm Level I, Box Alarm Level II, Level III, task force, ambulance task force, etcetera) via MABAS dispatch.[80] Initial response is within the MABAS member response division, but additional resources can be obtained through neighboring divisions as well as through the Illinois Emergency Operations Plan. Resources through the Illinois Emergency Operations Plan require a disaster declaration while other day-to day and non-declared

[79] Jay Reardon, President /CEO, MABAS- Illinois, phone interview with author, July 30, 2008.

[80] MABAS-Illinois, "What is MABAS?" MABAS, http://www.mabas.org/wimabas.asp (accessed July 28, 2008).

disaster event responses (such as the Northern Illinois University shooting) within and across divisions occurs automatically through pre-determined response cards through each division's primary MABAS dispatch center.

Joining MABAS requires signing the same contract as other member organizations and agreeing to certain safety practices, standards of operation, on-scene terminology incident command, equipment staffing, and conducting operations on common communications channels.[81] Over 850 MABAS extra alarm incidents occur annually through MABAS 63 divisions. [82] The MABAS parent organization support is collegial and MABAS is in the process of formalizing a president's council representing states that are a part of MABAS (Mid-American Mutual Aid Consortium or MAMA-C). The organization also includes other administrative staff, regional representatives, and working groups. MABAS growth within the state of Illinois and in surrounding jurisdictions in neighboring states has grown significantly since the Illinois Emergency Management Agency met with MABAS to assist in developing and operationalizing a statewide hazardous materials response plan that later morphed into an all risks, all hazards plan.

The second facet of MABAS is that the parent organization that equips and trains forty two strategically placed hazardous materials response teams and forty one technical rescue teams across the state. Team members agree to become part of the team for five years and the parent organization agrees to pay for member training costs, backfill, and overtime costs. The organization is in the process of developing a number of underwater/swift water rescue teams in the same manner. Each hazardous material response team and technical rescue team re-validates every three years. MABAS as the mutual aid organization is the subject of the evaluation. Information on the parent organization follows in Section D.

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[81] MABAS-Illinois, "What is MABAS?" MABAS, http://www.mabas.org/wimabas.asp (accessed July 28, 2008).

[82] Jay Reardon, President /CEO, MABAS- Illinois, phone interview with author, July 30, 2008.

According to the organizations website,

> On a daily basis, communities face emergencies, which overtax their local fire/EMS and special operations capabilities. Often the "local" crisis does not warrant the state's Declaration of Disaster and its accompanying statutory powers. Without a Declaration of Disaster or Declaration of an emergency, statewide mutual aid cannot be activated, nor are the statutory powers in force for an assisting agency's reimbursement, liability and workmen's compensation coverage. When such cases exist, being a MABAS member agency affords invaluable benefits to a stricken community, regardless of where the community is located. [83]

### 1. Northern Illinois Shooting- Feb 14, 2008.

Northern Illinois University (NIU) is located in DeKalb, Illinois, sixty-five miles west of Chicago and forty-five minutes southeast of Rockford. It has a student enrolment over twenty-five thousand, and is one of thirteen members in the Mid-American Athletic Conference.[84] The university has seven degree-granting colleges offering sixty-three undergraduate majors and seventy-nine graduate programs.[85] The non-student population of the city of DeKalb is roughly forty thousand.

DeKalb Fire is an all-career paid department employing 59 career firefighters, divided into administration and operations sections. Line personnel operate out of three engine houses providing fire suppression, EMS, hazardous materials, and technical rescue response capability. DeKalb Fire also provides fire prevention and public education services to their community.

On the afternoon of February 14, 2008, around 3:00 pm, a twenty-seven year old man, Steven Kazmierczak, entered Cole Hall then entered a door near the front of a lecture hall's stage carrying a guitar case with a shotgun in it and three handguns

[83] MABAS-Illinois, "What is MABAS?" MABAS, http://www.mabas.org/wimabas.asp (accessed July 28, 2008).

[84] Northern Illinois University, "Fast Facts," Northern Illinois University, http://www/niu.edu/about/fastfacts.shtml (accessed July 29, 2008).

[85] Ibid.

underneath his coat.[86] The shooter was a previous award winning sociology graduate student at the university who had stopped taking his medication and had begun to display erratic behavior.[87] Kazmierczak began shooting into the classroom of students around 3:06 pm Central Time and managed to fire fifty four rounds resulting in twenty three casualties. [88] The shooting spree lasted less than five minutes. [89] Police arrived within two minutes, but were unable to stop the shooter before he turned the gun on himself.[90] Fleeing students located campus police who called for assistance at 3:07 pm. Upon notification of a possible shooter at NIU, DeKalb Fire Battalion 1 requested a Box Alarm 10, which yielded response from DeKalb Medic Units 1 and 2 and DeKalb Engine 1, which began to arrive at staging within two minutes.[91] The campus was immediately placed on lockdown and by 3:08 pm and command was established with staging located at the campus Field House Parking Lot.[92]

Based upon victim information from campus police and statement of a safe scene from a possible second shooter, the Box Alarm was upgraded and the special tone was sounded through the Illinois Interagency Fire Emergency Radio Network (IFERN) for all dispatchers in MABAS Division 6 to hear a call for a Box Alarm 10- Level II upgrade at 3:16 pm. [93] The call for assistance resulted in thirteen apparatus from both DeKalb Fire

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[86] Russell Goldman et al., "Gunman Planned Campus Shooting for at Least a Week: 'Rapid Fire Assault' in Lecture Hall Killed 5, Wounded 16 Others," *ABC News*, (February 15, 2008) http://abcnews.go.com/US/story?id=4293081 (accessed July 28, 2008).

[87] Russell Goldman et al., "Gunman Planned Campus Shooting for at Least a Week: 'Rapid Fire Assault' in Lecture Hall Killed 5, Wounded 16 Others," *ABC News*, (February 15, 2008) http://abcnews.go.com/US/story?id=4293081 (accessed July 28, 2008).

[88] Ibid.; Powers, Elia and Elizabeth Redden. 6 Killed in Northern Illinois Shooting, *Inside Higher Ed*, Feb 15, 2008. http://www.insidehighered.com/news/2008/02/15/niu (accessed July 28, 2008).

[89] Russell Goldman et al., "Gunman Planned Campus Shooting for at Least a Week: 'Rapid Fire Assault' in Lecture Hall Killed 5, Wounded 16 Others," *ABC News*, (February 15, 2008) http://abcnews.go.com/US/story?id=4293081 (accessed July 28, 2008).

[90] Ibid.

[91] DeKalb Fire Department, *Northern Illinois University Campus Shooting*, (DeKalb, Illinois: DeKalb Fire Department, n.d.).

[92] Ibid.

[93] DeKalb Fire Department, *Northern Illinois University Campus Shooting*, (DeKalb, Illinois: DeKalb Fire Department, n.d.).

and five additional agencies.[94] Through the incident the Box Alarm was upgraded three times to a Box Alarm 5 that immediately yielded 39 apparatus from nineteen jurisdictions including nineteen EMS units both within and outside county lines[95]. Immediately the apparatus were deployed and responded from up to thirty minutes away.

The first patient was in route to the hospital seventeen minutes after the first unit arrived on scene at 3:26 pm. [96] An all campus alert was placed on the school's web site at 3:20 pm. [97] By 4:10 pm the scene on the campus was secured.[98] It was mandatory for incoming units to report to staging so that the incident could be coordinated to produce the best outcome and ensure personnel safety. This discipline prevented units from treating the first victim they came upon and ensured that the most critically injured patients received treatment and transportation to the hospital first.

Of the twenty-three victims, four died at the scene including the shooter, two died later at the hospital, eight were in critical condition, and the remaining nine were in good or stable condition.[99] Seven of the victims were transferred to other regional hospitals.[100] Due to the quick coordinated response, of the eight critical patients six experienced a positive outcome by avoiding death. The entire incident lasted roughly two hours and the

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[94] DeKalb Fire Department, *Northern Illinois University Campus Shooting*, (DeKalb, Illinois: DeKalb Fire Department, n.d.).

[95] Response included units from DeKalb, Sycamore, Malta, Maple Park, Genoa-Kinston Fire, Genoa-Kinston Rescue, Rochelle, Waterman, Hinckley, Burlington, Elburn, Shabbona, Sugar Grove, St. Charles, Somamauk, North Aurora, Cortland, Kaneville, and Ogle/Lee. Agencies filling in for DeKalb taking regular calls included Hinkley, Burlington, and Sugar Grove Ambulance.

[96] DeKalb Fire Department, *Northern Illinois University Campus Shooting*, (Dekalb, Illinois: Dekalb Fire Department, n.d.).

[97] Alison Go, "Shooting at Northern Illinois Wounds 17; Shooter Dead," *U.S. News*, (February 14, 2008) http://www.u.s.news.com/blogs/paper-trail/2008/2.14/shooting-at-northern-illinois-wounds-17-shooter-dead.html (accessed July 28, 2008).

[98] Ibid.

[99] Fatalities, may they rest in peace and God Bless their friends and families, included Gayle Dubowski, 20, from Carol Stream Illinois: Catalina Garcia, 20, from Cicero Illinois: Julianna Gehant, 32 from Mendota Illinois: Ryanne Mace, 19, Carpenters Illinois: and Dan Palmenter, 20, Westchester Illinois: DeKalb Fire Department, *Northern Illinois University Campus Shooting*, (DeKalb, Illinois: DeKalb Fire Department, n.d.).

[100] DeKalb Fire Department, *Northern Illinois University Campus Shooting*, (DeKalb, Illinois: DeKalb Fire Department, n.d.).

last patient was transported at 4:54 pm.[101] The DeKalb level of service was maintained as agencies honored change-in-quarters requests and emergency recall personnel responded to seven other calls during this event. [102]

Command ultimately pulled in more resources than needed, but the overall response was successful for several reasons. The first is that DeKalb Fire hosted an interdivisional exercise in October 2007, following the events at Virginia Tech, and practiced responding to a shooter on campus at Northern Illinois University.[103] Another reason is that the multi-jurisdictional response to this type of incident is pre-planned on a pre-established run card located with MABAS Dispatch. The card identifies apparatus that will be called out if this type of incident occurs and which apparatus will honor a change of quarters request to ensure service delivery for other calls while the major incident is occurring. According to DeKalb Fire Administration the incident was successful because they had the ability to call high-level alarms flawlessly into an organized response, the ability to operate on common communications channels, and that the incident was previously drilled and exercised.[104] Lastly, responders had established relationships and communicated with other agencies regularly reinforcing the willingness to cooperate.

## B. MABAS ILLINOIS- EVALUATION

MABAS as an automatic mutual aid organization will be the subject for review. Comments on the parent organization will follow after the evaluation. A comprehensive view of the evaluation can be seen on in Table 4 of this chapter.

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[101] DeKalb Fire Department, *Northern Illinois University Campus Shooting*, (DeKalb, Illinois: DeKalb Fire Department, n.d.).

[102] Bruce Harrison, Acting Chief, DeKalb Fire Department, phone interview with author August 7, 2008.

[103] Ibid.

[104] Ibid.

### 1. Benefits: Time Sufficient Medical Resources on Scene

The Target Capability List recommends a two hour goal to have adequate medical resources on scene during mass casualty events from the time of dispatch to arrival on scene. According to the information provided, the first victim was transported seventeen minutes into the incident with the entire incident lasting two hours.[105] Responding units coming from the farthest jurisdictions arrived within 45 minutes to an hour. Based on this information the assigned rating is exceeds standards.

### 2. Benefits: Impact on Patient/Victim Outcome

There is no specific standard for the response impact on victim/patient outcome so the specific measures discussed below are used as the standard by which to judge the criterion. The goal is to save as many lives as possible and reduce the extent of injury to the patient. When reviewing this criterion remember that of the twenty three victims, four died at the scene including the shooter, two of the eight critical patients died later at the hospital, and the remaining nine were in good or stable condition with seven of the victims transferred to other regional hospitals. [106]

Specific measures:

- The time in which injured patients received initial treatment by appropriately credentialed on scene medical personnel- within 30 minutes from initial units arrival on scene, Actual- 17 minutes the first patient was transported. Important to note here is that all campus police were also trained as EMT- Basics. Once the scene was secure they were able to assist with triage and basic treatment.
- The percent of patients transported in vehicles appropriate to each patient's conditions and the nature and magnitude of the incident- 100 percent, Actual- 100 percent.
- Time in which patients were transported-within 2 hours from initial units arrival on scene, Actual 2 hours transport was complete.

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105Bruce Harrison, Acting Chief, DeKalb Fire Department, phone interview with author August 7, 2008.

106 DeKalb Fire Department, *Northern Illinois University Campus Shooting* (DeKalb, Illinois: DeKalb Fire Department, n.d.).

- Time in which mass casualty patient transport was coordinated with the appropriate treatment facility- within 30 minutes from EMS Transportation/ Communications Officer arrival. Actual- 17 minutes.

Based on the above information the criterion receives an exceeds standards rating

### 3. Benefits: Political Resistance

Before 1998 and prior to the Illinois Emergency Management Agency meeting with MABAS to assist in developing a statewide all risk response plan (that originated as a statewide hazardous materials response plan) there were 250 agencies involved in MABAS.[107] Today there will be 1,300 after the parent agency adds underwater/swift water rescue teams to the list. This is due to both the development of the statewide plan along with increased awareness for the need after September 11. Additionally, joining MABAS gives members access to State Homeland Security Grant Program Funds as 80 percent of these funds need to go to local governments with the MABAS parent organization acting as the grant administrator.[108] Access to funds became another of the many incentives to join. Now the organization spans the State of Illinois and parts of four other contiguous states. Resistance to change is expected. Because of the explosive growth MABAS has experienced in the last ten years, any resistance to becoming a part of the mutual aid organization has been overcome. Based on this information, the criterion receives a meets expectations rating.

Also worthy of note is that there was no negative press regarding response to the Northern Illinois University shooting. All news articles found on the incident provided factual based information. DeKalb Fire Administration also mentioned that media and other organizations investigated the incident for flaws and none were found. [109] This is notable and provides further evidence of the effectiveness of the MABAS response system.

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107 Jay Reardon, President/CEO, MABAS- Illinois, phone interview with author, July 30, and 21 August 2008.

108 Ibid.

109 Bruce Harrison, Acting Chief, DeKalb Fire Department, phone interview with author August 7, 2008.

### 4. Benefits: Public Value

As discussed above, MABAS has grown in the last ten years from two hundred and fifty organizations to almost 1300. The measure attempts to capture the extent that government players affected by the change support and willingly become a part of the program. While there is no standard to measure public value or the degree to which government entities affected by the change support the change, the assigned grade of exceeds expectations is warranted for this criterion based on the exponential growth the program has experienced. The number of entities engaged in the program indicates they are in a better position to provide more enhanced services to their communities otherwise they would not willingly participate.

### 5. Costs: Financial-Initial

MABAS was started in 1968 in Elk Grove for fire departments in fourteen suburbs near Chicago O'Hare Airport. Fire professionals at the time realized that as communities were growing out from the city they would be more effective at responding to incidents if they pooled their resources. All agreed so MABAS was born. Today each jurisdiction creates box alarm cards for increasing levels of response (Box Alarm…, Level II, Level III, etcetera) that predetermine what type of resource will respond from which surrounding fire department and which apparatus from which fire department will fill in while the summoned vehicle is gone assisting a neighbor. This ensures that there is enough manpower to respond to regular incidents in each jurisdiction while the major incident is occurring. The originators developed one primary radio channel for area dispatchers to receive the notice of a MABAS alarm from the primary MABAS dispatch. Area dispatchers then sound the alarm and get apparatus moving to the scene. Communications on the fire ground occur on common MABAS tactical channels that all have access to. With enhancements, this is still how the system till operates today. Based on the information given above, it is unclear what the initial financial start-up costs were for the program; however, start-up costs appear minimal and required mostly the investment of time with some training. Therefore the ranking of meets expectations is given for this criterion.

### 6. Costs: Financial- Ongoing

Today for new members to join MABAS there are a few costs involved. They include annual dues paid to the parent organization. These dues range from $25 to $1500 dollars with the amount based on each department's budget. [110] The parent organization reports receiving $180,000 from dues per year to help support its operational costs.[111] Each MABAS District must designate a primary and secondary dispatch center and each center must have or obtain the capability to receive an alarm tone on IFERN.

Given this, there may be costs involved in obtaining and maintaining this capability, meaning purchase of the radio and maintenance for the equipment. User fees are paid by the parent organization. MABAS also has dedicated radio channels for fire response that can be accessed on low level VHF frequencies within divisions and has dedicated fire tactical channels that can be utilized statewide in the event the Illinois Emergency Operations Plan is activated. Costs are involved are the purchase and maintenance of radios and dues. Costs of radio usage may not be greater than what fire departments are experiencing today. Based on the above information this criterion receives a grading of meets standards. None of the costs described appear to be incredibly expensive.

### 7. Costs: Time Program Maintenance- Manpower

The largest investment of time is reaching out to neighbors, selling the program, and developing agreed upon box alarm cards. Additional effort is required to work with the state in identifying channels that can be solely used for the fire service in each division as well as statewide fire tactical channels that can be accessed when needed . This effort may require the reprogramming of a significant amount of radios. Further research is needed to fully assess the required manpower to adopt MABAS based on current radio capabilities within each state. Another investment of time is to revisit the

110 Jay Reardon, President /CEO, MABAS- Illinois, phone interview with author, July 30, 2008.

111 Ibid.

created box alarm cards on a periodic basis. Based on the information above, the criterion receives a score of meets expectations. Also to consider is the time demand on volunteer departments that could be demanding.

### 8. Costs: Time Program Maintenance- Personnel Training

There is some training required for fire, EMS and dispatch personnel. Primary and secondary MABAS dispatchers need to understand MABAS alarm procedure, where to access, and how to read box alarm cards. Fire and EMS personnel need to understand procedure for radio communications and integrating with neighboring jurisdictions during response operations. Once training is given, additional training should surround updated procedure. MABAS is utilized over 850 times per year, which averages over two times per day. With this frequency of use it appears that using MABAS becomes second nature to involved organizations so retraining may not be necessary and left for new hires. Based on this information, the criterion receives a grading of meets expectations. Much of the required training can occur during normal operational hours, not creating overtime and backfill costs.

### 9. Legal: All Categories

The Constitution of the state of Illinois authorizes local governments to contract with themselves and the Intergovernmental Cooperation Act states that "any power(s), privileges or authorities exercised by a unit of government may be exercised jointly with any other local government."[112] The act also provides that

> Any one or more public agencies may contract with any one or more public agencies to perform any governmental service, activity or undertaking which any of the public agencies entering into the contract is authorized by law to perform, provided that such contract shall be authorized by the governing body of each party to the contract.[113]

This language provides the basis for the contract that each agency signs to become a part of MABAS. Signing the contract indemnifies all member agencies. There

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[112] MABAS-Illinois, *MABAS Operational Forms- City Ordinance*, (October, 2003) http://www.mabas.org/forms/pdf/MABAS-ILLINOIS-CITY-ORDINANCE.pdf (accessed July 28, 2008).

[113] Ibid.

is a clear activation procedure that has rules against self deployment. Reimbursement is not paid on MABAS Box Alarm calls but is allowable for incidents resulting in disaster declaration and activation of the Illinois Emergency Operations Plan. Based on this information legal criteria meet expectations across the board.

### 10. Implementation: Tasks Required

From a grass roots effort to begin MABAS as it started in Illinois, tasks required to develop MABAS include: having meetings with stakeholders including EMS, fire, and emergency management; addressing legal issues; identifying divisions; identifying primary and secondary MABAS dispatch for the division; identifying a primary alert channel for the division that all dispatchers have the capability on which to communicate; identifying and obtaining the capability for common tactical channels that mutual aid response can operate; developing box alarm cards that identify which apparatus from which department will respond inside the differing jurisdictions as well as including which apparatus will fill in for those that leave their home station to assist a neighbor; developing a response procedure; and training staff.

The box alarm cards can be designated for specific incidents, such as a mass casualty event, a large hazardous materials incident, or incident at an airport. The recommendation resulting from this thesis will push for MABAS support at the state level that will require more tasks than those mentioned here and will be discussed in the concluding chapter. Based on this information, although developing MABAS requires significant work it is not considered excessive therefore the criterion receives a meets expectations ranking.

### 11. Implementation: Barriers

It appears at the beginning of MABAS development in 1968 there were minimal barriers**.** The organization grew steadily incorporating 250 more first response organizations until 1998. Then with the agreement made between MABAS and the Illinois Emergency Management Agency, the organization exploded to incorporate almost 1300 agencies. This growth suggests that there are minimal barriers to joining

MABAS. In the Wisconsin case, instead of all jurisdictions signing separate contracts the passed legislation including all first response agencies unless they specifically passed legislation at the local level to opt out of the program. Based on this information, the criterion receives a meets expectations rating.

## C. ANALYSIS

The strength of MABAS clearly lies in its ability to automatically deploy high level alarms and bring resources from multiple jurisdictions to an incident scene in the shortest amount of time possible. This capability can have a positive affect during mass casualty incidents as sufficient amount of EMS professionals can start life saving measures on victims quickly as was demonstrated in the Northern Illinois University shooting. Because MABAS is utilized frequently this adds to expediency as dispatchers and first responder personnel know what to do when an alarm is sounded instead of having to refer to a response plan before action is taken. The explosive growth of the organization in the last ten years suggests support for the program and that it adds public value to the communities it serves by being able to provide more enhanced services during incidents. Developing MABAS is time intensive in the beginning and does not require excessive spending. All legal issues are covered by entities signing the required contract and the primary initial barriers to implementation involve belief that the program is needed to new organizations joining.

See Table 4 for a comprehensive view of the MABAS-Illinois evaluation. MABAS- Illinois received favorable scores in all categories. The structure and benefits to both receivers and grantors of assistance and is not cost prohibitive to develop. There will be an investment of time to develop the program.

**Table 4. Comprehensive View of MABAS-Illinois Evaluation**

E = Exceeds Standards or Expectations, M= Meets Standards or Expectations
Bold markings reflect favorable scores.

| Criteria | Score |
|---|---|
| **Benefits:** | |
| Time sufficient medical resources on scene | **E** |
| Impact on patient/victim outcome | **E** |
| Political resistance | **M** |
| Public value | **E** |
| | |
| **Costs:** | |
| Financial- initial, start-up | **M** |
| Financial- ongoing | **M** |
| | |
| Time-program maintenance-manpower | **M** |
| Time-program maintenance- personnel training | **M** |
| | |
| **Legal:** | |
| Liability/immunity | **M** |
| workers comp | **M** |
| equipment damage | **M** |
| Activation/operational process/procedure | **M** |
| Dispute resolution | **M** |
| Reimbursement | **M** |
| Self deployment | **M** |
| | |
| **Implementation:** | |
| Tasks required | **M** |
| Barriers | **M** |

## D. MABAS - THE PARENT ORGANIZATION

As mentioned earlier, there are two facets of MABAS, the mutual aid component and the parent organization that facilitates program maintenance, develops, equips and trains statewide specialty rescue teams. Teams include hazardous materials response teams, technical rescue teams, and MABAS will be adding underwater/ swift water rescue teams. Team training and validation is provided and performed by the Illinois Fire Service Institute.[114] The movement from fulltime fire personnel providing collegial

[114] Jay Reardon, President /CEO, MABAS- Illinois, phone interview with author, July 30, 2008.

oversight to MABAS in addition to their regular duties to developing a paid MABAS staff occurred within the last two years. The growth of the organization and responsibilities warranted full-time attention. The MABAS parent employs three full-time employees and eight part-time employees.

This move did not occur without some resistance. In the beginning many MABAS members did not see the need to move to a full time staff. Others had personal agendas and jealousies were involved. In the end the motion won 60 of 63 possible division votes.[115] The organization operates on an $850,000 dollar budget from four primary sources of income including dues from member departments, state subsidies, grant funds for planning costs and manages 11 million in grant funds that go to 42 hazardous materials teams and 41 technical rescue teams for development, training, maintenance, and purchase of equipment. [116] Each team has a thirty-person roster, receives 200 hours of training (400 hours for technical rescue), costs roughly $350,000- $400,000 to equip, and is available for local and statewide response.[117] Funds are also used for overtime and backfill to ensure member replacement when being trained. Each team is validated by outside validation in multi-team development exercises every three years by responding to a mock incident and operating for a 72 hour operational period.[118] Being run from the state level, each of the teams brings the same capability of response to all areas of the state. Teams also comply with staff assistance visits every 18 months that run through a checklist ensuring team performance and competence.[119]

## E. SUMMARY

There are few established standards by which to evaluate either case study on the chosen criteria, therefore the measures of meets or exceeds expectations are relative to individual perception. The narrative sections discussing the case evaluation provide

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[115] Jay Reardon, President /CEO, MABAS- Illinois, phone interview with author, July 30, 2008.

[116] Ibid.

[117] Ibid.

[118] Ibid.

[119]Ibid.

supporting evidence for the chosen score. All scores are debatable. This evaluation is meant to create dialog for decision makers to ponder regarding the feasibility of adopting parts of either program or the program in its entirety. The ultimate decision, however, is determining whether the risk of facing certain disasters demands a more robust response structure than is already in place. If so, then do the benefits of adopting either program outweigh the costs of time and money? If the benefits do outweigh the costs, then given the political environment and barriers to implementation can the program be successfully implemented?

The last chapter provides the findings on the case study review, ties the results of research back to the original research questions and argument, proposes recommendations, and concludes with final thoughts.

# VII. CONCLUSIONS

The following section describes the combined findings for the Hampton Roads Metropolitan Medical Strike Team and MABAS- Illinois Evaluations. A comprehensive view of the evaluation can be seen on page 72.

## A. FINDINGS

In reviewing the two structures, both exceed expectations in adding public value to the communities they serve, as was demonstrated by the number of jurisdictions willing to participate in both programs. Both systems have demonstrated the ability to meet the two hour target capability of having sufficient medical resources on scene, although MABAS has an advantage through automatic dispatch of resources within and across divisions. The DeKalb Fire and MABAS responses clearly led to a positive impact on victim outcome during response to the Northern Illinois University shooting. Because the exercise Operation Chain Reaction was used to assess the Hampton Roads Metropolitan Medical Strike Team, it is unclear whether their response had a positive impact on victim outcome. In both cases political resistance was overcome and did not inhibit the creation of two robust response systems. All legal criteria were met for both response structures. Both overcame implementation barriers, Hampton Roads had significantly more tasks to accomplish to obtain jurisdictional buy-in, get the team recruited, equipped, and trained, and develop deployment and program maintenance procedures.

Perhaps the largest disparity between the two systems is cost. Developing the medical response team requires significant financial and time investments in equipment, personnel training, exercises and drills, maintenance, and replacement of expired equipment. There is also a significant investment of time in program oversight through the Hampton Roads Metropolitan Medical Response System. For the MABAS system it appears financial costs are manageable and primarily surround developing communications capability, but there is a significant investment in time to develop the Mutual Aid Box Alarm System and accompanying box alarm cards. Although adding

additional staff for any jurisdiction involved in program implementation may not be needed to develop MABAS, dedicating staff to work on the project is warranted for both development and maintenance of the program.

Table 5 compares both response systems. Bold markings are considered most favorable. MABAS received favorable scores in all categories. The Hampton Roads Metropolitan Medical Strike Team received favorable scores in all categories except for costs (financial and time), and in the number of tasks required to develop the team. Both structures bring enhanced response capabilities to their jurisdictions.

**Table 5. Comprehensive Combined View of HRMMST and MABAS Illinois**

E = Exceeds Standards or Expectations, M= Meets Standards or Expectations
Favorable scores are marked in bold

| Criteria | Hampton Roads Metropolitan Medical Strike Team | MABAS- Illinois (Statewide Automatic Mutual Aid) |
|---|---|---|
| **Benefits:** | | |
| Time sufficient medical resources on scene | **E** | **E** |
| Impact on patient/victim outcome | **M** | **E** |
| Political antagonism | **M** | **M** |
| Public value | **E** | **E** |
| | | |
| **Costs:** | | |
| Financial- initial, start-up | E | **M** |
| Financial- ongoing | E | **M** |
| | | |
| Time-program maintenance-manpower | E | **M** |
| Time-program Maintenance- personnel training | E | **M** |
| | | |
| **Legal:** | | |
| Liability/immunity | **M** | **M** |
| workers comp | **M** | **M** |
| equipment damage | **M** | **M** |
| Activation/operational process/procedure | **M** | **M** |
| Dispute resolution | **M** | **M** |
| Reimbursement | **M** | **M** |
| Self -deployment | **M** | **M** |
| | | |
| **Implementation:** | | |
| Tasks required | E | **M** |
| Barriers | **M** | **M** |

The next sections tie lessons learned from the case studies back to the research questions and argument proposed in the introduction. The balance of the chapter includes recommendations and conclusions on the research and findings presented in this thesis.

## B. TYING IT ALTOGETHER

In reviewing the research questions proposed in the introduction: Have or how have other states and jurisdictions incorporated their EMS communities in disaster planning and response and what can be learned in order to create this process elsewhere? What are specific elements that need to be included or considered for the EMS community to be included into a newly developed disaster response structure? Each of these questions will be answered below.

*Have or how have other states and jurisdictions incorporated their EMS communities in disaster planning and response and what can be learned in order to create this process elsewhere?* Both MABAS-Illinois and Hampton Roads have incorporated their EMS communities in disaster planning and response. In the MABAS case both public and private EMS agencies are apart of the automatic mutual aid response structure. They have the ability to communicate on common communications channels, have agreed to receive training on and abide by incident command procedures allowing smooth integration into incidents, and had practiced responding to a shooting incident at Northern Illinois University prior to the event occurring.

For Hampton Roads, the Hampton Roads Metropolitan Medial Response System (HRMMRS) is managed by contract with the Tidewater EMS Council. This unique arrangement allows for full EMS perspective on and participation in both strike team membership and other disaster preparedness programs led by HRMMRS, such as expanding hospital surge capacity during mass casualty incidents, acquiring and managing pharmaceutical caches for first responders in the event of a biological incident, and other programs. What can be learned from each case is that their inclusion in both response structures had a positive impact on both incidents in which each responded, and that for both cases training, exercises and pre-incident planning contributed to the success at each incident.

*What are specific elements that need to be included or considered for the EMS community to be included into a newly developed disaster response structure?* For MABAS-Illinois there are several elements for the EMS community to be included in the mutual aid structure. First they need to be signed into contract with the organization. By being a MABAS member they agree to common response/deployment procedures, utilize incident command that reduces scene chaos and allows for scene integration, follow accountability procedures, and utilize common radio frequencies. This requires training of personnel and exercising the system to reinforce learning and ensure smooth transition into incident response. Next, EMS professionals join into the planning of box alarm card development for each MABAS division. They pre-plan incident response and unit change of quarters when primary units are out responding to calls. This allows for regular call volume to be honored when primary units are out responding to the disaster.

For the Hampton Roads Metropolitan Medical Strike Team, each jurisdiction also begins by signing an agreement for personnel to become members. The agreement allows for team member release for training, exercises and response. Each team member receives extensive training prior to being deployable and agrees to hands-on training, exercises or drills held on a quarterly, semi-annual, and annual basis. Other logistical issues required for team member development were discussed in Chapter V. Briefly they include funding for team training and purchase and maintenance of equipment, and in the Hampton Roads case, pass legislation for funding that supports team sustainability.

In reviewing the argument proposed in the introduction: for many states, outside standard mutual aid agreements, a disaster declaration is required prior to other types of medical aid rendering assistance. This structure results in turn around times that create a gap in the ability to provide immediate assistance to a jurisdiction in need. Adopting automatic statewide mutual aid, supported by EMS involvement in incident pre-planning, training, and exercises, will allow responders to immediately deploy upon request, which closes the gap in response and results in positive outcomes for victims of the incident. Improving jurisdictions' ability to immediately deploy medical assets to the scene of disasters or terrorist attacks will decrease the incidence of human suffering and reduce

the rate of morbidity and mortality during disaster. Below the each assertion is evaluated against research found and lessons learned from the case studies.

For many states, outside standard mutual aid agreements a disaster declaration is required prior to other types of medical aid rendering assistance. This structure results in turn around times and creates a gap in the ability to provide immediate assistance to a jurisdiction in need. Each state has an emergency management agency with its authority and responsibilities delineated in state law. Generally, emergency management is designed to assist victims of disaster through a tiered response. Once local resources are overwhelmed, jurisdictions can request assistance from neighbors with which agreements are pre-established. As more resources are required to mitigate the incident these jurisdictions then request additional resources from the state emergency management agency. After the state has exhausted their resources, the state governor can request resources and assistance from the federal government.

The declaration status allows for the mobilization of resources and possible reimbursement for expenses. The Department of Homeland Security realizes the need for enhancing intra and interstate mutual aid as demonstrated by the contract established with International Association of Fire Chiefs.

> In many incidents, local mutual aid agreements will be sufficient to handle an emergency incident. In some cases, the incident may exceed the capabilities of a local jurisdiction or its neighbors. A robust intrastate mutual aid system is critical to respond to these incidents. The key factor for statewide mutual aid systems is the timeliness in which resources can be delivered to save lives.[120]

Adopting automatic statewide mutual aid, supported by EMS involvement in incident pre-planning, training, and exercises will allow responders to immediately deploy upon request, closing the gap in response, resulting in positive outcomes for victims of the incident. Improving jurisdictions' abilities to immediately deploy medical

[120] Steven P. Westermann, "Leveraging Mutual Aid for Effective Emergency Response"(written statement to Subcommittee of the U.S. House of Representatives, Washington, D.C., November 15, 2007), 2.

assets to the scene of disasters or terrorist attacks will decrease the incidence of human suffering and reduce the rate of morbidity and mortality during disaster.

In reviewing the results of the MABAS-Illinois case study, the fact that EMS had been involved in the response structure, understood incident command procedures, and had previously exercised the shooting incident at Northern Illinois University contributed to the success of the incident. Of the twenty three casualties, four died at the scene and two of the eight critical patients died after transport. According to the DeKalb Fire Administration, the incident was successful because they had the ability to call high-level alarms flawlessly in an organized response, the ability to operate on common communications channels, and that the incident was previously drilled and exercised.[121]

In reviewing the results of the Hampton Roads Metropolitan Medical Strike Team and their response to Operation Chain Reaction, four hundred victims were placed in the amphitheatre of which two hundred and thirty seven remained after some self rescued to neighboring hospitals. The remaining victims were put through gross decontamination within the first half hour of the exercise with the entire process (patient decontamination, re-monitoring for contamination, then technical decontamination) completed in two hours. Patients were then transported. While the artificiality of the exercise did not allow for the chaos that would be experienced in a real event, nor can patient/victim outcome be measured here, because of extensive training the Hampton Roads Metropolitan Medical Strike Team was able to immediately deploy upon request and integrate into the incident. Their opportunity lies in educating other responders on their availability and capabilities.

The success of the response structures discussed above clearly lay in their ability to immediately deploy resources upon request, their understanding of incident command which allows for smoother scene integration, extensive personnel training, and exercising and pre-planning together. The ability to communicate with each other also supports incident mitigation. These findings result in recommendations presented in the next section.

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[121] Bruce Harrison, Acting Chief, DeKalb Fire Department, phone interview with author, August 7, 2008.

## C. RECOMMENDATIONS

The findings of the analysis lead to four recommended courses of action. The first course of action is for states to adopt automatic statewide mutual aid including both EMS and fire assets. States offer significant assets to large scale incidents that run multiple operational periods through traditional county EOC to state EOC requests but response to Level II Medical incidents can be enhanced through adopting automatic statewide mutual aid.

First of all, the automatic aid improves response times. Asset response is pre-determined on run cards that can be accessed when a box alarm is called for. This leads to single, multiple, or specialized response assets such as task forces or strike teams. For high risk or hazard incidents a box alarm (airport or box alarm school/university) can automatically deploy specific assets identified on the run card while maintaining service delivery drawing from the closest assets and identifying units that can fill the request for a change of quarters. Automatic statewide mutual aid can incorporate EMS, fire, and law enforcement resources as well. In the mass casualty incident case, response times are commonly used measures as an indicator of quality for EMS care, and research supports that the sooner EMS is able to provide care, specifically for traumatic injuries, the higher the chances for positive outcomes for the patient.

Additionally, with automatic statewide mutual aid jurisdictions will have access to multiple resources not only during large scale events but in everyday incidents as well. MABAS- Illinois is used roughly 850 times per year. This demonstrates that there is a need for the response structure in Illinois. Next, with budgets declining creating pressure on communities to downsize in size and level of service, automatic statewide mutual aid provides a more efficient and effective use of resources improving service delivery to citizens.

Lastly, as used frequently, integrating resources on scene and utilizing common methods to communicate will only be reinforced when larger scale incidents occur. The Hampton Roads jurisdiction is currently undergoing a study to evaluate if automatic region wide mutual aid is appropriate for the localities involved. Moreover, the Northern Virginia Response Agreement, which provides cross-boundary automatic response, was

touted as a model to replicate from a total regional perspective as it contributed to the success of the response to the Pentagon attack on September 11, 2001. [122]

The second recommendation is for state boards of EMS and the National Registry of Emergency Medical Technicians to require disaster training for certification and revisiting these concepts for refresher certification. According to the Institute of Medicine, ninety-six percent of state EMS office functions include establishing EMS training standards.[123] The institute also makes this recommendation in *Emergency Medical Services at the Crossroads.*[124] Critical components that should be included in disaster training are incident command, weapons of mass destruction training with use in personal protective equipment, and mass casualty incident response training. Organizing response to disaster management, triage, patient treatment, and organization of patient transport are critical skills of which all EMS professionals should be familiar.

According to the National Registry of Emergency Medical Technicians, both EMT- Basic and EMT- Paramedic levels require 72 hours of continuing education for recertification requirements. Of these requirements each allows for elective or distributive education that can fill this requirement. Elective education is chosen by the instructor while distributive education can be the choice of the student as long as that education meets certain certification requirements. Services tied to fire departments or governmental service delivery may already be receiving forms of these types of training, but this may not be the case for private service delivery. The Federal Emergency Management Agency offers online versions of introductory command modules and National Incident Management System including IS 100, 200, and 700. Various forms of weapons of mass destruction training and mass casualty incident response training are available.

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[122] U.S. Department of Justice, *Arlington County After-Action Report on the Response to the September 11 Terrorist Attacks on the Pentagon* (Washington D.C.: Department of Justice, 2002), 52.

[123] Institute of Medicine, *Emergency Medical Services*, 51.

[124] Ibid., 13.

Also for recertification the student should be able to pick from a desired list of disaster-related trainings to fulfill this requirement, have selected trainings pre-approved by the students accrediting agency, or demonstrate participation in a disaster related exercise to fulfill this requirement. Even if not located in larger communities that have access to larger sums of grant funds, most emergency management agencies utilize local emergency planning committees that conduct annual exercises of which EMS can become a part. It is critical for EMS providers to be familiar with the skills required for every day incident response. At the same time, they need to be prepared for the large scale low- frequency mass casualty incident as well. Critical to large sale events are communications, integration of resources into the scene, and distribution of patients across boundaries.

The third recommendation is to establish and strengthen reciprocity agreements between states for sharing of resources. According to the Institute of Medicine, "state and federal response to a national disaster is hindered by inconsistent standards for the licensure of all emergency care providers and a lack of adequate reciprocity agreements between states."[125] As speed of resources arriving on scene is critical to incident mitigation, resources should deploy from nearest jurisdictions to the incident even if those resources need to cross state boundaries. Both the Mid-American Mutual Aid Consortium and the National Fire Service Mutual Aid System Task Force are working on this issue as they are establishing intra and interstate mutual aid systems. States not yet involved from this endeavor should be open to learning from their experience.

Lastly, the Department of Homeland Security needs to ensure funding for personal protective equipment for EMS personnel. The funding needs to reach beyond what is available to the fire service. The Institute of Medicine recognizes this need as well; "local systems should be prepared and equipped for specific potential disaster events. The training and equipment and emergency planning currently under way in most areas are inadequate." [126] The California Emergency Medical Services Authority created

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[125] Institute of Medicine. *Emergency Medical Services*, 201.

[126] Ibid., 195.

Guidelines for Minimum Personal Protective Equipment for Ambulance Personnel in California. Beyond daily fatigues and standard response gear, each unit carries a barrier garment, full length EMS jacket with reflective stripes, protective nitrile and work gloves, foot covers, N-95 or N-100 masks, Mark-1 auto injectors, and field operations guides. [127] Higher levels of protection for responders are available at their headquarters and include chemical resistant clothing, and a mission ready "Go-Pack" that allows for self-sustained operations for up to seventy two hours.[128] The state of California provided this equipment for EMS responders through grant funds. A similar model can be adopted elsewhere. At terrorist incidents where chemical, biological, radiological, or nuclear weapons are used, EMS responders need to have access to and be trained in personal protective equipment.

State offices or boards of EMS can lead this charge along with cooperation from state fire chief's associations, state departments of health, and state emergency management agencies and be advocates for EMS personnel in their state. Their need of funding for personal protective equipment, training, exercises, and inclusion into disaster preparedness is clear. Significant Homeland Security grant funds flow through state departments of health and state emergency management agencies of which a portion should be earmarked for EMS professionals. Additionally, state fire chiefs associations will be critical to co-lead the effort at developing automatic statewide mutual aid. Their leadership and standing in the first responder community will be crucial to program success. Adopting automatic statewide mutual aid will better serve both responders and receivers of aid in those communities that adopt the response structure by reducing response times to mass casualty and other type incidents and improve integration of resources on scene through training, exercises and incident pre-planning.

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127 California Emergency Medical Services Authority, *Minimum Personal Protective Equipment for Ambulance Personnel in California Guidelines* (Sacramento, California: California Emergency Medical Services, 2005), 7-10.

128 California Emergency Medical Services Authority, *Minimum Personal Protective Equipment for Ambulance Personnel in California Guidelines*, (Sacramento, California: California Emergency Medical Services June 2005), 7-10.

### 1. Items to Consider- Steps to Adopt Statewide Automatic Mutual Aid

The decision to adopt automatic statewide mutual aid should be made by a committee of stakeholders and not by one agency alone. Michigan identified the need for intrastate mutual aid after requests for resources came to Michigan from Louisiana during the response to Hurricane Katrina. Due to lack of an agreement they were unsure of how to honor the request.[129] Today Michigan is adopting MABAS and state agencies are encouraging the initiative at the regional, county and departmental level.[130] The advantage of adopting MABAS for Michigan is that the response structure can be used on a daily basis. According to Chief Nelson of Troy Michigan Fire Department, "communications interoperability is 80 percent people and 20 percent technology. If people talk to each other day to day than they will in an emergency." This reinforces the need for partners, including the EMS community, to have a seat at the disaster preparedness table.

The first step is to create a mapping of stakeholders that should be involved when deliberating on adopting and implementing automatic statewide mutual aid. The National Fire Service Intrastate Mutual Aid System also encourages this practice. [131] John Bryson's *Strategic Planning for Public and Non-Profit Organizations* provides useful tools to use in this process. See Table 6 on the following page for the power versus interest grid for automatic statewide mutual aid.

Based on the book's information, players are those with interest and significant power, subjects are those with interest but little power, context setters are those with power but little direct interest and the crowd has little interest or power. All are people whose interests and power bases must be taken into account in order for this proposal to be considered. The matrix is an excellent tool that can reveal gaps in stakeholder

129 William Nelson, Chief of Fire, Troy Michigan Fire Department, phone interview with author, August 28, 2008.

130 Ibid.

131 International Association of Fire Chiefs National Fire, *Service Mutual Aid System Task Force, National Fire Service Intrastate Mutual Aid System Guide to Intrastate Mutual Aid Planning*, International Association of Fire Chiefs (December 21, 2007), http://www.iafc.org/associations/4685/files/mtlAid_PlanningGuide.pdf (accessed August 27, 2008), 6.

representation. These deficiencies must be addressed in the future for this proposal to be considered. Table 6 below is a sample power verses interest grid for states considering adopting automatic statewide mutual with agencies and individuals that should be considered in an initial stakeholder meeting. This list can later be refined.

**Table 6 Power VS Interest Grid: Automatic Statewide Mutual Aid** [132]

High Power

| | |
|---|---|
| Subjects:<br>Metropolitan Medical Response System Coordinators, UASI and CRI grantees<br>Hospitals<br>Available Regional Response Teams, | Players:<br>Local fire/EMS/ County EMS<br>County EMA Directors<br>State EMA<br>State Department of Health<br>Local Sheriff Offices<br>Local Police Departments<br>State Patrol Organization<br>Fire-Based Mutual Aid Enrollees<br>Private EMS<br>State Fire Chief's Association<br>Union representation<br>State Fire Marshal |
| Crowd:<br>Civilians, victims, or consumers of disaster response assistance | Context Setters:<br>State National Guard<br>County Health Commissioners<br>Governor<br>County Commissioners<br>Local Mayors<br>County Coroners |

Low → High Interest

People listed in Table 6 above represent the major agencies typically involved in disaster/incident planning response in various ways and civilians or victims who are consumers of disaster assistance and information

*Players* are those who have the power, responsibility, and authority to make decisions and request initial and additional resources once jurisdictions are overwhelmed when mitigating incidents, or those who respond and perform functions on scene. Some mentioned in this section may have local or state legislative authority to perform this

[132] John M. Bryson, *Strategic Planning for Public and Non-Profit Organization,* 3rd Ed. (San Francisco, California: John Wiley and Sons, 2004).

function. They have a direct interest in how resources are requested, obtained, and used to help suffering members of their communities.

*Context Setters* have power, interest and roles in disaster mitigation. For first response asset requests they may not have a direct interest. Their legal authority needs to be taken into consideration when considering the proposal for automatic statewide mutual aid.

*Subjects* are those involved in disaster planning and differing forms of incident response and mitigation. Their mission is disaster planning, tactical response, and resource coordination where appropriate. They operate upon request but have limited authority in disaster response. As they are preparing for disaster in their communities, they have a direct interest in how aid will be requested and received.

*Crowds* are civilians and those individuals that are direct victims of the affects of the disaster. Their concern is that assistance and that actionable information comes in a timely manner. They may not have direct interest in how this process occurs but their expectations should be taken into consideration. Often planners take a prescriptive approach concerning citizens' needs. Enlisting their input advocates for victims of disaster.

If the decision is made to adopt the program, other items to consider for this program include designation or establishment of a lead state agency that can champion and market the program; development of a standard box alarm card format that can be utilized by all; identification of divisions; identification of primary and secondary MABAS dispatchers; development of a standard procedure for deployment and scene integration; training for dispatchers, firefighters, EMS personnel, and law enforcement; ensuring that the response system integrates with established state response plans; establishment of communications channels for intra-divisional and statewide fire operations; and establishment of a MABAS specific alert tone recognized by first responders. Implementing MABAS will take years to develop. Success will also be dependant on state support to assist in driving the process and to assist with the communications piece. Also for consideration in the beginning stages is including

partners from neighboring states. This way reciprocity agreements for first responders between states can be addressed early in the process rather than as an afterthought.

Critical to inclusion in this process from the beginning is the EMS community, from the state EMS agency to public, private, and hospital based systems. Their integration into the response structure will allow for immediate deployment of EMS resources to the scene of mass casualty incidents, which can have a positive affect on victim outcome. Furthermore, being involved from the beginning will allow them to have input and develop agreed upon response and recovery procedures.

All may not agree with the decision to move to developing automatic statewide mutual aid. The National Fire Service Intrastate Mutual Aid System *Guide to Intrastate Mutual Aid Planning* recognizes barriers to planning that may be present in some states. Highlights include labor agreements, turf/ego issues, personal agendas, resistance to change, lack of local government support, apathy, people who do not see a need, fear of loosing local control, and many others.[133] While resistance may be discouraging progress can still be made with those in agreement to the idea. Remember that MABAS-Illinois started in Elk Grove Illinois and took years to develop to the capacity they have today. Michigan also anticipates years for development in their state. The reality of disaster striking any community is more probable today than in past years. It would be irresponsible for state and local agencies to not consider enhancing current response structures. Although work is required to develop these systems, the reward could prove to be priceless.

## D. CONCLUSION

Terrorist attacks that result in mass causalities cannot be predicted with any certainty yet the number and magnitude of natural disasters continues to threaten human life and safety. Both must continue to be planned for. The current methods to obtain immediate medical assistance during disaster are limited for many states. Beyond a

[133] International Association of Fire Chiefs National Fire, *Service Mutual Aid System Task Force, National Fire Service Intrastate Mutual Aid System Guide to Intrastate Mutual Aid Planning*, International Association of Fire Chiefs, (December21, 2007) http://www.iafc.org/associations/4685/files/mtlAid_PlanningGuide.pdf (accessed August 27, 2008), 9.

limited number of pre-arranged mutual aid agreements for EMS utilized daily and available during crises, other forms of medical aid such as activating the Medical Reserve Corps (in some areas) or Disaster Medical Assistance Teams require local or state disaster declarations before available resources can respond resulting in significant turn around times before aid requests can be honored. At maximum, adopting statewide automatic mutual aid can help to ensure enough medical resources arrive on scene without the delay from awaiting a disaster declaration as time will be critical in saving as many lives as possible. A critical piece to adopting statewide automatic mutual aid is inclusion of the EMS community from the beginning as they have significant resources that are critical to mass casualty incident response. EMS community inclusion in disaster response structures must be accompanied by inclusion in planning and delivery of training to ensure smooth scene integration and operations.

At minimum, local communities should consider developing MABAS. If not supported at the state level, local communities can develop MABAS as the originators did in Elk Grove, Illinois forty years ago. A community MABAS structure currently exists in Northeast Ohio where six counties have come together to provide automatic aid to each other. Developing the response structure is relatively inexpensive and mostly requires the investment and commitment of time from member agencies.

The success of MABAS- Illinois cannot be overlooked. Mutual aid through the response system is utilized over 850 times per year both within Illinois and in jurisdictions in contiguous states to Illinois. The response to the Northern Illinois shooting is one successful example utilizing the MABAS system and another was deploying 900 personnel with apparatus to Hurricane Katrina, over 1,000 miles away, on a rotating basis for six weeks.[134] Many states have put significant work into disaster planning over the years and should be commended. The proposal to adopt statewide automatic mutual aid is one more step to improve upon the work already accomplished. Benefits include quicker response times, predetermined asset response for high risk incidents, ensured service delivery while the incident is occurring, increased access to

[134] Jay Reardon, President/CEO, MABAS- Illinois, phone interview with author, July 30, and August 21, 2008.

more assets on a daily basis, more efficient and effective use of resources, improved service delivery to citizens, and assistance in reinforcing scene integration in neighboring jurisdictions. There will be significant investments of time to develop MABAS. Also programming radios to honor common district and statewide primary, tactical, and alert channels may be cumbersome but not unachievable. Other states developing or enhancing intrastate mutual aid agreements can learn from this research and consider statewide automatic mutual aid as well. Further research is needed to determine exact costs for the program. State and local agencies can work together to adopt MABAS for and improve service delivery to their communities.

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