

A Look at Disaster Preparedness Activities

With Emphasis on Orange County, NC

by

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ABSTRACT

The following paper will examine the types of preparedness activities available to leaders in Public Health, Emergency Management Services, Healthcare Facilities, Law Enforcement, Fire Services, Social Services, and Animal Control Services to prepare their communities for an act of bioterrorism. In particular it will explore types of operations based and discussion based exercises. A specific case study in disaster preparedness taken from experience in Orange County, North Carolina will be used to illustrate these activities. The case study will be discussed at length to illustrate strengths and weaknesses that can be gleaned from such activities. Finally, the paper will conclude with recommendations for addressing two key deficiency areas: communication and stake-holder buy in.

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With the threat of bioterrorism and disaster preparedness at their peak awareness in American society since September 11, 2001, the question could be posed, "How better prepared are we for an event three years later?" The answer to this query is somewhat rhetorical in the sense that the United States is without a doubt more prepared today than it was on that ominous day in 2001. However, in many counties across the country, funding from the 2002 Homeland Security Act has only recently been secured and planning initiated. This situation is the case in Orange County, North Carolina. A grant was issued in January 2004 to help the county prepare for potential acts of bioterrorism through planning its first ever countywide disaster preparedness exercises. The grant provided money for equipment and supplies needed to implement preparedness activities, which were to closely simulate a realistic event. Ultimately, the functions were carried out in the summer of 2004. Many useful lessons in disaster preparedness planning were learned from the activities. Among the most useful information that emerged were deficiencies that stand to present potential pitfalls in the event of an actual bioterrorism event. Before we look at this issue in depth, let us examine bioterrorism preparedness exercises from inception with emphasis on their purpose, the different types of exercises, and focus on the roles of agencies involved in their implementation.

The Homeland Security Act of 2002 set forth a policy for protecting all Americans from potential acts of terrorism. Central to this policy is the belief that

protection begins with being prepared. (The White House, 2002) Preparedness ensures that if disaster strikes, people are equipped to overcome it safely, and respond to it effectively. (US Dept. of Homeland Security-FEMA, 2004) Although terrorist attacks by foreigners on American soil is a relatively recent development, the foundation of bioterrorism preparedness planning is rooted in our decades of experience in developing readiness for natural disasters such as earthquakes, floods, fires, and major accidents. By practicing response roles to these types of catastrophes, facilities can better equip themselves for an actual event. Not surprisingly, many of the same procedures used in natural disaster preparedness have utility when applied to bioterrorism. For both situations, readiness is often achieved by conducting preparation exercises. According to the CDC ASTDR satellite web-cast, "Mass Vaccination Clinics- National and State Perspectives: A Reality Check", exercises are critical to success during an actual event. They provide a sense of flow of operations and allow the opportunity to identify and address problems (Backer, 2004). Exercises also aid in improving relationships among community partners. Furthermore, it has been shown that experiences in responding to both real and simulated disasters help achieve coordinated and effective responses in subsequent disaster situations (Moser, 2001).

Now, let us look at the purpose of conducting such activities. Planning has been said to be the key to effective crisis management and response. (Hamburg, 2001) The purpose of planning and preparing for an event of bioterrorism via drills, exercises, and functions is to become better prepared to respond in the event of an actual bioterrorist attack. The basic preparedness elements that can be gained from carrying out exercises

include: identifying the types of terror events that could take place in the community, planning emergency response in advance to ensure a coordinated and organized response in the aftermath of an event, building capabilities necessary to respond effectively during the aftermath of those events, identifying the type and nature of an event when it occurs, implementing the emergency response plan quickly and efficiently, and ultimately, recovering from the incident. Another important purpose of planning disaster preparedness activities is to improve communications among targeted agencies (Szejniuk, 2004). According to Dr. Thomas Glass, Department of Epidemiology at John Hopkins University, “pre-existing personal knowledge of one another, being in a situation with people you know, inoculates against panic and dysfunctional behavior” (Glass, 2001) . It is important for involved agencies to work together in planning exercises in order to be able to respond as a team during the actual event. Additionally, it is important not only to include key decision-makers and agencies but also members of the community in this endeavor to increase communication effectiveness. Public Health can collectively expand its ability to execute bioterrorism preparedness and response and address the unique challenges communities face against terrorism through establishment of productive relationships with partners in the community. Equally important in the process of planning, is testing communications between all involved agencies. Lastly broad scale preparation can serve as a deterrent to terrorism. A terrorist may be less likely to strike given the knowledge that communities are prepared to minimize the impact. (Jones et. al, 2002)

On a final note regarding the purpose of preparedness it is worth mentioning that the U.S Homeland Security Act of 2002 stands to generate sweeping improvements in the realm of disaster preparedness. In the words of U.S. Senator Sam Nunn, we have an unusual opportunity to “defend our nation and improve public health for America and the world with the same dollars at the same time.” (Nunn, 2002) However, recently controversy has arisen regarding the effectiveness of federal grant spending. For example, is it better to spend money on drills, exercises, and functions or to upgrade antiquated equipment for state of the art anti-terrorism gadgets? Many counties across the U.S. have requested funds for “double duty” preparedness activities. The term, “Double duty” preparedness refers to efforts to leverage available resources to respond to both naturally occurring and bioterrorism threats. Such exercises as the ones conducted in Orange County fall into this category in that they not only work towards preparing the county for a bioterrorism event but they also prepare for such threats as pandemic influenza or Severe Acute Respiratory Syndrome outbreaks. In these activities, people gain knowledge, experience, and build relationships. The pay off is saving lives whether it is due to bioterrorist attacks or influenza. However, various cities and counties in the U.S. have opted to utilize allotted money for high tech gadgets such as environmental monitors or biodetectors that can detect airborne bacteria soon after release. While these monitors might sound like a wise purchase on the surface, some would argue they are not well developed. Current biodetectors lack high sensitivity for some agents, and produce a high number of false positive results. (Jones et. al, 2002) Therefore, despite the high profile that such technologically advanced devices impart, they may not be the best

option for smaller cities and counties. More lives will likely be saved through practicing response plans than upgrading to high-tech anti-terrorism equipment.

With that said, let us take a closer look at the two major categories of exercises: Operations-based and discussion-based exercises. According to the United States Department of Homeland Security Office for Domestic Preparedness, operations-based exercises focus more on tactical response issues while discussion based exercises focus on strategy and policy issues. (2004) The fundamental goal of operations-based exercises is to elucidate the roles and responsibilities of involved agencies and gaps in resources. They are characterized by real response, mobilization of equipment and resources, and commitment of personnel, usually over an extended period of time. (U.S. Dept. Of Homeland Security-Offices for Domestic Preparedness, 2004) Examples of this type of exercise include drills, functional exercises, and full-scale exercises. Typically, these activities are conducted by planning agencies to help ready involved parties for a real event. According to the Agency for Healthcare Research and Quality, “drills are one of the most commonly used disaster training techniques”. (2004) Drills are a form of exercise that focuses on only one activity such as providing inoculations or triaging patients. Moreover, many people are exposed to drills in elementary school by way of fire or tornado drills. Since drills were not conducted in Orange County as part of the Emergency Management Services 2004 Fiscal years disaster exercise, they are beyond the scope of this paper.

The functional exercise (FE) is one type of operations based exercise. This type of exercise tests and evaluates individual agencies and departmental capabilities and the combined capabilities of those agencies. Moreover, such exercises usually focus on rating the functionality of plans, policies, procedures, and staff of the direction and control branches of the Emergency Operations Center (EOC), which is the coordination point of an Area Command under the National Incident Management System (NIMS) Incident Command and Unified Command centers. (U.S. Dept. Of Homeland Security-Offices for Domestic Preparedness, 2004) The Command Post is the place where primary command functions are performed for a particular incident scene (U.S. Dept. Health and Human Services-Office of Justice Programs, 2002). Usually, events are simulated through a hypothetical scenario with event updates at planned intervals of time that direct activity at the management level of involved agencies. Movement of personnel and equipment is performed exclusively by virtual means. The primary objective of the FE is to execute specific plans and procedures and apply established protocols under simulated crisis conditions, within or by participating agencies. The FE simulates planned operations by presenting complex problems that require rapid and effective responses in a highly stressful environment. Ideally, the participants in the exercise are the ones that would normally be in charge of decision making in an actual event. This type of exercise allows for evaluation of the emergency response plans and responder actions, reinforcing and establishing policies and procedures for response, and examining interdisciplinary agency relationships.

The final type of operations-based exercises is full scale exercises (FSE). According to Office for Domestic Preparedness, they are the most complex exercises to execute in that they span multiple agencies and gage numerous components of emergency preparedness response endeavors. (U.S. Dept. Of Homeland Security-Offices for Domestic Preparedness, 2004) The focus of FSE's is to execute and assess the implementation of disaster response plans, policies, and procedures by virtue of a simulated event with deployed response personnel. The events are usually scripted with some flexibility to allow for integration of events as they unfold during simulation. The activity closely imitates reality and participants are asked to act as if an actual event has occurred. FSE's provide an opportunity to evaluate the performance of agencies and individuals involved in the event by studying resource and personnel allocation, interagency collaboration, communication mechanisms (including equipment), and systems of public dissemination of information.

Discussion based exercises are also utilized in preparation activities for disaster response. Tabletop Exercises are an example of such exercises. Generally, these types of activities are best for familiarizing agencies with one another and emphasizing individual roles and responsibilities while working as a team. Tabletop exercises allow for group problem solving, orientation of senior officials with working conjointly on the logistics of problems, evaluating inter-agency communication, and inter-agency collaboration. The exercise commences with one or more pieces of information being divulged to participants with ensuing response from all involved agencies. Issues arise are then discussed at length as time permits. The environment of a tabletop exercise is conducive

to in-depth discussion during a slow methodical process. Ideally, tabletop exercises engage key personnel involved in the decision-making process during an actual disaster to provide these participants with experience and knowledge of what to expect in a real event. The exercise is a way of generating discussion regarding particularly perplexing issues associated with response to an event. It can be used to assess plans, policies, and procedures or to assess resources needed to aid the prevention of, response to, and recovery from a disaster.

Part of the challenge in planning a bioterrorism exercise is the fact that bioterrorism is considered by many officials to be a “low probability but high consequence event” (Hamburg, 2001; Glass, 2001). In fact, in some jurisdictions in the United States it is exceedingly difficult to obtain an audience of key stakeholders (such as politicians and top ranking officials and policymakers) for such events. The reasons for this difficulty include factors such as funding, political environment, and constituent priorities. Yet, one of the main purposes of conducting disaster preparedness exercises is to seize the attention of key stakeholders in hopes of gaining greater attention and assistance for disaster preparedness. To illustrate the utility of stakeholder buy-in, let us look to the tuberculosis epidemic in New York City in the 1980’s and early 1990’s. The problem was largely ignored in the beginning. However, as the numbers of cases mounted in the early 1990’s tabloids began over-sensationalizing the problem, and prison staff along with transit employees threatened to go on strike. At this point, policymakers and politicians began to take heed of the growing public fear and address the problems with public health in the city. As a result, government officials put more money into

tuberculosis prevention and control to reduce the problem. (Hamburg, 2001) This case illustrates that once issues are framed in a meaningful way to the stakeholder, it becomes possible to acquire commitments and support from them for vital public health programs like disaster preparedness. Stakeholder buy-in is a building process. It must start with a foundation of trust and local support to gain attention and keep it from waning. One can view the events of Fall 2001 as the attention provoking event that framed the issue of disaster preparedness in a meaningful way to many key politicians and policymakers in the United States. But, for how long will this policy window remain open? We will come back to this question at the conclusion of the paper.

Just as the purposes for conducting preparation activities are numerous so are the reasons for establishing the roles of the agencies that carry out the task of preparedness. These agencies are charged with the responsibility of planning, organizing, practicing, modifying, and implementing response protocol. In many cases these agencies form a planning team composed of a variety of professionals from an array of backgrounds and disciplines. If possible, the team consists of representatives from local, state, and federal agencies. Each member is selected to serve on the preparedness committee based on his or her position and skills. Part of the responsibility of these teams is usually to design and plan disaster preparedness exercises to better equip their county or region for disaster. The planning team can provide a wealth of input and resources for such events. Duties of planners range from assemblage of materials to gathering input from other counties and similar organizations regarding disaster preparedness exercises. Examples of organizations and agencies that constitute emergency planning teams are as follows:

County and State Public Health Departments, County and State Emergency Management, Law Enforcement, Social Services, Health Care Facilities, School Systems, Public Works, Animal Control Services, Fire Service, and non-profit organizations.

Let us briefly look at each of the aforementioned agencies role in disaster response to underscore their importance in the preparation process. Public Health is responsible for monitoring disease surveillance in the community. In the event of a covert bioterrorist attack, they will be able to unveil trends in disease reporting to their agency. In the state of North Carolina, once the attack is known, public health will be in charge of medication distribution to first responders and the public. They will also be looked to for guidance and support by the public and will likely engage the media to this effect. In North Carolina, the state and local Public Health Director are the only persons with authority to call for quarantine of exposed individuals refusing treatment. (NC General Assembly, 2000) The state public health laboratory is charged with identification and confirmation of a disease agent. Finally, Public Health can coordinate activities with federal agencies such as the Center for Disease Control and Prevention or the Department of Health and Human Services (HHS). For example, the Strategic National Stockpile (SNS) can be requested by the State Health Director once local and regional supplies have been exhausted.

Another important agency is Emergency Management Services (EMS). Paramedics who are a part EMS assist in early recognition of disease/illness trends. This detection of trends is monitored through response to 9-1-1 calls and will likely be seen

through an overloading of the system. (Nordberg, 2000) In the event of a bioterrorist attack, the ability of EMS to respond to calls will be paramount to saving lives. They will need to be prepared to respond in a timely manner in the early hours of attack awareness and triage patients to treatment facilities.

Law Enforcement will also be vital in an incident. They will be required to provide security to response staff and supplies such as scarce medication or antidotes. They will be in charge of the investigation of acts of terror to pinpoint the perpetrators. In the event quarantine is mandated by public health, law enforcement will carry out the orders seeing that individuals are appropriately sequestered from the public. Lastly, they will serve to control large crowds at distribution sites and to direct traffic in and out of the facilities. Law Enforcement also provides security during receipt, transport, and storage of the SNS.

Social Services will be necessary to coordinate mental health activities for victims, the “worried well”, and children in the aftermath. They will also tend to the essential affairs of quarantined individuals such as banking, grocery shopping, and mailing letters. Additionally, Social Services will find suitable care for displaced children after the event.

Next, the role of the Health Care Facilities is to provide accommodation, treatment, and care to victims. These facilities provide triage services, arrange patient transfers to other facilities, assist in staffing of mass care facilities, manage

pharmaceuticals, and restock the SNS once it arrives. The state Medical Examiner is encompassed within this group in Orange County, North Carolina since his office is at the University of North Carolina- Chapel Hill. The Medical Examiner coordinates autopsy and coroner services for victims.

School Systems are also involved in response. They can supply building space (gymnasiums and cafeterias) for dispensing medication to the public. Schools can also serve as a mass care facility such as a field hospital. Additionally, they can serve as a family reunification center for families to reunite after being separated.

Another agency that contributes to the effort is Public Works. This agency imparts such services as supplying potable water, removing debris, providing emergency power, and repair of public infrastructures such as water supply systems.

Animal Control agencies are yet another agency involved in the response effort. They investigate possible infections in the animal population by tracking and catching suspect animals then destroying and disposing of carcasses in conjunction with the state Department of Agriculture and Public Health. In addition to this role, they attend to animals belonging to incapacitated and deceased victims.

Lastly, the Fire Service has a part in the endeavor. They are part of the unified command structure that works to assist in urban search and rescue, hazardous materials operations, decontamination, and support services such as manpower. Additionally, Fire

Service controls any malfunctioning building systems such as alarms, elevators, and communication services. Fire Services also aid in public warning by driving through neighborhoods and announcing pertinent information. It is important to note that all emergency response agencies assist in public warnings. However, it is primarily the responsibility of fire and law to perform the duty.

It is imperative for all of these agencies to understand each other's roles, responsibilities, experience, and resources in disaster response efforts. Preparedness exercises provide the opportunity for such learning to occur. By planning the exercises together, conducting exercises as a team, and engaging in constant training and education to face disasters in a joint manner, effective response is more likely in the case of an actual event.

Specifically, let us examine the three disaster preparedness activities that took place in Orange County, North Carolina (NC) during the summer of 2004. The exercises in Orange County were funded through the US Department of Homeland Security FY 2002/ 2003 State Homeland Security Grant Program- Exercise Section. The County Department of Emergency Management secured funding for the first countywide bioterrorism exercise series with the stipulation of completing the events by August 30, 2004. Various organizations and agencies in Orange County had held exercises in the past two years to test response mechanisms to a chemical and radiological event regarding bioterrorism but a joint effort had never been attempted. Therefore, the primary goal of Orange County's first ever biological exposure response functions was to

bring together dissimilar but complimentary organizations in the county in order to address the issues and conflicts in the process of preparing for a potential bioterrorism event. Although each agency possessed a unique capability in the realm of disaster management, they had never collectively participated in working on issues that could arise during an actual terrorist event of this magnitude. The first task involved formation of a Full Design Committee in January. Each organization and agency involved in disaster response sent a representative to serve on the Full Design Committee. The committee was charged with the responsibility of planning the overall scenario, evaluating needs and areas to be tested, and providing general guidance during the planning process. One of the first actions the Full Design Committee performed was to designate a sub-committee called: The Core Design Subcommittee. The smaller sub-committee's role was to assimilate the intricate details of planning the functional, full-scale, and tabletop exercises. They also performed the work necessary to conduct the exercise such as developing written materials and arranging logistical resources. These two committees worked together to devise the objectives of the exercise to test the response system currently in place and to identify deficiencies that need to be improved upon. The Core subcommittee periodically reported to the Full Design Committee for feedback. The Full Design Committee worked to create links with local stakeholders and other key community members. Numerous meetings took place between February and August to assimilate the disaster response plan for an act of bioterrorism via observation-based and discussion-based exercises. In particular, the sub-committee met almost every week for two hours from February to July to plan and discuss progress for three exercises (a functional exercise, a FSE, and a tabletop). The sub-committee chose the disease

agent of plague, *Yersinia pestis*, for the summer 2004 exercises. This agent was kept anonymous to everyone outside of the committee to help decrease the chance of participants at respective agencies in the exercises from planning in advance for the simulated disease agent of plague in the scenario. The exercises were meant to simulate reality therefore, unless it was detailed in advance by a warning letter from a malicious entity, in reality no one would have advance warning of the specific disease agent. After this task was accomplished, the most important task charged to the team was to write and revise the scenario events that would be used by participants to simulate an actual bioterrorism attack in Orange County. This task required considerable research and discussion regarding the chosen disease agent. The sub-committee members debated the levels of intensity and complexity of the exercises. They also refined the plan for action in order to make the exercise as realistic as possible for participants without over-burdening them in this initial activity. The committee contacted other health departments, hospitals, and Emergency Management Agencies to gain information regarding the logistics of bioterrorism exercise planning. They secured venues for the exercises and designed the floor layout for seating of participants and organization of the full scale event in accordance with the bioterrorism response plan in Orange County. In the experience of the 2004 event, planning was difficult due to the necessity of agencies to create their bioterrorism response plans to apply to the exercises while simultaneously developing the exercises provided for in the governmental grant for the county. Some agencies needed to have their plans written before the exercise was conducted. It was often hard to make progress in planning because certain plans for action had not been written.

Nevertheless, the first of the series of three exercises, a functional exercise, was held on June 8, 2004. The event evolved around a scenario depicting a plague outbreak in the county. Three categories of exercise staff were present: Controllers, Evaluators, and Observers. Controllers had a script of the scenario and the expected actions of participants. They issued pre-scripted messages to participants during the function. The events were linear in nature in that all actions were occurring simultaneously at each agency. The Controllers took subjective notes on the events as they occurred to critique decision making skills of the involved agencies. Evaluators were not informed of the scenario details and were therefore blinded to the events until such were presented. They took objective notes on the proceedings as they occurred and answered objective based questions regarding the actions taken by senior representatives from the participating agencies. The activity was planned to last for four hours. Observers were present to watch the function and did not interact with the participants. The observers were asked to record their subjective observations of response as the events unfolded. Once "play" began, the participants were to behave as if the events unfolding were real and proceed stepwise by making the difficult decisions that were necessary. Numerous expected responses were listed in a hand-out to assist Observers in gauging responses. Every agency had certain aspects of the scenario designed to test their policies and procedures for response to a bioterrorism event. Some leeway was allowed for unexpected responses to occur by incorporating blank messages delivered by function controllers in the disease outbreak. Bioterrorism response exercise evaluation forms were given to each participating agency at the tabletop function in order to accomplish the next important

step: collecting and analyzing data. Specific personnel from every organization were designated to serve as Evaluators. Their main responsibility was to indicate if critical points in the activity were achieved and then to comment on each critical point (Szejniuk, 2004). The Evaluations were collected from the majority of participants after the exercises. There were a total of 86 individuals involved in the functional exercise. Of this number, there were nine Controllers, 15 Evaluators, and nine Observers.

From the comments offered by participants at the debriefing immediately following the event and the collected evaluations, it was determined that the exercise was a success in many respects. The exercise helped highlight problems and set a benchmark to build upon in future functions in the county. First, it achieved the goal of bringing together diverse groups to work as a unified team in a crisis. For many participants, this activity represented the first time they had been involved with a simulated exercise. It also allowed many people within the county agencies to become acquainted. This fact was especially true for the Public Information Officers (PIO's) within the county who have only recently began to work together as a team. It was generally felt that the participants took the function seriously and good discussions were generated. The exercise invoked a lot of thought about topics not yet resolved in the county regarding dealing with such a disaster. For example, discussion developed around triaging symptomatic patients after screening, logistics of ordering the SNS from the CDC, and verifying existing pharmaceutical supplies at various pharmacies in the county. The functional exercise provided an opportunity to practice establishing an Emergency Operations Center (EOC) for all senior representatives from county agencies. The

“mock” EOC was setup relatively early in the play of events at the tabletop. It was soon bombarded with issues ranging from complaints over a lack of mock event details to confusion regarding which agency was represented by whom.

This issue led us to the deficiencies highlighted by the exercise. The exercise illuminated many issues regarding the effectiveness of emergency plans and procedures for involved agencies. A lack of good inter-agency communication mechanisms was apparent from the misinformation and confusion that surrounded the events, as they became known. This revelation came as no surprise to planners. Traditionally, the United States has not ranked preparing for an event of bioterrorism as a high priority. As such, the U.S. (on the federal level) has proven ill prepared to deal with an attack of this nature. Exercises such as Dark Winter and TOPOFF have illustrated the country’s lack of preparedness prior to 9/11. (Inglesby, et. al, 2001; Keating, 2001) Part of the reason for the lack of preparedness is the lack of communication amongst diverse groups of professionals, such as law enforcement and public health. For example, the two realms practice vastly different approaches in dealing with disaster. This fact can be best illustrated by examining each agency’s aims of investigative work. As stated in an article in *Emerging Infectious Disease* by Butler, et. al., public health collects data with the purpose of withstanding the scrutiny of world-renowned scientists and experts in order to develop better control efforts. Whereas, law enforcement investigates to collect enough evidence to withstand legal scrutiny in order to acquire a conviction (Butler, 2002). As such, the two disciplines are held to different standards. By recognizing differences and learning to understand each other, the two agencies can learn to work more efficiently as

a team. The functional exercise provided an opportunity for both agencies to become more familiar with each other's practices. Participation in a simulated event allowed the agencies to identify systems that were effective in routine activities (like planning and coordinating joint events and delegating duties) and then to find methods that did not work in order to improve inefficiencies for an adequate response during disasters (Hamburg, 2001). Ultimately, through continued collaboration and participation in disaster preparedness exercises, inefficiencies can be reduced to a minimum number.

In addition to the previously mentioned communication problem, the state government agencies were not involved at the onset of events. Furthermore, the Unified Command did not give timely briefings to the media to inform the public immediately of the occurrence due to the rapidly unfolding events of the exercise scenario. Critical time elapsed during the initial hours of simulated events before the state participants were brought in to assist. Theoretically, individuals could have been exposed in the time that passed between the onset of events and public notification in the exercise. One of the reasons for this problem may have been a design flaw in the scenario itself in that it presented too many activities to be addressed in the four hour time frame. However, in reality one can not plan for the number of events that will take place in a time of disaster. The exercise allowed for the lesson of ensuring validation of information (even from seemingly reputable sources). It is essential during an actual event to avoid causing undue stress and panic by reporting information before it can be verified as actually true. In reality, a lack of reporting of facts to the information officers could result in public panic and disarray.

Due to the stressful situation imposed on participants and lack of time for them to make important decisions, the public was not protected in the exercise as quickly as could have been possible. A possible reason for this fact was that key personnel from participating agencies that are usually depended on to manage a crisis did not participate in the exercise play because of their duties as non-participatory observers and controllers. This fact limited the personnel resources available to agencies and hindered the planning of response action during the function due to a training and experience deficiency. Another possible reason was the fact that higher ranking staff members from some agencies did not come to the event which may have created uncertainty in the chain of command and authority to make decisions. This showed the importance of having trained staff capable to act in the primary's stead.

Another deficiency noted in the scenario itself was the omission of the onslaught of telephone calls to the 9-1-1 center during the emergency that would likely occur in a real event. It was uncertain if the current system could support a mass influx of calls. The hospital established a hotline for worried-well and others to call. Yet, no unified county system was discussed to inform and protect the public.

The Full-scale exercise was held on August 10th, 2004 at Grey Culbreth Middle School in Orange County, North Carolina. The primary intention of the exercise was to test the Orange County Health Department's ability to distribute medication to the public in response to a bioterrorism attack and other agencies to support them in that endeavor.

In this activity, public health devised a plan for medication distribution in the event of mass exposures. The exercise also aimed to test key processes set forth in the Public Health Emergency Preparedness Response Plan to help better plan and coordinate pertinent activities. Namely, the mass medication dispensing exercise tested the site and setup (Grey Culbreth Middle School) to assess functionality and capacity for patients and the Medical Reserve Corps (MRC). This group consisted of Orange County physicians, pharmacists, nurses, etc. One of the main purposes of testing the MRC was to provide them with the experience of working while wearing personal protective equipment (such as gloves, goggles, and masks) and dealing with continuous lines of patients. This experience allowed the MRC to become more familiar with the demands of the work itself. The dispensing process was designed to test patterns of traffic flow of people through the screening and dispensing site. The exercise monitored the amount of time it took to dispense medication to a set number of people. In planning, a total of 50 “patients” per hour for three hours were expected to be seen at the distribution site. This testing took into consideration the extra time that would be required to deal with special populations of people (children, disabled, non-English speaking, etc.). Additionally, the purpose of the mass medication dispensing exercise was to allow the opportunity for the entire group (local agencies and the MRC) to understand each other’s roles in response and to learn to work together in avoiding duplication of efforts. Law Enforcement’s main objective for the function was to test their ability to secure a medication dispensing center and coordinate traffic and parking at the site. These two agencies were the predominant agencies being tested in the exercise. Finally, PIO’s representing Orange County Health Department, University of North Carolina (UNC) Hospitals, UNC, and area law

enforcement among other agencies were also tested but to a lesser extent. In an actual event, it will be the charge of this group to make sure the latest and most accurate information is relayed to the media and issued to the public. The group was given the opportunity to practice working with the media at the Mass Medication Distribution Exercise. Other agencies such as Orange County Emergency Management, Commissioner's Office, and Social Services served as support agencies in the event.

The Full Design Committee designated roles for various ancillary organizations in the County. The Core sub-committee devised the details of the exercises to ensure the success of the event. One of these details regarded recruiting essential participants. They helped secure nearly 150 Orange County community volunteers to serve as "victims" in the full-scale event. Volunteers were recruited from a variety of community agencies ranging from church groups to civic organizations. Orange County Public Works was asked to help set up supplies needed for the exercise such as tables and chairs at the dispensing site. Chapel Hill Transit was incorporated to transport volunteer participants to the distribution site from the park and ride lot at Jones Ferry Road. Chapel Hill Schools were involved in supplying the site school (Grey Culbreth Middle School) and serving as on-site representatives to assist in aspects of planning involving the school's layout and accessibility. Law Enforcement provided security at the site and directed traffic in and out of the school on the day of the exercise. The same system of using Controllers, Evaluators, and Observers was utilized in this exercise as was previously used in the functional exercise. However, as a lesson learned from the functional exercise, The Wake County Health and Human Services division was asked to serve as

evaluators for the full-scale exercise to allow key personnel from Orange County to participate in the exercise.

In many respects, this exercise too was a success. Evaluators cited good aspects of the exercise at the debriefing session immediately following the exercise. Areas noted included good use of Incident Command communications, good adaptability (handling of the failure of the air conditioning system in the gymnasium), good overall organization, and good definition of roles for participants. Praise was also given regarding the attentiveness of the greeters to the sick. Overall, the planning and execution of the entire function was commended. However, deficiencies were noted. Problems noted included difficulty in hearing communications over the Nextel radios in the noisy gymnasium, bottlenecks in traffic flow patterns at the screening site and dispensing site, lack of a serpentine line formation for boarding buses in an orderly fashion, and issues at the infirmary regarding proceeding with treatment of sick patients. It was noted that more interpreters were needed to assist non-English speaking community participants. Overall, the exercise was a good learning experience for all participating agencies. This exercise will be used as a catalyst to plot future exercises, to hire more staff, and to perform exercises more frequently.

As the final exercise in the series of preparedness activities for the “Silent Summer 2004”, a table top exercise was held on August 12, 2004. The event simulated a quarantine of a geographic area involving mock victims exposed to the disease agent and expressing symptoms in which treatment could not improve. The 10th Amendment gives

states the right to enact laws and to promote regulations that protect the health, welfare, and morals of its citizens (CDC, 2003). State quarantine laws have been determined by the courts to be an appropriate application of the police power given in this amendment. Such laws are used to detain an individual within a defined area and to restrain healthy persons from entering the area. As mentioned earlier, in NC, the State Health Director and County Public Health Director are the only persons who have authority to mandate quarantine. It is important to note that once the quarantine is invoked by public health, it is then the duty of law enforcement to carry out the actual orders. In the tabletop, the quarantine portion of the exercise was simulated by means of a tabletop enactment meant to be an extension of the Emergency Operation Center established during the tabletop function in June 2004. The purpose of the quarantine tabletop was to facilitate understanding between all involved agencies of their roles and responsibilities during a quarantine event. The intention was to devote time to discussing the logistics of handling mutual aid, enforcement, planning needs, and the governing statutes that exist. It was also meant to highlight policies that might need to be written to address problematic issues. Representatives from the following agencies were in attendance: Chapel Hill Police Department, Carrboro Police Department, Orange County Sheriff's Office, UNC Public Safety, Orange County Health Department, and Orange County Department of Social Services. As with the full-scale exercise, Public Health and Law Enforcement were the key agencies participating in this exercise that evaluated the mechanisms in place to handle the task of calling for a quarantine of individuals and implementing the measures. An open forum of questions and answers were posed and discussed by participating agencies over a two hour period. This discussion forum allowed for multiple case

scenarios to be presented and answered giving way to some difficult questions. Topics of uncertainty included the procedure for ordering the Strategic National Stockpile and then securing its appropriate storage requirements, methods of requesting mutual aid by law enforcement, and dealing with children of the quarantined. These are questions that will need to be addressed in the coming months and years before Orange County will be ready to respond to an act of bioterrorism. Ultimately, good discussions were generated from all involved agencies, furthering the effort of inter-agency communication in Orange County. No deficiencies were highlighted in this exercise.

The CDC has the following comments on the role of communication in disaster preparedness activities, "Communications must convey a credible and consistent message that is delivered in a timely fashion through effective and accessible channels of exchange." (CDC, 2004) Problems in delivering information were apparent in two of the three Orange County Disaster Preparedness activities in 2004. At this time, recommendations for improving deficiencies pertaining to communications in future preparedness activities will be discussed. The importance of this action cannot be overemphasized. Good communication can minimize an emergency, expedite response, and reassure the public during a disaster situation. The importance of good communication skills have been stressed in functional exercises held in other parts of the state. For example, Mecklenburg County simulated a small pox bioterrorism tabletop in June 2004 and professed, "clear delineation of roles and responsibility, lines of communication, and capability of public health to communicate and coordinate with other county and state agencies were major factors in managing the response." (NC

Public Health Preparedness and Response, 2004) The Bioterrorism Design Task Force Team in Orange County is an excellent example of initial efforts in the right direction of bettering communication in the county among agencies involved in disaster response. Moreover, the activities and exercises conducted in the county during 2004 went a long way towards developing relationships and improving communication between area agencies and the public. However, there is room for continued progress in the areas of inter-agency communication, communication with the media, communication with the public, and communication devices.

First, interagency communication is in its introductory stages in Orange County. Some agency representatives met for the first time at the preparedness planning meetings and activities. It is imperative to nurture these newly formed relationships with additional networking and experience in working together as a team. During times of crisis it is these relationships that will emerge to foster a good response effort. Communication among local and state response agencies was generally perceived to be effective during all three exercises. Yet, deficiencies were noted by participants. Most prominently, channels of communication between public health and other responders, including law enforcement and the hospital, seemed to shut down at times during the first tabletop function. There was uncertainty as to the information that was being reported and to whom it needed to be reported. Communications with state agencies (that are better equipped to assist in disaster situations) was delayed. Weak communication links were observed between the representatives serving at the EOC and their home agencies. The lag times in relaying information to pertinent people resulted in a lot of confusion. In

some cases there was confusion as to who called whom to relay breaking information. In other cases the delays may have been borne of fear in reporting misinformation prematurely and creating undue panic in the community. The uncertainty witnessed at the tabletop function in June realistically parallels the situation that would occur in a real event. For this reason, it is vital that efforts to facilitate interagency communication be established. These efforts could include quarterly or at least yearly training and exercises in the county to practice communicating, creating a telephone call down tree where everyone is responsible for calling someone but no one person is in charge of calling every single person, developing an internet emergency preparedness website for local agencies to post news, events, and even photos of themselves with descriptions of their job functions, and networking more closely with other neighboring counties and stage agencies to better familiarize with each other. (Moser, 2001)

Another area for communication improvement pertains to the media. The June tabletop dealt very little with this component having only one person present to simulate the media's role. The full-scale exercise implemented actual media involvement with press sessions with the county Public Information Officers to relay information about the event itself. Yet, it was decided prior to the exercise that the PIO's were not ready to incorporate the media as actual players in the simulation. In subsequent events, it would be beneficial to include media representatives as allies in preparedness by having them play in the scenario. When people need information they typically utilize the media to find out what is happening. Especially in the early hours of a bioterrorist attack, it will be of utmost importance to ensure the public gets accurate information to avoid further

casualties. It is important to engage the public in the event of a crisis. (Hamburg, 2001) It should be realized by senior agency representatives that delaying information updates too long in effect is more likely to create widespread panic. It also opens the window for rumors to fill in the information gap. (Hamburg, 2001) According to Laurie Garrett, a reporter for *Newsday*, the more time it takes to get details relating to a disaster situation, the more impatient the media and the public grow. In a short time, accusatory fingers are pointed at authority figures which in turn might turn panic to anger. (Garrett, 2001) By collaborating with key media contacts this occurrence can be deterred and work towards bridging the communication gap between agencies and the public achieved. The CDC Strategic Planning Workgroup states that effective communications with the public by the use of the media will be essential to control terrorist's abilities to incite mass hysteria and disrupt daily life. (Khan & Levitt, 2000).

Another problem indirectly related to the media is that of having access to media coverage itself. In the September 11th attacks on the World Trade Center in New York City, fire department chiefs had no access to outside reports by the media to help them assess the overall situation which ultimately hindered accurate evaluation of the disaster and cost lives. (McKinsey and Company, 2002) Measures should be taken to ensure Orange County senior officials have access to media coverage in a bioterrorism event or other disaster. This information can prove useful in forming more comprehensive situational awareness and help in making tough decisions.

Deficiencies in communicating with the public were problematic as well. Ways to improve contact with the public regarding disaster situations must be incorporated to best prepare them for an event of bioterrorism. The full-scale exercise began the initial steps in this process. Members from the community were recruited from multiple sources ranging from churches, civic organizations, youth organizations, and even Latin American associations. Participation in the event gave community members a sense of pride in volunteering for such a worthy cause and also knowledge of what will happen should a real event occur in their community. Additionally, it offered security in knowing that their community is making an effort to be prepared for terrorism if or when it strikes. However, there is room to improve communications endeavors with the public. Just as the public keeps items on hand to be prepared for hurricanes and snowstorms, they must also keep a supply kit for emergencies such as a bioterrorist event. To become fully prepared the public must enter this mind set. In the future, lists of detailing the contents of pocket sized personal protective equipment could be distributed to the public to extend awareness of being prepared. (Glass, 2001) This equipment could include a mask, gloves, batteries, radio, water, etc. Instructions could be given to users to keep these materials in a convenient place. These lists could easily be offered at county fairs or at public speaking events. Additionally, Social Marketing campaigns could be used to raise awareness and the level of knowledge of the public. In particular Public Service Announcements and advertising are a good way to raise awareness of issues. (Glass, 2001; Siegel & Doner, 1998) Instituting training campaigns such as the Community Emergency Response Teams would be beneficial in teaching citizens basic emergency preparedness and response during the early time after an event. This training would help

bridge the gap between the need and the time professional responders actually arrive. Lastly, involving the public in future exercises and listening to their comments and suggestions will be paramount to improving communication practices and procedures.

The final communication deficiency involved communication devices, or lack thereof. At the functional exercise, there were no mechanical communication devices. Only paper and pad were used to relay messages between individuals. At one point, the room became too noisy to hear updates and people began using their personal cell phones to communicate. While this tactic worked satisfactorily at the tabletop, using these devices is not a viable solution in a real disaster. Both limited battery life and the potential for circuit overload makes cell phones unreliable tools. (Moser, 2001) A better solution for future functional exercises would be to use multiple rooms to separate participants thus reducing noise and more accurately depicting a realistic scenario in which key personnel are at least initially at different locations in the county. In reality, communication would be dependent upon the situation at hand. It would be best to establish a meeting place for the essential representatives to convene upon notice of the disaster. One option, albeit expensive, would be to use hand held satellite based terminals for phone, fax, and internet access. (Jones et. al, 2002) For the full-scale exercise, family radio service walkie talkies were utilized to improve communications between agencies. However, it was soon discovered that the environment at the dispensing site was too noisy to hear to use the two-way radios and the range of the units was somewhat limited. Similar communication difficulties have been noted in actual disasters. Namely, the events of September 11th illustrated poor communication systems

within New York City Fire Department. As stated in the McKinsey Report, the malfunction of fire fighters communication radios left the chief officers with little reliable information on the progress or status of many of the units they had sent into the buildings. (McKinsey and Company, 2002). The report recommended that the New York Fire Department evaluate the use of Ultra High Frequency (UHF) Portable Radios. (McKinsey and Company, 2002). The same devices could be evaluated for use in Orange County for future emergency communication upgrades.

As stated, the activities of Summer 2004 in Orange County were the first joint exercises in disaster preparedness between county agencies. With this limitation in mind, let us turn our focus to another deficiency that was gleaned from the activities. It was previously mentioned that stakeholder buy-in is essential to garnering support for vital public health programs like disaster preparedness. The events of Fall 2001 are often thought to have been dramatic enough to serve as this encouragement. However, it is becoming increasingly clear as time progresses that the events are slipping to the background once again for many key figures. Such evidence was presented in the disaster preparedness activities in Orange County. Key personnel from some agencies were not present at the tabletop activity despite invitations and timely planning considerations. Such absences can create problems for future preparedness activities in that other key individuals may perceive it is acceptable for them to pass over the opportunity to practice procedures and become more familiar with other key players. Most importantly, the absences can result in being ill prepared in a real event because these individuals may not know the procedures and will have less established

communication links which may culminate in a poor response effort. Other personnel that would have been helpful in the planning and preparedness activities and should be included in future activities are: hospital clinical microbiology directors, Medical Examiner's office senior staff, county veterinarians, Chapel Hill Transit Authority Directors, American Red Cross Representatives, and senior staff from Hazardous Materials. Work must be done to emphasize the importance of their presence at such exercises. One recommendation for accomplishing this task is for members of the Bioterrorism Task Force Team to arrange one-on-one meetings with individual representatives to discuss their personal role in county-wide disaster preparedness. These individuals could also be invited to the monthly meetings of the task force to view proceedings and become more familiar with the roles and responsibilities of other members. Persistence will be the key to gaining active participation.

Recent events in the US have highlighted the need for preparedness against acts of terrorism. The preparedness effort has afforded the country a rare chance to defend the nation against not only terrorism but all hazards with the same funds. Exercises and functions have been carried out across the country to facilitate preparedness for disasters. In a conversation with Eric Griffin, Orange County Emergency Management Specialist, it was noted that the exercises in Orange County cost approximately \$18,000 each with a total of approximately \$60,000 for the entire series (conversation, August 10, 2004). These grant funds helped support the work that was carried out to further the cause of disaster preparedness in the county. While financial resources were extremely vital to the success of the exercises, the daunting task of preparedness will not be solved with money

alone. It will require a network of trained agencies and community members to pull off true readiness for an attack. In the end, the combination of these two components made Orange County more prepared for any disaster that may occur in the future, be it bioterrorism or a natural disaster.

Returning, to our initial question, "How prepared are we for an event three years later?" The answer was simply stated in the introduction that we are more prepared than we were in 2001. However true this statement may be though, the answer should be received with caution. Being more prepared does not mean there is not room for improvement. Deficiencies were noted in the Orange County exercises that indicate there is more work to be done. Areas of interagency, media, and public communication and participation of key decision making personnel were cited as key issues to be addressed in future exercises. Terrorism preparedness must be thought of as a Continuous Quality Improvement process. High value must be placed on teamwork, collaboration, communication, and participation in order to create an exceedingly prepared community. It will be an on-going process of assessments and improvements to ready the system. Just as we did not expect the events that occurred in the Fall of 2001, it is difficult to anticipate the next disaster. Our best defense is preparation.

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