

# Biological Terrorism: Impact on and Role of the Emergency Medical Response Community

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## ***Abstract***

*In the event of a true Bioterrorism attack against the United States, emergency responders will be on the front lines. Once the pathogenic process evolves, the transport of acutely ill persons, persons seeking medical care, and the “worried well” will rapidly overwhelm existing transport capabilities. In addition, the exposure of emergency response personnel will result in direct and indirect effects on the responders. Fear of both personal infection and transmission to family members could result in a loss of emergency workers who would otherwise be available to provide services. Emergency workers exposed to victims would also have a higher incidence of secondary infection, and therefore be incapacitated by the disease. The critical actions in the event of such an attack will be the timely diagnosis and identification of the attack, a rapid dissemination of information to emergency workers, and quick action relative to inoculation and/or prophylaxis.*

## **INTRODUCTION**

Prior to the 11 September terrorist attacks and the following anthrax events much

had been written about the possibility and probability of such events, yet despite events such as the Tokyo sarin attack, the message was not universally received. Whether local, state, and federal officials considered the possibility too remote, or they adopted a “can’t happen here” mentality, or they were too busy dealing with daily events to have time to fully consider the potential, little attention was being paid. The anthrax attacks that followed the events of 9-11 came as a splash of cold water in the face of many. Agencies that had not even considered the possibility found themselves responding to requests to investigate suspicious packages and materials; some – even in small communities – came face-to-face with the actual pathogen. While the horror and tragedy of the anthrax attack can not be minimized, it had one positive outcome – the emergency response community, as a whole, realized the extent to which they were exposed, the potential for their own community to be involved, and the fact that they were unprepared to effectively deal with such an event.

Since these events much information has been disseminated at all levels about

possible terrorist attacks. In most of the envisioned scenarios the affects of the attack would be immediate and visible. The one that causes the most alarm, because the affects are neither, is bioterrorism. In the case of anthrax, the time between the actual attack and the realization of what was actually happening was significant. Review of the index case reveals there was a long delay between the onset of symptoms, the confirmed diagnosis, and the identification of the event as a “terrorist” attack. If this attack had been perpetrated by an attacker who had greater resources and a more extensive network, the number of cases would have been much greater. Fortunately, because of the fact that anthrax is not transmittable from person to person, the attacks were self-limiting, and had a relatively small direct impact.

### **BIOTERRORIST IMPACT ON THE EMERGENCY RESPONSE COMMUNITY**

The effect of a bioterrorist attack will have on the pre-hospital EMS community will depend largely on the nature and extent of the attack. There are three basic types of biological based agents that might be employed:

- ◆ A biologically produced toxin (e.g., ricin)
- ◆ An infectious agent that is not communicable from person to person (e.g., anthrax)
- ◆ A communicable agent (e.g., variola [smallpox])

The first listed agent will effectively be the same as a chemical warfare agent -

rapid onset, self-limiting, small scale (relatively), and rapidly fulminating. The pre-hospital community will respond similar to a chemical warfare agent, employing mass-casualty plans, large-scale gross decontamination, and providing transport to acutely ill. The overall scene will most likely be similar to the Tokyo sarin attack. Because of the relatively small area that could be attacked at any one time – although there could be many simultaneous attacks, each would have finite limits determined by the effectiveness of the individual attack – there would most likely be sufficient resources that could be mobilized from surrounding areas to deal with the attack somewhat effectively. This would be further supported by the fact that the attack would most likely occur in an area of larger, more dense populations, and therefore a corresponding larger, denser EMS system. This type of attack would also have a lesser impact on the EMS community in terms of the direct physical and psychological issues. Responders would be able to effectively protect themselves, would not have to wonder if they were infected, and would not have a significant concern over “taking it home to the family.”

The impact of the second can be seen to a small degree in the response prompted by the anthrax incidents subsequent to 11 September 2001. While there was some delay in the diagnosis and identification, because the agent was non-communicable, the EMS community did not have a significant concern. Again, the actual agent was more of a chemical weapon, in that it required direct contact with a sufficient amount to induce the disease.

Universal precautions were generally adequate, effective treatment available, and good hygiene practices protected the family. Even had anthrax been used in a greater amount, or had been disseminated in an aerosolized form, by the time the population showed symptoms, the attack was over. Responders would know that if they had not been infected by the attack, they were relatively safe, and with antibiotic prophylaxis they could be reasonably assured of their own safety. As with the toxin based attack, the fact that there is no person-to-person communicability makes the event self-limiting, and even though some may have left the immediate area of the attack, they would be unlikely to spread the material in sufficient quantities to create any large outbreak outside of the margins of the actual event. One major difference between the toxin based attack and the infectious agent is the potential number of persons effected, the length of time for the event to stabilize and conclude, and the total number of persons involved. With casualty estimates in the hundreds of thousands for an idealized aerosol based release over a major population area (one source estimates that such a release would result in 95,000 deaths and 125,000 persons incapacitated<sup>1</sup>), even a single event could tax the entire regional, if not national, health care system. The response of the system will need to be very much like the profile described below for transmittable agents - a complete shift in the concept of "adequate care" from one that is focused on each patient as an individual to one that is based on doing the best possible for the most persons. It will need to be clearly understood that the pre-hospital EMS system cannot and

would not have any significant impact on the mortality/morbidity of the victims. That these resources must be kept for those persons who are not victims of the attack, but have the "normal" plethora of medical emergencies, ranging from trauma to cardiac.

The most difficult event to manage, from an EMS perspective, would involve the use of a highly communicable agent. In the event of a true full-scale terrorist attack using an communicable infectious agent such as variola (smallpox), the "rules" regarding transport of patients will have to be altered, as described above, or else those with non-variola illnesses will suffer as a consequence. Instead of using the limited number of ambulances for transport, buses, vans or military medical vehicles will have to be adapted and used. Medical transport will be – at best – BLS, and most effectively will be by untrained drivers with quickly trained attendants. It might be practical to provide one medical professional to respond to EMS calls to perform on-scene field diagnosis (a more focused form of triage.) Once the person was identified as being infected, they would be assigned for transport to a regional center. Tying up the limited resources of paramedic personnel, knowing that ALS care would do little for victims even in the acute phase of the disease, will result in an increase in mortality and morbidity among the non-infected population, while creating very little impact to those affected with the disease. Massive treatment and care facilities will need to be established, not unlike those created for the influenza outbreak of 1918 - 1919. EMS transport would need to be a "production-line"

activity of collecting, transporting, delivering. There would be no time or value in attempting to maintain a communications network to give data on each individual patient; the diagnosis would be the same, as would the prognosis. The role of lay care-givers cannot be overstated. In one report published by the Johns Hopkins University Center for Civilian Biodefense Strategies about preventing panic following a bioterrorist attack the following is stated:

*“Enlist the general public as a capable partner. Emergency services personnel, when focused on executing their professional duties, tend to think of the public as passive bystanders who are dispensable to the business of response. To the extent that medical resources exceed the medical needs of a specific event, this view is reasonable. At the scene of a traffic accident, for example, members of the general public are separated from the response operation by the familiar barrier of yellow tape. By definition, however, a disaster is an event that generates casualties in excess of available resources. In those specific circumstances, this “yellow-tape phenomenon” is vestigial. Data show that ordinary, nonprofessional citizens are capable of full and useful participation in times of crisis. In general, nonprofessionals in the immediate vicinity have saved the majority of people rescued in disasters, greatly aiding the work the professionals who respond.”<sup>2</sup>*

In addition to the need to retain EMS

personnel for those they can effectively help, is the fact that unlike health-care professionals in all other settings, many paramedics are dual-role emergency workers - they must also function as firefighters. By committing all of the EMS resources to the support of the ill, the collateral emergency responses – fire, hazardous materials, rescue, etc. – will be insufficiently addressed.

Finally, there must be consideration for the fact that the EMS community, itself, would be infected and effected by the attack. It is possible that a high percentage of emergency workers could be ill, and not able to perform their tasks. It is also likely that there may be a large number of “defections” - workers who choose to abandon their jobs in an effort to shield themselves and their family from the disease. In fact, it is the potential to bring the disease home to their family that would be of the most concern to many - if not most - emergency workers. Supporting this contention is one of the lessons learned from the “Dark Winter” exercise in which a terrorist attack involving smallpox was conducted at Andrews Air Force Base, Washington, D.C. on June 22-23, 2001. In the report “Shining Light on Dark Winter” the following observation is recorded:

*“The challenges of distinguishing the sick from the well, of rationing scarce resources, and of shortages of health care staff worried about becoming infected or about bringing infection home to their families all imposed a huge burden on the medical system.”<sup>3</sup>*

**PRE/POST-EVENT INOCULATION**

For some of the agents there currently exists methods of inoculation that could provide significant protection to the response community. The most obvious one is, again, variola. The question becomes one of “when?” and “who?” to inoculate. In the case of variola, inoculations can provide some protection even if given post-exposure. The difficulty will be in reacting quickly enough after the identification of the index case.

Another approach would be to inoculate the emergency community against those agents for which such protection are available before an attack. A decision would need to be made as to at what point in the time frame would emergency responders be inoculated against potential weapons. Should it be done as soon as possible, on the assumption that such an event is either inevitable or extremely probable – or is it better to wait until either direct evidence of an attack is seen? Weighing the medical benefits and risks of the two is an ethical dilemma that is for others to resolve. Perhaps offering the inoculations on a voluntary basis would be a reasonable start, and would establish at least a minimum base of workers protected from those agents.

The second question that is evoked by this issue is whether such prophylactic measures would then be offered to the emergency worker’s family, as well? The problems of taking this measure would include both an expanded potential for medical consequences, such as adverse reaction to the serum, as well as defining the limits of “family.” Even more significant might be a general panic

caused once the general population knows that emergency workers families are being inoculated - *“if them, why not me?”*

## **CURRENT PREPARATIONS**

Reviewing current plans and preparations for response to WMD events, the recently implemented state-wide mutual aid plans are an excellent start. Under these plans, and community or area that is declared a disaster may draw upon the resources of the emergency services of the entire state who have signed onto this plan. Under the current edition, the area that is requesting the aid could receive specialized equipment, fire fighting, or EMS assistance. The level of assistance would be determined by the location for the requesting agency, and the availability of external resources. Because the plan is designed to provide resources for a limited event, should there be state-wide involvement, this plan would no longer be valid, as each agency that could normally provide assistance may be overwhelmed by local events.

## **EMS SYSTEM ISSUES**

There are several issues that are inherent in the current EMS system<sup>1</sup> that need to be addressed relative to the concerns discussed. The first is that of information sharing and dissemination. It is no secret that hospitals are very reluctant to share information with the response community.

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<sup>1</sup> For purposes of this section, I use the term “EMS System” to include both pre-hospital and hospital based services.

This lack of information sharing even became a legislative issue that ultimately required the passing of legislation requiring hospitals to notify responders of exposure to communicable diseases. Whether based in legitimate liability issues, or a result of some perceived issue, the fact is that there exists a wall that limits the sharing of information, and that may be one of the most serious issues in the event of an attack. EMS personnel who find themselves on the “front-line” of the attack are generally not in the information loop relative to possible events. Thus, the hospital that has identified what may well be the index case in a terrorist attack would be unlikely to notify the local response community of its suspicions. Because of this, responders may be behind the curve in obtaining valuable preventative medical care, such as antibiotic prophylaxis or vaccination.

A second issue related to information collection and sharing is that of where and how case data is evaluated. While the state agencies as well as the CDC may collect and evaluate data seeking patterns that might indicate an intentional event, local jurisdictions and agencies should be doing this, as well. Given a population base the size of the Chicago metropolitan area, cases could occur in communities that are geographically close, but this information may be unrecognized by someone not familiar with the area. In addition, the inherent delay in collection, compilation, evaluation, and assessment of state-wide data may dilute or delay identification efforts within the city and surrounding area.

Finally, there still appears to be a divide

between the hospitals and the EMS providers. While those in charge may believe there is a great amount of cooperation, this is – from the responder’s perspective – a one-way street. While the paramedic and EMT are out on the street dealing with the real world, most emergency room staff have little street experience, and base their reactions on perceptions, or -worse yet - television and movies. One example of unrealistic – however well-intentioned – directives was a requirement to have EMS personnel obtain approval for medical releases from persons in minor vehicle accidents, and for which no sound medical rationale could be given, and that served no perceivable practical use other than to delay and frustrate EMS personnel.

In the event of the feared terrorist attack, it is essential that these two parties see each others as equals – and not with the current paternalistic attitude shown by the hospital personnel. Communication – clear, direct, unambiguous, quick, accurate, and useful – must be the order of the day. The established methods for response, assessment, communication, treatment and transport will be useless. System policies that place restrictions on EMS providers or which, for example, require two paramedics or an EMT driver will need to be abandoned. In fact, a disaster plan that has provisions for casting aside the standards should be established in advance. Once an event is identified, a medical director must take the responsibility to quickly shift into the “disaster protocol” mode and throw conventional wisdom and idealized protocols aside.

## HISTORICAL PERSPECTIVES

It may seem impossible to find a historical perspective on the issue of a bioterrorist incident in the United States, yet one does exist. In 1918, what started with a single case of influenza at an Army camp in Kansas became the worst plague to sweep the world in recorded history. Out of a United States population estimated at 101 million there were 675,000 deaths with 200,000 occurring in a single month (October, 1918.) Worldwide the death total is estimated at 30 - 40 million. Just as significant is the fact that at Fort Funston, Kansas, out of a population of 60,000 there were at one time 14,000 cases of influenza (23% of the population.) In New York city one survey found that in one city block out of 1400 people 220 were ill<sup>4</sup>. How the health care systems responded to and supported the ill under these circumstances, and remembering that this was at a time when the U.S. was just entering the First World War provides a chilling view of what a bioterrorist attack could be like.

## RECOMMENDATIONS

In the wake of the terrorist attacks, the cooperation and collaboration of the various parts of the emergency response community reached an unprecedented level. Concerns over where and when the next attack would take place provided impetus for the various sections to set aside differences and work for the collective good. Unfortunately that spirit may have been short lived. A return to the pre-event levels of segregation is again becoming the fact. While we continue to hold meetings and discuss what needs to be done, little is being done at the

emergency response level. Collaborative training and response protocol development that was to be the cornerstone of the program has been shelved and top-down planning has returned. Even as agencies scramble for position at the starting gate of the federal-grant horse race, they are happy to push aside others for their share of the prize.

In a report prepared by the Chemical and Biological Arms Control Institute – *Bioterrorism in the United States: Threat, Preparedness, and Response*<sup>5</sup>, the authors discuss in detail what changes are required in the culture, operations and core concepts of the entire medical community to deal with the threat. In regard to the current level and type of training, the Institute makes this observation:

*“DoD’s [Department of Defense’s] training program, which today represents the most widely available training forums for personnel involved with bioterrorism response, in particular retain a chemical focus. This is in part because the target audience of the DPP [Defense Preparedness Program] was initially the public safety community. Fire departments in particular were dubbed “first responders” because they go to the scene of an emergency and take control of the situation. The DP training initiatives built on the operational experience fire departments had in responding to HAZMAT incidents. As a result of their HAZMAT bias, training programs often leave the health care worker unprepared to respond to an event involving a biological agent release.”*

This statement, alone, should serve as an indication of where we, as a medical community need to go.

One additional recommendation is for medical professionals to obtain and carefully review, study, and understand the information generated in the reports that were promulgated following the “Dark Winter” exercise<sup>6</sup>.

### **CONCLUSIONS**

When - *not if* - the next attack occurs it will still be the fire and EMS community that is the first “on-scene”, even should the event be covert rather than the overt act at the World Trade Center and Pentagon. Until and unless current chauvinistic attitudes that restrict information sharing, create unrealistic controls, and that fail to provide realistic training, we will still be unprepared and unable to mount an effective response.

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