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for

Incidents of Chemical and Biological Terrorism

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Abstract

The proliferation of chemical and biological weapons has experienced a dramatic increase since the collapse of the former Soviet Union. Scientists from the biological and chemical weapons programs throughout the former eastern bloc have been courted by rogue nations and terrorist groups, either through economic necessity or shared political, cultural, or religious ideology. As a result, the threat of a terrorist attack using chemical or biological weapons has increased dramatically. This leads many experts to concede that it’s no longer a matter of if, but when.

For almost fifty years, Cold War planning doctrine focused on a full-scale nuclear war with the Soviet Union. Although attempts to eliminate biological and chemical weapons did occur, their use was still restricted primarily to the battlefield against military targets. As a result, the United States civilian response plans failed to address these threats. With the widespread proliferation of these weapons and information about them, federal, state, and local authorities are rapidly developing plans to meet this new threat. The healthcare industry is particularly vulnerable for a number of reasons, among them are a lack of experience and training; reduction in national

healthcare assets due to reforms; and denial of the threat and the role they would play in response to such an attack.

Efforts so far have focused on first responders, with very little emphasis on the healthcare infrastructure that would ultimately treat and care for victims. This represents a serious flaw in the national domestic preparedness strategy that will require leaders in all fields to correct. This paper will address some of the shortcomings of current disaster plans and offer recommendations for local level response activities to consider in developing their contingency plans. It is critical that local efforts be strengthened, as they will be the first line of defense if such a terrorist attack were to occur.

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Introduction

The end of the Cold War and the collapse of the Soviet Union brought about many positive and negative changes throughout the world. Some of the negative changes include the inadequate accountability for weapons of mass destruction (WMD) in the former Soviet Union, the exodus of scientists and technology from the former Soviet Union to rogue states and terrorist organizations, the accessibility and desire of terrorist organizations to obtain weapons of mass destruction, and the false sense of security that the United States no longer faces any serious threats.

These negative results have thrust the healthcare industry in the United States into a precarious position that it is just beginning to recognize and understand. This is evidenced by the numerous journal articles, committees, and convention speeches across all healthcare disciplines regarding terrorism and the use of WMD against the citizens of the United States. Much like the Y2K issue however, the medical community has been slow to respond to the growing threat of biological and chemical terrorism.

So what is the Problem?

The impact of disasters, whether natural or man-made, is increasing because the world’s population density is

increasing (Lewis and Aghababian, 1996). Combine this with the terrorist's goal of maximizing casualties and the metropolitan areas become the most at risk targets (Simon, 1997). Weapons that contain radioactive, chemical, and biological components are ideal to terrorists because they are sure to create panic even in the population that is marginally exposed (Slater & Trunkey, 1997). Thus, chemical and biological weapons offer terrorists a very effective tool to achieve their goals. Across the nation, officials in all levels of government recognize the very real threat of terrorist attacks on U.S. soil using these weapons. This has fueled serious concerns about the adequacy of the local, state, and federal response to such incidents. These concerns have led to studies of how well prepared the U.S. is to respond to a major terrorism incident and the findings are not encouraging (Simon, 1997). During hearings held in 1995 and 1996, the U.S. Senate Permanent Subcommittee on Investigations found that the U.S. did not have a plan that coordinated federal, state, and local agencies in managing the consequences of a terrorist attack with a weapon of mass destruction (Simon, 1997). The subcommittee also found that principle field officers with police, fire, and EMS departments in major cities are inadequately trained and do not have basic equipment to

deal with biological, chemical, or nuclear terrorism, including protective gear, breathing apparatus, decontaminants, and antidotes (Simon, 1997).

The federal government concedes it does not have the response resources necessary to quickly react to a terrorist attack either. For this reason, significant emphasis is being placed on preparing the assets in local communities who will be the first responders to chemical and biological incidents. Most of this emphasis has been on police, fire, and EMS resources. However, there are other healthcare entities that also play a significant response role during incidents of chemical and biological terrorism. There are several reasons for the inadequate planning and preparation in the healthcare community, which will be discussed in the following sections.

What is the goal and how will it be accomplished?

First of all, this paper is intended to be educational and informational for those individuals and organizations that will be involved, or may become involved, in the local-level civilian response to chemical and biological terrorism. It will draw upon the expertise and experience of professionals in the field of disaster management, much of which has been obtained during conferences, meetings,

and personal interviews. The concepts presented will intentionally span beyond the healthcare industry to emphasize the critical importance of “thinking out-of-the box.” This will be accomplished by generically identifying known shortfalls in current response plans throughout the nation. The paper will offer plausible recommendations to overcome these discrepancies in the hopes of facilitating a more thorough, broad-based, and cooperative planning environment in the community. The resources drawn upon will provide the foundational planning considerations necessary to promote communication, coordination, and detailed planning among civilian healthcare and disaster management entities. Finally, the paper will draw upon the author’s own experiences, observations, and interactions in the disaster-planning environment. It is the author’s intention that the information contained in this paper will be cross disciplinary in its application. This is not a disaster plan, but a collection of considerations that should be discussed when developing actual plans to contend with incidents of chemical and biological terrorism.

Literature Review and Discussion

Terrorism—A Historical Perspective

Terrorism is not a new concept and has been around for centuries. One of the earliest documented accounts of a terrorist act using large-scale explosives occurred on April 5, 1585 near Antwerp, Belgium (Slater & Trunkey, 1997). It is a common misconception in the United States that terrorism is something that happens in other countries, but from a historical perspective this is not the case. Between 1984 and 1994 there were almost 18,000 explosive and incendiary bombing incidents in the United States resulting in 256 deaths and 3,215 injuries (Mallonee, et al., 1996). Three of the most notable recent terrorist attacks in the U.S. are the 1993 World Trade Center bombing, the 1995 bombing of the Alfred P. Murrah Federal Building in Oklahoma City, and the Olympic Village bombing during the 1996 Summer Olympics.

Historically, many terrorist organizations have moderated their choice of weapons and targets in an effort to maintain popular support (Slater & Trunkey, 1997). However, there has recently been an emergence of terrorist groups that are increasingly isolated from the mainstream and appear unconcerned with public opinion (Slater &

Trunkey, 1997). Couple this with the fact that state sponsorship of terrorism has also risen, along with a worldwide diffusion of technology through the Internet and the exodus of scientific experts from Eastern Europe, and the potential increases that a WMD terrorist incident will occur (Breman, 1998). This is supported by evidence of the expansion during the past decade of the potential users of these weapons, which now includes not only a growing number of developing nations but also a wide range of non-state actors such as terrorist groups, religious cults, and even individuals (Ferguson, 1997). The acquisition by these non-state actors increases the threat potential for the use of biological weapons as agents of terror rather than as instruments of war (Ferguson, 1997).

Chemical and biological weapons have been used for centuries in warfare around the world. Plague infested bodies and animal carcasses were catapulted over the walls of Kaffa during the Tatars siege in the 14th-Century (Christopher, Cieslak, Pavlin, & Eitzen, 1997). During the French and Indian war, British military forces gave smallpox contaminated blankets and handkerchiefs to Native Americans in the Ohio River Valley (Christopher, et al., 1997). During World War I, chemical and biological agents were used against soldiers and military animals. In World

War II, the Japanese used chemical and biological weapons against the Chinese and in experiments on Allied Prisoners of War. Despite several treaties designed to terminate chemical and biological weapons development, several nations still have viable programs. This is evidenced by the revelations in Iraq following the Gulf War and in 1992 statements from Russian President Boris Yeltsin that the Soviets violated the 1972 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological and Toxin Weapons and on Their Destruction (Christopher, et al., 1997).

The relative ease of producing and delivering chemical and biological weapons has lead to them being referred to as the “poor man’s nuclear bomb.” For this reason, most experts contend that a chemical or biological terrorist attack is a viable and a foreseeable scenario. This forecast may have been manifested by the fact that several chemical and biological terrorist attacks have already occurred. In the late seventies, Bulgarian agents used ricin toxins to assassinate a Bulgarian émigré in London and attempted to assassinate another in Paris (Simon, 1997). This same toxin was involved in a failed 1995 attempt by a Minnesota militia group against local government officials (Simon, 1997). Ricin was also the

center point of the 1993 arrest of an Arkansas man by Canadian customs officials who found in his possession enough of the toxin to kill 30 million people (Slater & Trunkey, 1997).

In regards to biological incidents, 750 people in Oregon were deliberately poisoned with Salmonella in 1984 by a follower of Bhagwan Shree Rajneesh, in an effort to disrupt local elections (Slater & Trunkey, 1997). Similarly, an Ohio man was arrested in 1996 after he obtained bubonic plague cultures through the mail (Simon, 1997). Perhaps the most infamous recent incidents have been the efforts of the Aum Shinrikyo cult in Japan. The cult used sarin gas in attacks on the cities of Matsumoto in 1994 and Tokyo in 1995. It has also been revealed that the cult had obtained a Russian helicopter, VX gas, anthrax and botulism toxins, and were attempting to obtain Ebola virus cultures to use in their terrorist attacks (Slater & Trunkey, 1997). The cult reportedly dispersed aerosols of anthrax and botulism throughout Tokyo on at least eight occasions, but the attacks failed to produce any illnesses (Inglesby, et al., 1999). The threat of Anthrax was also involved in several 1998 hoaxes involving letters mailed to health clinics in Indiana, Kentucky, Tennessee, and

California (U.S. Department of Health and Human Services [DHHS], 1999).

These incidents underscore the reality and significance of the threat faced by the healthcare industry from chemical and biological acts of terrorism. It is clear that the threat to the nation from biologic and chemical weapons is no longer a debate issue (Russell, 1997). Unfortunately, there is a widespread tendency to think about defense against biological warfare as unnecessary, as someone else's responsibility or as simply too difficult (Danzig & Berkowsky, 1997). Also, our quick and efficient responses to natural disasters and even the bombing of the Federal Building in Oklahoma City may be instilling healthcare leaders, legislators, and disaster preparedness officials with a false sense of security (MacPherson, 1996).

Further complicating this issue are the market driven and legislative changes in healthcare, such as the Balanced Budget Act (BBA), which are having a profound negative impact on the nation's hospitals. This is not just an urban healthcare issue either. As the BBA and other negative economic trends occur, rural healthcare organizations must reevaluate how they will contend with disasters that occur in their area (MacPherson, 1996).

This is particularly true for facilities near large metropolitan areas, which are the most logical targets of terrorism. Consideration should be given to a reverse evacuation plan should urban systems become overwhelmed with terrorist victims. Other casualties, some not directly related to the attack, will still occur and may reach peak levels in the aftermath of an incident as panic and fear spread throughout the population.

Federal, state, and local planners must take into account the new healthcare environment and the impact it will have on meeting the needs of the community in a disaster, whether it is natural or man-made. It is imperative that the healthcare industry prepares itself to meet the chemical and biological terrorism threat, as well as the challenges that go with it.

The Federal Response Plan—Isn't it enough?

Despite all the natural and man-made disasters that have occurred in a country more than 200 years old, the organized convergence of disasters and the U.S. Government is a fairly contemporary occurrence (Roth & Gaffney, 1996). Federal planning for WMD incidents has for many years been focused on a nuclear attack from the former Soviet Union. One element missing from this planning has been the

coordination of all the federal agencies that would be intertwined to meet the nation's needs in the event such an attack were to occur. This lack of coordination, along with some significant natural disasters, led to the creation of the Federal Emergency Management Agency (FEMA) in 1979 by President Jimmy Carter (Roth & Gaffney, 1996). In essence, FEMA was given the lead role in planning and coordinating the federal response to domestic disasters (Russell, 1997). Unfortunately the focus remained on widespread nuclear warfare and not on single incident response, an issue only recently overhauled (Roth & Gaffney, 1996).

It wasn't until the passage of the Stafford Act that planning and preparedness were given financial priority, thus allowing FEMA to respond more adequately to disasters (Roth & Gaffney, 1996). This led to the development of the Federal Response Plan (FRP) in 1992, which is the structure the Federal Government uses to respond to disasters (Roth & Gaffney, 1996). The procedures contained in the FRP allow FEMA to more adequately support local and state governments during natural and man-made disasters (Tucker, 1997). However, the FRP is not the catchall answer to disasters and many concede it still falls short in several key areas to include coordination, integration, time and money (Roth

& Gaffney, 1996). Although it addresses the coordination of federal agencies, the FRP still lacks a single, specific command and control system that integrates state and local assets (Roth & Gaffney, 1996). It should be noted, however, that as with any plan, the FRP is still evolving, realizing efficiencies, broadening its scope, and improving its response capabilities (Oster, 1997).

Even though it is still evolving, the FRP does provide a foundation, and strides are being made to address the shortcomings and include the flexibility to meet new challenges in disaster management as they arise. This flexibility is evidenced by the 1996 FEMA development of the FRP annex delineating rapidly mobilized interim responses that would precede the more logistically demanding traditional response assets (Tucker, 1997). This annex details procedures for responding to incidents of nuclear, biological, or chemical (NBC) terrorism in areas where state and local capabilities either do not exist or are inadequate to handle the incident (Tucker, 1997). It must be noted that no single disaster plan will answer all the questions and ensure that all the needs are met, however, by incorporating flexibility and comprehensive sub-plans, various needs may be addressed adequately as the situation changes (Lewis & Aghababian, 1996).

Shouldn’t the Military be responsible for this?

One myth that continues to persist is the role that the U.S. military will play in the event of a domestic chemical or biological terrorist incident. The Posse Comitatus Act (Title 18, Section 1385, of the U.S. Code) strictly limits the use of U.S. military forces to execute civil and criminal law (Tucker, 1997). Department of Defense (DoD) support to state and local authorities must be provided by military and civilian personnel who are not armed and do not engage in domestic law enforcement activities unless properly authorized by the president (Tucker, 1997). This does not mean that the U.S. military doesn’t get involved in disaster relief as evidenced by recovery efforts in the wake of Hurricanes Andrew, Fran, and Bertha, in addition to earthquakes, fires, and other disasters across the country.

This involvement is not limited to direct response activities either. Significant research and development efforts in detection and neutralization of chemical and biological weapons have been provided by the Defense Advanced Research Projects Agency (DARPA) (Stephenson, 1997). Department of Defense support of scientific research and development in the field of NBC defense can

and will have significant implications on domestic civilian preparedness and response.

Obviously, the Department of Defense has a role in the FRP and coordinates its activities with FEMA and other signatories of the plan. Federal laws and codes have been one of the major obstacles in improving DoD responses to domestic disasters. Currently, the Department of Justice and DoD are developing regulations for military support during emergency operations involving weapons of mass destruction (Tucker, 1997).

It is true that in the United States, the military has the most assets to deal with nuclear, biological, and chemical (NBC) warfare. However, as the Senior Advisor to the Biological Warfare Improved Response Program, Brigadier General Donna F. Barbisch, D.H.A., states:

> We’re positioned to deal with these kinds of threats on the battlefield. When the threat becomes a domestic issue, a lot of the dynamics are changed. We don’t traditionally mobilize our military for events in the continental United States. The military does not get involved until called upon by the actual agency that has the lead in domestic situations. In the Federal Response Plan, the Department of Health and Human

> Services—The Public Health Service-is the lead Federal Agent in a medical emergency. (Johnson, 1999).

This statement is further strengthened by an October 5, 1999 letter to the editor of USA Today by the Honorable John J. Hamre, Deputy Secretary of Defense, which clarifies the distinction of the military's role in domestic incidents as being supportive of and subordinate to the civilian agencies tasked with responding to the incident. Secretary Hamre further stipulates that the U.S. military does not want a domestic law-enforcement role (Hamre, 1999).

Realistically, neither the military's NBC units nor any of the other elite federal units are geared to respond in a timely manner. In 1996, the Marine Corps established the Chemical Biological Incident Response Force (CBIRF) to respond to incidents of chemical or biological terrorism (Tucker, 1997). CBIRF has been pre-deployed to high visibility events such as the 1996 Summer Olympics, the Republican and Democratic National Conventions, and a G-7 Summit. However, in spontaneous acts of terrorism CBIRF and other elite federal units would require a minimum of four hours airtime to deploy to the scene (Tucker, 1997).

It is unlikely that terrorist organizations will give advanced warning of their intentions specific enough to permit a pre-deployed response. Elite federal assets also lack the capability to handle large numbers of casualties during chemical attacks and the ability to respond to simultaneous incidents (Tucker, 1997). In 1996 the DoD admitted shortcomings in its ability to provide the assistance that local emergency agencies might need following a WMD terrorist attack (Gunby, 1998). As a result, the emphasis switched to civil-military cooperation and enhancing domestic preparedness, which Congress facilitated by enacting the Defense Against Weapons of Mass Destruction Act of 1996 (Danzig & Berkowsky, 1997). One provision of this act includes the enabling of DoD and other federal support to more than 100 state and local prevention and response efforts (Danzig & Berkowsky, 1997). It is for these reasons and others, that the major focus of the Domestic Preparedness Program is on training and integration exercises involving local police, firefighters, medical personnel, and other first-responders (Tucker, 1997).

Local Response—troubles in the first line of defense

Despite federal response plans, much effort will be required to enhance the preparedness of the local first-responders (Tucker, 1997). Traditionally first responders include fire, police, and EMS resources. In the event of a chemical or biological act of terrorism, the local medical community will also be a key component of the response, although it may not be the first to respond. For this reason, the Centers for Disease Control and Prevention (CDC) and the Department of Health and Human Services (DHHS) are working with state and local organizations to improve their response capabilities and develop locality-specific plans (DHHS, 1999).

Who will “respond” first will be dependent on whether the attack is chemical or biological in nature. Chemical agents by their nature result in casualties almost immediately upon contact. Biological agents on the other hand, may take days to make the victim show signs of an illness. Because of this, the discussion will alternate between chemical and biological attacks. In the event of an overt biological attack the emergency response would be similar to that needed in a chemical case (Tucker, 1997). For this reason, it must be understood that the traditional

first responders—police, fire, EMS—may be aware of, and have to contend with, a biological agent at the scene of the disaster.

Because the arrival of specialized federal response units could be delayed for several hours, prompt medical treatment will inevitably be the responsibility of local first-responders (Tucker, 1997). If a terrorist incident were to result in the release of a lethal chemical agent, local assets—firefighters, police, paramedics—would be the first to arrive on the scene, and local hospitals and health care workers would bear the immediate burden of treating casualties (Tucker, 1997). These responders will have to perform their duties at a time of unprecedented crisis and fear (Simon, 1997). Complicating this is the fact that not all fire departments are trained to deal with hazardous material incidents, even though a majority of municipalities have special hazardous materials (HAZMAT) teams equipped and trained to handle industrial HAZMAT contingencies (Tucker, 1997). It is common for these special teams to be included in local plans to respond to chemical terrorist incidents. Nevertheless, such teams are generally not trained or equipped to detect, identify, or handle chemical warfare agents, which depending on the chemical and its concentration, may be significantly more

toxic than industrial chemicals (Tucker, 1997). This statement is supported by Domestic Preparedness Program field exercises that have often found these individuals to be poorly trained and equipped to respond to incidents of chemical or biological terrorism (Tucker, 1997). Additionally, while local responders will most likely be first on the scene, they should also be trained to integrate with federal support from the Public Health Service (PHS) and DoD (Lederberg, 1997). These field exercises have also found that local response planning is inadequate for such incidents (Tucker, 1997). It is important that state and local health departments work with the first responders to ensure that their plans address chemical and biological terrorism, paying particular attention to protective measures and training (DHHS, 1999).

This inadequacy has also prompted several Federal and State initiatives to strengthen the capabilities of first responders. The Department of Justice, by order of the Attorney General, setup an Office for State and Local Domestic Preparedness Support to administer grants to state and local public safety personnel for the acquisition of equipment and training necessary to safely respond to and manage domestic terrorist activities, nuclear, radiological and explosive devices (U.S. Department of Justice [DOJ],

1999). This program specifically identified 157 cities and counties nationwide that are eligible for this grant program and generally directed the funds to the first responders in these locations.

Our current capability to effectively respond to an incident of biological terrorism is far less than needed (Russell, 1997). The civilian population cannot be protected in the same manner as the armed forces, which has access to vaccines, equipment, training, and intelligence information (Atlas, 1998). The first responders to a biological attack are unlikely to be the military, police, or firefighters even though they are the emphasis of most of the current preparedness initiatives (Atlas, 1998). The first responders to such an attack are more likely to be emergency room workers or other healthcare personnel (Atlas, 1998). To a further extent, physicians will be in the front line for remediation in the wake of a biological terrorist attack (Lederberg, 1997). They should be trained to be alert to any constellation of disease that might be the harbinger of new outbreaks (Lederberg, 1997).

There has been little focus on preparing the healthcare infrastructure to handle chemical and biological casualties. There are several possible reasons for this, most notably a lack of communication. The lack of

preparedness can also be attributable to the fact that casualties from biological terrorism are so disturbing to think about, that many public officials cling to the hope that with the right mix of police, security measures, and intelligence gathering, such events can be prevented (Simon, 1997). Another reason cited is the difficulty in planning for an event that has never occurred before (Simon, 1997). Furthermore, defense against a biological attack is both unfamiliar and difficult, and there is a natural tendency to put it aside in favor of problems that are easier to deal with (Danzig & Berkowsky, 1997). There is also the belief that because they have never been used, therefore they never will be (Danzig & Berkowsky, 1997). For some, there is a sense that a potential actor can be deterred from using biological weaponry if it is clear that this would invite nuclear retaliation (Simon, 1997). This notion is completely lacking in sound reason given the evidence of the great difficulty that lies in linking forensic evidence back to the perpetrators. It also fails to take into account an attack by domestic terrorist groups.

The medical and health communities will play the most significant role in combating biological terrorism, and will have to contend with mass public fear and uncertainty

on a national scale (Simon, 1997). To the extent that we can reduce the uncertainty about how biological terrorist incidents are likely to unfold, the better the medical and health professions will be prepared to deal with the aftermath of this most dangerous form of global terrorism (Simon, 1997). Casualties from biological and chemical terrorism will challenge our disaster medical plans and health professionals to the extreme (Slater & Trunkey, 1997). Not only will the number of casualties be potentially overwhelming, there is the added risk for contamination from the patients and the environment (Slater & Trunkey, 1997).

While protective clothing is a solution to this, it also brings about unique issues to address as noted in studies conducted by the U.S. Military. These studies found that claustrophobia, difficulties with breathing apparatus, overheating, dehydration, failure to recognize danger, and anxiety commonly occur in personnel using protective equipment (Slater & Trunkey, 1997). Studies of fire and HAZMAT response teams may show similar findings. The implications are profound; particularly given the level of training the average civilian healthcare worker receives in this type of protective clothing (Slater & Trunkey, 1997). Indeed, healthcare workers beyond those with even

minimal protective clothing training may suddenly find themselves challenged with the prospect of functioning in protective equipment (Kvetan, 1999). It also highlights a potential problem of secondary exposure, should healthcare workers be unable to tolerate prolonged use of protective clothing (Slater & Trunkey, 1997). Thus, there is a great potential that healthcare facilities would be rapidly overwhelmed by a mass outbreak of infectious disease from a biological attack (Atlas, 1998).

The relative unfamiliarity of most emergency medicine personnel with the diagnosis and treatment of injuries from non-conventional weapons combined with the high casualty generation potential of these weapons will exacerbate these difficulties (Slater & Trunkey, 1997). It is imperative that communication and coordination between all levels be fostered since local resources will be central to any successful response to the terrorist use of a biological agent (Tucker, 1997).

As difficult as coordination among FRP agencies is, an even more significant hurdle exists at the integration of these assets into local and state governments (Roth & Gaffney, 1996). In general, each locality, county, and state will have its own agenda and management structure into which a federal resource must fit (Roth & Gaffney,

1996). It is critically important that improved coordination be developed between federal response teams and state and local first responders (Tucker, 1997). Otherwise, as evidenced in previous events, it will take from days to weeks to make this integration (Roth & Gaffney, 1996). In the meantime, federal assets are either unused or underused (Roth & Gaffney, 1996). To resolve this, each jurisdiction's emergency management plan must address the integration of these resources into their existing structure (Roth & Gaffney, 1996). It is not uncommon for these plans to do so for mutual aid resources coming from the immediate area, but rarely does a plan go further than that (Roth & Gaffney, 1996).

The National Guard is also integrated into most state emergency response plans (Gunby, 1998). Should an incident overwhelm local assets, the state governor may decide to call up National Guard assets to assist local authorities (Tucker, 1997). Unfortunately, it may take 12-24 hours for these units to mobilize and deploy (Tucker, 1997). In an effort to improve coordination and local capabilities, the DoD drafted a plan in 1996 to establish one Rapid Assessment and Initial Detection (RAID) team in each of the ten FEMA regions (Gunby, 1998). These units would be composed of state National Guard units with the thought

that the personnel are already located in many of the potential target communities (Gunby, 1998). The plan also calls for stockpiling antibiotics and vaccines (including those for anthrax and smallpox) as part of a federal health agency-wide effort to protect civilians in the event of a terrorist act (Gunby, 1998).

Another aspect that inhibits cooperative and coordinated disaster planning efforts in the civilian healthcare sector is the competitive nature of the industry. Regardless of whether an organization is for profit or not for profit, it still must compete for market share and scarce financial resources in order to exist. It is difficult to convince CEOs of the importance of committing resources to prepare for a scenario that may never come to fruition. Its even more difficult in areas with several competing organizations when committing scarce resources could easily result in forfeiting a competitive edge.

The healthcare industry in the United States has undergone significant and often painful transformations over the past ten years, with many facilities having to downsize or close as a result. This has led to another issue that disaster planners must contend with and that is the issue of dwindling community resources. Once a plan is

developed, it must be updated to reflect changes in the environment for which it will be implemented. Adjustments for new threats, new technologies to deal with the threats, and changes in the response resources in the community are all considerations that must be taken into account. It is important that individuals involved in the planning process keep abreast of political and legislative changes that impact the healthcare environment as well. The Balanced Budget Act is one such piece of legislation that has had a severe and negative impact on the healthcare industry, particularly hospitals. While relief efforts are being sought, it is already too late for many facilities, particularly in the rural communities. This is a prime example of the broad type of intelligence information that must be reflected in the planning process.

The Joint Commission for Accreditation of Healthcare Organizations (JCAHO) requires hospitals in the United States that seek accreditation to have disaster plans and ensure that their employees are familiar with them (Auf der Heide, 1996). Hospitals are not only required to have a written disaster plan, they must also implement that plan at least twice a year to meet JCAHO standards (Oster, 1997). Of course, the mere existence of a disaster plan does not assure that the institution is actually prepared

(Auf der Heide, 1996). Rehearsal of the plan and continued refinement are extremely critical (Slater & Trunkey, 1997). Unfortunately, the analysis of numerous disasters has revealed that hospitals are often inadequately prepared (Auf der Heide, 1996). This analysis has found that hospitals are often overwhelmed by the substantive and unplanned for problems that develop in disasters (Auf der Heide, 1996). This is particularly true in terrorist incidents where over triaging often occurs and results in inefficient consumption of medical resources (Slater & Trunkey, 1997). Empirical studies also reveal that plans are only as good as the assumptions they are based on, and much of this conventional wisdom has been incorrect (Auf der Heide, 1996). If the threat of chemical and biological terrorism is to be taken seriously, it will require a major effort to develop contingency plans (Russell, 1997).

There are many reasons for the inadequacies that exist in the local civilian response activities. Those mentioned in the previous paragraphs are by no means all-inclusive, but are merely a sample from across the nation of the primary reasons given for the current state of ill preparedness for chemical and biological terrorism. Fortunately the evidence suggests that some policymakers,

lawmakers, community and industry leaders are beginning to heed the warning signs and take action.

Recommendations

What can we do to fix this?

Disaster can be defined as an event that results in risk of injury or loss of life or property and results in a demand for services that exceeds available resources (Lewis & Aghababian, 1996). Chemical and biological weapons certainly have the capability to overwhelm local response capabilities. Only by planning and investing in the right training and defensive measures can we reduce the risks, disruption, and casualties from such incidents (Danzig & Berkowsky, 1997). In developing plans, the number of victims and severity of injuries necessary to overwhelm services will vary from community to community and is dependent on the availability of EMS and hospital resources (Lewis & Aghababian, 1996). Disaster planning must take into account resources available locally as well as the options that are available from outside sources (Lewis & Aghababian, 1996). Planners must take into account the possibility that some local response assets will fall victim to the attack and hamper response activities (Slater

& Trunkey, 1997). Hospital disaster plans must also account for the limits of the community resources and establish systems to assess damages and anticipate needs (Lewis & Aghababian, 1996). There must be a network of comprehensive plans for all expected losses, such that they can be replaced as the events surrounding a disaster unfold (Lewis & Aghababian, 1996).

Disaster planners must plan for a variety of disasters, especially those that pose the greatest potential risk to a given community. Although many disasters are unpredictable and unpreventable, there are potential disasters that can be identified through community assessment (Oster, 1997). A comprehensive hospital disaster plan begins with a community assessment to identify likely scenarios and the needed resources to respond to them (Oster, 1997). Hospital plans must also distinguish between internal and external disasters (Lewis & Aghababian, 1996). External disasters occur within the community and may or may not affect the hospital directly (Lewis & Aghababian, 1996). Internal disasters refer to conditions affecting the hospital directly and may be an extension of the external disaster (Lewis & Aghababian, 1996). The plan should address the loss of power, water, heat, communications, and structural problems (Oster,

1997). Contingency plans for dealing with public hysteria and disruption of health care delivery systems—including the possibility of health care professionals' becoming ill from the biological attack, or fleeing the affected area if they are not confident that they have adequate equipment to protect themselves—should be established in every large city (Simon, 1997).

Experiences encountered during actual disaster situations form the basis for teaching disaster medicine and disaster planning (Lewis & Aghababian, 1996). This is true in San Antonio, which recently held a Disaster Planning Conference that drew from experience during the Great Flood of 1998 to facilitate thinking for other disaster scenarios. Past experiences and lessons learned can provide an excellent foundation in the development of contingency plans.

The conclusions drawn from the previous sections highlighting the shortcomings in preparedness for acts of chemical and biological terrorism can be subcategorized into the following groups: planning; strategic planning; intelligence; personnel and facilities; education and training; and coordination and communication.

Planning. Each individual healthcare entity should examine its role or potential role in the event of a WMD

incident. As mentioned earlier, the federal government recognizes it does not have the resources to respond adequately to a domestic incident of biological or chemical terrorism and is therefore establishing programs to assist local and state agencies' preparation efforts. In essence, the civilian healthcare sector, which includes some of the first responders, has been tasked with developing its own readiness mission, similar to the military's.

Planning occurs in three time-based segments. The first and logical ideal is the pre-incident or contingency plan. Issues are addressed and planned for ahead of time and the plan is merely implemented if a crisis occurs. Those involved in the plan implementation and response efforts should monitor the situation, adjusting the response to meet the crisis as it develops. The second time-based segment, and unfortunately the one that is most often utilized, is concurrent planning. This occurs at the same time the crisis is occurring and is reactionary in nature. This type of "seat of your pants" planning is not very effective in adequately meeting the needs of the community and often serves as an example of lessons learned in how not to do things. The final segment is the post-incident plan. This is a very important segment in preparing the community's assets for future crises. In

this segment, a review of the disaster and its consequences is conducted, along with an evaluation of how the response plan's implementation developed. Lessons learned are incorporated into the response plan's revision to facilitate a better response in future disasters. Planners and others responsible for the response efforts should incorporate the contingency and post-incident philosophies in their planning activities. By doing so, responders will be better prepared to meet the dynamics of the disaster and be less reliant on reactionary planning.

The American College of Emergency Physicians (ACEP) has received numerous requests for disaster medical planning information (Auf der Heide, 1996). Among them, have been requests from hospitals for generic disaster plans to adapt for their own use (Auf der Heide, 1996). Disaster preparedness is not something that can be developed for us by someone else, however, and disaster researchers have discouraged the use of "generic" disaster plans (Auf der Heide, 1996). There is an increased awareness of the importance of the multi-disciplinary approach to disaster planning to improve asset mobilization and utilization efficiencies (Oster, 1997). It has been argued that the process of disaster planning is more important than the written document that results (Auf der

Heide, 1996). In an ideal planning environment, a broad spectrum of disciplines, internal and external to the organization are brought in to brainstorm and develop a plan.

So how do we develop a plan? One method has been to extensively research disaster management literature for key problems that will have to be addressed in a disaster plan (Auf der Heide, 1996). The problems are phrased as questions and organized into categories, then addressed according to appropriate local circumstances (Auf der Heide, 1996). The result is a reasonably effective plan that recognizes the fact that in disasters, hospitals do not exist in isolation (Auf der Heide, 1996).

It has also been suggested that the type of contingency planning used by the military in anticipating new threats serves as a useful framework for the civilian sector (Buchanan, 1997). In this case, civilian planners are encouraged to adapt the four military contingency planning components of intelligence, personnel and facilities, rapid response, and strategic planning to formulate their own plans (Buchanan, 1997). In military terms this can be done at the tactical or short-term level, and at the strategic or long-range level.

Strategic Planning. This component of contingency planning draws on and feeds the other components of contingency planning. Strategic planning involves futurist thinking to consider how changes in global politics, society, economics, technology, science, and medicine will impact an organization's ability to meet future challenges (Buchanan, 1997). While this list is not all encompassing, it serves as a reference point for how broad a view is needed in contingency planning. Few in the healthcare community would have ever predicted that the fall of the Soviet Union would be brought about by the economics of a Cold War arms race and would result in the exodus of scientific personnel and materials to rogue nations and terrorist organizations. Nor would they have made the connection that biological and chemical terrorism were more of reality than at any other time in history. Nor would they have believed that they would be drafting plans, training personnel, and purchasing equipment to help their staffs cope with such terrorist incidents.

Healthcare executives and leaders are becoming increasingly interested in the military's war colleges where questions such as "what we would do if" are posed and appropriate responses are planned for (Buchanan, 1997). This type of strategic planning is undertaken with the

realization that the probability of any specific “what if” scenario is low, but the probability that one scenario will materialize is extremely high (Buchanan, 1997). Most healthcare organizations recognize the importance of internal strategic planning for their routine operations, and some are beginning to recognize its importance in preparing for acts of terrorism. These organizations are cautioned not to forget the external strategic planning necessity. Healthcare organizations should consult and work with police, fire, EMS, public utilities, city planners, county planners, local military facilities, pharmaceutical and medical equipment suppliers, other consumables suppliers (food, water, fuel), local public health districts, and the business community to draft contingency plans in the event of a terrorist act. They should also involve state and federal authorities as well, tapping into their vast networks of resources. The efforts some healthcare organizations have undertaken to deal with the Y2K bug offer an excellent starting point for strategic contingency planning, particularly if their efforts have included collaborative community efforts like those of the Greater San Antonio Hospital Council’s Y2K committee.

Intelligence. In the most simplified terms, intelligence is the gathering of information prior to,

during, and after an event to strengthen the response to the event, regardless of when it occurs. More specifically, intelligence is the gathering of medical, scientific and other information (Buchanan, 1997). In fact before any planning can take place, initial information must be gathered to facilitate the planning process (Leonard, 1996). Intelligence gathering plays a key role in the aforementioned strategic planning process because it provides scenario drivers to facilitate the planning process. Under ideal conditions, planners know all the information about a possible event and it is only a matter of moving the assets to meet the needs generated by the event. Unfortunately this is rarely the case, even when terrorists or informants provide advance warning of their intentions. Details are often vague or deliberately misleading, often resulting in chaos that causes initial mismanagement of response assets.

Much like the military, tactical and strategic intelligence mechanisms can overlap. From the civilian perspective, tactical intelligence is available from many sources. In the pre-incident phase, the healthcare industry can draw from numerous Internet sites that provide useful planning, informational, and response information for various incidents. Some of the major sites include the

Centers for Disease Control, the Department of Defense, the Department of Energy (DOE), the World Health Organization (WHO), and the Department of Health and Human Services. An appendix is provided which lists several useful websites for contingency planning.

Federal and State health agencies also provide warnings of potential disease outbreaks and should be utilized as resources for planning purposes. There are also non-medical resources that should be considered for intelligence gathering. The predominant sources are the DoD, the FBI and others in the law enforcement community. These organizations, along with the National Security Agency (NSA), the State Department, and the Central Intelligence Agency (CIA) accumulate enormous amounts of data regarding threats to the United States. A significant portion of this information is available to the public at their respective websites. It is important to rely on these intelligence and law enforcement organizations to identify specific threats (Russell, 1997). This information is beneficial in planning both tactically and strategically. Other sources of information are the numerous scientific, medical, and educational institutions that offer personnel resources and library archives related to some of the threats posed. These resources are often

available in electronic format through such sources as Med-Line and the institution’s or individual’s website.

Organizations should not limit their intelligence gathering efforts to only domestic sources. There are many nations that have vast years of experience with terrorism. Perhaps one of the best at responding to such incidents is the nation of Israel. Because of near continuous military and terrorist threats, Israel has one of the most advanced national disaster plans in the world (Kvetan, 1999). The Israeli system fully integrates military and civilian medical assets, and has designed its hospital system to specifically accommodate HAZMAT casualties (Kvetan, 1999). It may be valuable for organizations and communities to establish consultative exchanges to strengthen their abilities to respond to acts of terrorism. Many communities have already established economic and cultural exchange programs, and disaster planning could easily be incorporated into these programs.

Intelligence gathering goes beyond simply addressing the medical issues of potential victims. Administrators, facilities managers, HAZMAT managers, pharmaceutical managers, and public relations managers must also be involved in the intelligence process. Bed capacity; staffing; security; ventilation; water supplies and

drainage; communications; electricity; generators; maintenance; protective clothing supplies; decontamination supplies and equipment; antibiotic and vaccine supplies; and media control are a few of the issues to consider should a terrorist incident occur.

If contaminated patients arrive at your facility, what hazards will they pose to the facility and its occupants? Do you have the capabilities of decontaminating large quantities of staff and patients? How will contaminated clothing and water be handled? Will your communications network withstand the onslaught of calls seeking information, both internally and externally? If the incident involves a power disruption that affects your facility, how long can you go with generator power? Will you be able to acquire fuel supplies? Do you have enough beds, staff, and supplies to cope with a large-scale disaster? How will you handle the media to avoid panicking the public and simultaneously ensuring public safety? The answers to these questions will depend on who is attacked, how many are affected by the attack, and the reaction of the public to the attack. One scenario to keep in mind is the potential for an attack on an area of the city with a large concentration of medical facilities, such as in the San Antonio Metropolitan Area known as “hospital hill”.

In the early stages of a terrorist attack, the general public, first responders, and news media can often provide real time information to the healthcare system that may enable it to properly prepare its response to the crisis. Healthcare personnel will need to guard against inaccurate or exaggerated reports from panicked citizens or deliberate misinformation from the terrorists or their sympathizers. In general the first responders, that is, the police, fire, and emergency medical system (EMS) personnel will be the most reliable source of this information. Because they will be the first official response on the scene, the first responders have been the focus of recent federal and state efforts to prepare the civilian community to cope with chemical and biological terrorist attacks. The ability to recognize and treat victims for various chemical agents, provide an accurate and timely estimate of the number of victims, and contain further contamination to people and equipment will significantly enhance the medical community's ability to respond appropriately to a chemical related crisis.

This is quite different, however, when biological agents are used. Victims may appear in ERs, individual doctors offices, public health clinics, school nurse offices, worksite health offices, and nursing homes. The

ability of those who would make first contact with these patients to diagnose their symptoms is important. Perhaps even more important is the provision of a mechanism to report such incidents to a central point, which may provide the first indication that a biological attack has occurred.

In the U.S., individual clinicians funnel their reports to local and state public health offices, and in turn to the national Centers for Disease Control and Prevention (Lederberg, 1997). Other mechanisms co-exist with the CDC system, such as Southern California's ReddiNet system, which among other things has the ability to detect spikes in flu viruses ("Flu Task Force Endorses," 1998). The monitoring sensitivity of such systems could be enough to warrant further investigation to determine if a deliberate biological agent is responsible or if it is just a naturally occurring event. The effectiveness of this reporting mechanism will be in the training of healthcare workers to recognize the symptoms of biological warfare agents and understand that they often mimic routine illnesses. With the exception of ER staffs, this training should be geared toward those not in the first responder category. This does not imply that first responders should not be trained in the risks of biological agents. First responder training should focus on personal protection and

containment if a biological agent is suspected or confirmed at a disaster sight.

Personnel and facilities. The chaos that will develop with a chemical or biological terrorist attack will pose significant managerial implications for local responders. Plans should address issues of staff availability and recall. Additionally, as the severity of resource deprivation increases, the need for role flexibility also climbs (Bissell, 1996). This implies the need for cross training and exposure to other areas of the hospital outside of the employee's normal work environment. Considerations should also be given to the fact that some healthcare workers will be victims and several replacement sources should be identified ahead of time. Large-scale attacks will drain on staff capabilities, further aggravating the need for additional healthcare workers. This drain on healthcare resources will require the staff to implement unique triage procedures that they may not be familiar with. In chemical or biological attacks, it becomes critically important to prioritize care to those victims that will benefit most with the limited resources available (Oster, 1997). This will require a fundamental change in the American approach to emergency healthcare delivery, which often entails heroic efforts for an

individual without regard to the resources involved. Rendering selective care through disaster triage, although essential, is alien to most providers because they are trained to exhaust all possibilities for all victims (Oster, 1997). This will require training for all staff members to recognize when it becomes futile to render care to victims that won’t survive regardless of the efforts of the staff (Oster, 1997). Only by instilling this philosophy in disaster preparedness efforts can the healthcare community begin to address the resource limitation problems that will present during a large magnitude crisis.

Plans should include problems brought on by staff fears and concern for their safety and that of their families. The 1992 Los Angeles riots provide some insights that planners should consider in regards to staffing issues. Many Los Angeles hospitals experienced difficulty convincing staff to remain on duty partly due to the hostile environment created by the riots and because staff members were uncertain over the safety of their own families and homes (Lewis & Aghababian, 1996). Stress relief and counseling services should be planned for ahead of time and implemented for staff and patients during and after the immediate crisis.

Planners should consider the legal issues of alternative sources of healthcare workers, such as those in independent practices, nursing homes, and charitable organizations. Emergencies on this scale will produce unique situations that most healthcare administrators are not prepared or trained to deal with. Additionally, as in many disasters, untrained and uncoordinated volunteers may show up and begin rendering assistance. It is imperative during chemical and biological terrorist incidents that these assets be managed in a positive fashion to avoid contradictory treatment protocols and to prevent further proliferation of the agent through contamination. Public relations staff will be of great assistance at this stage, disseminating accurate information about public health concerns and hospital needs to include blood donations. Public hysteria and disruptions in healthcare delivery are very real possibilities during a chemical or biological attack. Public relations staff should also be used to disseminate accurate information that will help reduce this public panic (Simon, 1997).

Security will also be a major point to address in the plan as well. Controlling public panic and disruption of services will require a significant security element. Lessons from the Los Angeles riots include the fact that

many facilities lost power after 2-3 days of civil unrest in their external environments (Lewis & Aghababian, 1997). Security plans should be made in conjunction with utility companies and local, state, and federal law enforcement agencies to minimize the potential disruption of services from factors in the external environment. Provisions should be made for shortages or complete unavailability of local law enforcement officials to assist with security measures as well.

This section also addresses facilities, which encompasses the physical building and its components. It should also include the services, equipment, and supplies necessary for the facility to fully function in the event of a chemical or biological incident. Ventilation, power, and water supplies will be of critical importance in sustaining the organization’s response to a terrorist act. In preparing its plans, the facility should look at internal and external disaster factors, and plan for meeting the challenges they present. Supply stocking policies will vary from organization to organization, with many relying on just-in-time inventory practices for most non-urgent consumables. Clearly, there is a need for hospitals to have adequate supplies—or ways to quickly obtain these supplies—of antibiotics and antitoxins that

could be used to treat those exposed to biological agents (Simon, 1997). The Tokyo subway attack provided some supply lessons planners should consider. Initial supplies of pharmaceuticals to treat victims were sufficient for the moderate to severely ill victims (Okumura, et al., 1998). Early in the crisis, an order was placed for additional pharmaceuticals that facilitated further treatment of the victims (Okumura, et a. 1998). The plan should give consideration to alternative sources for obtaining all supplies to include substitutes. It is possible that containment efforts will disrupt routine delivery services. This can significantly delay the arrival of critical items that may be needed in the treatment of victims of this incident or an unrelated but equally traumatic incident. Planners should keep in mind that not only will there be biological or chemical casualties, but trauma victims from the resulting chaos as well. Interagency and mutual support agreements are other issues to consider when developing supply contingency plans. It is important that plans address coordination and lines of authority to facilitate a smooth and thorough response to the crisis (Roth & Gaffney, 1996).

In addition to medical supplies, plans should address water, fuel, food, linens, and other items necessary to

sustain an extended staff section and extraordinary patient load. Due to the potential transportation, security, and workload problems that may be encountered, it is important that plans include provisions for sleeping quarters, scrubs, and linens to support staff members that remain at the facility for an extended period of time (Lewis & Aghababian, 1996). Consideration should also be given to the potential of refugees camping in and around the hospital compound. If a chemical or biological attack resulted in an evacuation of an area, planners should be aware of what potential populations may end up at their facility. Nursing homes may evacuate their patients to local hospitals and add to the burden on staff and supplies (Auf der Heide, 1996).

Along with antibiotics and vaccines, the plan should address other protective measures such as masks, respirators, hazard suits, and decontamination capabilities. Additional lessons from the Tokyo Sarin attack include the ineffectiveness of ordinary masks and gloves worn by medical staff for protection against chemical agents, which resulted in secondary exposure of some staff members (Okumura, et al., 1998). Very few disaster plans include a comprehensive decontamination component (Slater & Trunkey, 1996). Decontamination

requires large quantities of water, the ability to apply it to the patient, and a means to dispose of contaminated wastewater and clothing that the patient was wearing (Slater & Trunkey, 1996). During such a crisis, significant supplies of protective clothing may be utilized depending on the size of the disaster. While such supplies can be stockpiled, plans should address the issue of shelf life to prevent unnecessary risk to staff and civilians. Disposal of contaminated gear and patients' clothing, in addition to the decontamination agents must also be addressed. It is possible that decontamination will occur at the attack site, however, and those forward decontamination units may surface a need for additional protective gear for their staff and the victims, again depending on the scale of the attack. Community wide coordination of decontamination plans is necessary to ensure it is properly conducted and supported to contain the agents used and prevent further exposure. If fixed decontamination stations are established, the plan should include maintenance schedules to ensure the equipment is working properly. Additional consideration should be given to the water supply to be used for decontamination. Areas that are susceptible to droughts should consider alternate sources of decontamination. Alternative treatment areas

should also be configured for the unique problems that chemical and biological casualties will pose. This was a lesson learned in the Tokyo attack when poor ventilation in overflow treatment areas resulted in secondary chemical exposure to the staff (Okumura, et al., 1998).

Individual facilities must also consider protective gear for other staff members who are involved in the response, but are not providing direct patient care. This would include some administrative staff as well as security personnel. Contingencies involving biological and chemical casualties, although urgent, will be processed slower than normal mass casualty situations. Consideration should be given to alternate forms of communication due to the cumbersome nature of the protective clothing that will be used. In addition to this, decontaminating patients, on scene responders, and transport vehicles will delay the arrival of victims to the treatment areas. The mindset that must drive the response to this type of crisis is the safety of the many over the lives of a few. Containing the potential agents used in the attack is paramount.

Designated safe areas and controlled access to the facility at all possible entry points must be maintained. As is often the case in most disasters, getting victims to the nearest hospital is seen as the most important

objective (Auf der Heide, 1996). Security measures must address the spontaneous arrival of patients in non-traditional modes of transportation. This will be critical in preventing the possible spread of the chemical or biological agents. Security personnel should be equipped and trained to operate detection equipment and plans should be developed to decontaminate vehicles and personnel at the healthcare facility. Depending on the type of attack, the location, and meteorological conditions, the facility will need to verify that staff and patient vehicles already at the facility and those just arriving are not contaminated. Likewise, those facilities that operate medical evacuation (medevac) helicopters must consider the safety of the crew and the decontamination issues if the aircraft is used in the response. This is also an area the military has considerable experience in and should be used for consultation in developing a plan and procuring protective clothing for flight crews. Finally, most protective clothing will be cumbersome to the point that normal functions cannot be performed, to include the use of some treatment equipment. Training and exercises will identify these shortcomings and facilitate adaptation to overcome them. Consideration should also be given to the equipment that will be used during the response. It is unlikely that

this equipment is compatible with the protective clothing that staff members will be wearing, nor is it compatible with the decontamination methods commonly used. This is particularly true for off-the-shelf electronic instruments and computers. Plans should address the use of low-tech treatment and administrative mechanisms until the threat has passed.

Prudent public health measures, including vaccination of selected groups—military, healthcare workers, and other civilian populations—stockpiling of medicines, and development and deployment of rapid diagnostic systems should be undertaken to combat the real threats of biological weapons (Atlas, 1998). Plans should give ample consideration to the key elements of personnel, facilities, and supplies to facilitate a productive response to an incident of chemical and biological terrorism.

Education and Training. Education and training of the healthcare community will require a major effort involving several major professional organizations (Russell, 1997). Early recognition will be an important factor in determining the overall outcome and will depend on the level of suspicion and knowledge of the healthcare providers that see the initial cases (Russell, 1997). In chemical attacks, timeliness is a critical factor in

successfully treating victims. In biological attacks, the nature of the weapon may delay initial onset of symptoms for several days. In this scenario, medical personnel must be trained to recognize the symptoms and quickly determine how widespread the exposure is. If the agent used can be transmitted through person-to-person contact, an epidemic outbreak among healthcare workers is likely to occur (Atlas, 1998). This requires healthcare workers to be adequately trained in identifying biological agents to prevent the risk of contamination to them and others (Atlas, 1998).

To minimize the effects of a biological terrorist attack, the healthcare community must be aware of the threat of biological warfare and terrorism and have an increased index of suspicion that such an attack can occur (Atlas, 1998). They must have some understanding of the classes of agents that have been and can be weaponized and their effects after inhalation (Atlas, 1998). It is imperative that treatment protocols for victims of terrorist attacks be incorporated into the disaster medical plan (Slater & Trunkey, 1997). This will be a readily available reference for healthcare workers who are unfamiliar with treating these types of casualties and will facilitate appropriate treatment (Slater & Trunkey, 1996).

None of the providers by virtue of their basic training is well equipped to manage the public health consequences of disasters, but nurses and physicians should be able to easily move into the role, given appropriate special training (Bissell, Becker, & Burkle, 1996). The principles of prevention that help clinicians conceptualize strategies against disease are relevant as the medical profession considers the problem of biological weapons proliferation (Kadlec, Zelicoff, & Vrtis, 1997).

Primary prevention of biological weapons proliferation requires education, specific protective measures, and environmental modification (Kadlec, et al., 1997). For the medical community, further education stressing the recognition of this threat is both timely and necessary (Kadlec, et al., 1997). Medical personnel also should be trained to recognize the different symptoms of various biological agents so that those exposed can be treated quickly (Simon, 1997). If an attack with biological agents is suspected, the proper authorities, whether military or civilian, should be notified immediately (Franz, et al., 1997). Disaster plans for managing a biological attack must be developed and realistic training provided to ensure effective response to an actual terrorist event (Holloway, et al., 1997).

These plans must also assume that emotional and psychiatric problems will occur in the unexposed population as well as the exposed (Holloway, et al., 1997). Medical responders will need training to recognize the symptoms of anxiety, depression, and disassociation (Holloway, et al., 1997). The mental health of the responders should also be considered in planning for chemical and biological terrorist attacks (Simon, 1997). The likelihood of treating mass victims, to include children and colleagues, can take a toll on emergency workers as indicated in some studies (Simon, 1997). Crisis intervention programs such as Critical Incident Stress Debriefing (CISD) will be useful in meeting the mental health needs of the crisis responders (Simon, 1997). Thusly, Critical Incident Stress Management (CISM) should be considered in the planning process (Oster, 1997). Planning and preparation for biological attacks and their attendant psychological consequences can diminish the terrorists' ability to achieve their overall goal—the induction of terror (Holloway, et al., 1997).

Increased training, research, and response capacities of the biomedical community is critical for developing and deploying the protective network against biological

weapons, as well as for dealing with natural outbreaks of disease. (Atlas, 1998).

Coordination and Communication. Planning is key to effective coordination and communication. One reason cited for communication difficulties is that although most hospitals have a disaster plan, few localities have a coordinated, community-wide plan for disaster medical care (Auf der Heide, 1996). Among other reasons, such planning is often deterred by jurisdictional disputes and the day-to-day competition that exists in the community (Auf der Heide, 1996).

Organizing and managing the care of patients and mounting the appropriate public health response will involve local healthcare representatives, municipal agencies and state public health authorities (Russell, 1997). The public health response to bio-terrorism will require communication and coordination with first responders and law enforcement officials as well (DHHS, 1997). State and local health departments should work with these groups to ensure that local disaster preparedness plans address bio-terrorism; define the roles of each agency, including protection of first responders; and are tested through simulations (DHHS, 1999). The effectiveness of coordination, support, and leadership at the federal

level will also make significant differences in reducing death rates and containing the possible secondary spread of communicable disease (Russell, 1997).

Disaster Medicine is developing as a subspecialty within Emergency Medicine (Oster, 1997). Although still in its infancy, this new subspecialty has begun to compile the data needed to guide future growth (Oster, 1997). The goals of disaster medicine are two-fold: to provide an efficient and prepared response to any type of medical disaster and to prevent medical disasters through proper and informed disaster planning (Oster, 1997). These developments are encouraging and foster the planning mindset in the providers that will be impacted heavily in the event of such disasters. Surveys carried out on preparedness for chemical accidents and airport mishaps revealed that hospitals were better prepared when the medical directors of the emergency department participated in the community planning (Lewis & Aghababian, 1996).

Another issue compounding disaster events is the frequent lack of communication from the scene to receiving hospitals (Auf der Heide, 1996). In numerous disasters, initial notification of the disaster was received from the first arriving casualties or ambulances (Auf der Heide, 1996). Often more information was received via “rumor

networks”, the news media, or from the first arriving casualties or ambulances than through official channels from the disaster scene or command post (Auf der Heide, 1996). Consideration should be given to a centralized communications center to collect and disseminate information in a timely manner. This serves two purposes: timely and accurate exchanges of information, and an accurate picture of the situation and how it is developing. Several cities have established coordination activities, namely Emergency Operations Centers (EOC) to direct the response efforts during disasters. It is imperative that the EOCs also include the healthcare community, beyond that of the public health department, to ensure that the community medical assets are meeting the needs of the general population during the crisis. This can facilitate better use of limited local medical assets by preventing over utilization and under utilization of healthcare assets. Should the incident require it, EOCs and healthcare facilities should establish a means of medical regulating to control patient flow to area hospitals and clinics. This is a process used by the military to spread casualties among available healthcare assets to prevent backlogs, supply shortages, and injury escalation in

patients. Communication and coordination planning can greatly impact the response outcome during a crisis.

Other Considerations. In disasters, where it is known that it will be some time before sufficient medical resources will be available, the consequences of triage, and therefore its practice, change considerably (Bissell, et al., 1996). It may be necessary to make patients who would normally be classified as second priority patients, the new top priority given the futility of investing time and resources in those who are immediately life threatened (Bissell, et al., 1996). This is particularly true with regard to chemical casualties, and may hold true for many biological victims. The legal and ethical considerations are staggering, but a very real issue that must be addressed in the plan.

In summary, the preceding sections on planning considerations are by no means all inclusive. There is no single disaster plan that will answer all the questions and always ensure that all needs can be met (Lewis & Aghababian, 1996). Yet, if the “plans” within the disaster plan are flexible as well as comprehensive, various needs can be addressed as the situation changes (Lewis & Aghababian, 1996).

Conclusion

Unfortunately, the nature of the current healthcare environment is not conducive to adequate planning for WMD incidents. Competition for scarce healthcare dollars and market share, further reductions in Medicare reimbursement rates, and technological advances take precedent over planning because they are tangible subjects with foreseeable outcomes. In large cities with several healthcare systems in operation, it's difficult to foster cooperation in developing a coordinated disaster plan. This trend is likely to continue until a terrorist incident sheds much negative light and litigation on the healthcare industry's inability to respond to the needs of the community during the crisis. Perhaps only then will the lessons learned be implemented on a grand scale to ensure adequate protection of the public.

Despite a dismal outlook for the first line of defense, the message is being taken seriously by some organizations. These include the American College of Healthcare Executives (ACHE), the American Hospital Association (AHA), the Texas Hospital Association (THA), the Texas Department of Health (TDH), the Bexar County Emergency Operations Center (EOC), and the San Antonio

Metropolitan Health District to name a few. Other regions of the country are also showing signs of contingency planning and coordination efforts specifically geared toward WMD. This is evidenced by the numerous web sites and web based networks that have been established addressing the subject.

From the discussion, it is clear that the number and types of organizations that will respond to incidents of domestic chemical and biological terrorism is widely varied. However, to date there have been no domestic incidents of chemical or biological terrorism that have stressed the response system like it would be stressed should a major incident occur. Coping with hundreds or perhaps thousands of sick and dying patients, thousands of panicking citizens, and the assorted chaos created by a terrorist event is not something that can be practiced sufficiently. This fuels the trend to ignore the possibility by those who would be directly managing the event.

The fact is the medical community will play a significant role in responding to those who are impacted by such events. The disciplines of disaster planning and disaster management are critical elements in preparing our response capabilities to meet the challenges of domestic

terrorism regardless of its magnitude. Unfortunately, the level of planning and management varies significantly among civilian agencies, particularly healthcare organizations. There are a host of reasons for this variation and one could apply numerous variations to each disaster scenario. There are sufficient resources to meet the planning and training shortcomings if organizations choose to pursue them. There is sufficient evidence and ample warning that chemical and biological terrorist attacks will occur. It is imperative that those who have an influence or impact on our response capability become more proactive and less reactive in meeting this threat. In closing, experts in the security and law enforcement communities concede that domestic incidents are on the rise and its no longer a matter of if, but when and where and incident will occur (Johnson, 1999).

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Appendix

The American Public Health Association
http://www.apha.org/

The Agency for Healthcare Policy and Research
http://www.ahcpr.gov/

The Centers for Disease Control and Prevention (CDC)
http://www.cdc.gov/

The Central Intelligence Agency
http://www.odci.gov/cia/ciahome.html

U.S. Department of Justice
http://www.ojp.usdoj.gov/

Veterans Administration
http://www.va.gov/VA.htm

Electronic College of Process Innovation
http://www.dtic/mil/c3i/bprcd/index.html

Federal Bureau of Investigation (FBI)
http://www.fbi.gov/

Federal Emergency Management Agency (FEMA)
http://www.fema.gov/

Food and Drug Administration (FDA)
http://www.fda.gov/

Health Care Financing Administration (HCFA)
http://www.hcfa.gov/

The Library of Congress
http://lcweb.loc.gov/

U.S. Army Medical Department Library and Information Network
http://www.armymedicine.army.mil/medcom/medlinet/ulsrch.htm

National Aeronautics and Space Administration (NASA)
http://www.gsfc.nasa.gov/NASA_homepage.html

National Security Agency (NSA)
http://www.nsa.gov: 8080/

Thomas: Library of Congress Search Engine
http://thomas.loc.gov/

United States Intelligence Community
http://www.odci.gov/cia/other_links/wheel/contents.html

United States Information Agency (USIA)
http://www.usia.gov/usis.html

MedicCom.Org—public health/disaster management links
http://mediccom.org/public/default.htm

National Oceanic and Atmospheric Administration (NOAA)
http://www.noaa.gov/findex.html

The White House
http://www.whitehouse.gov/

Department of Defense (DoD)
http://www.defenselink.mil/

Defense Threat Reduction Agency
http://www.dtra.mil

Chemical Warfare/Chemical biological Defense (CW/CBD) Information Analysis Center (CBIAC)
http://www.cbiac.apgea.army.mil/

The NBC Medical Defense Information Server
http://www.nbc-med.org/

The Army Medical Department Center and School
http://www.armymedicine.army.mil/armymed/

U.S. Army Soldier and Biological Chemical Command Information Server
http://www.sbccom.apgea.army.mil/

Edgewood Research, Development, and Engineering Center (ERDEC)
http://www.sbccom.apgea.army.mil/RDA/erdec/

Joint Service Chemical Biological Information System (JSCBIS)
http://www.sarda.army.mil/jscbis/jscbis.htm

Dugway Proving Ground
http://www.atc.army.mil/~dugway/

Chemical and Biological Weapons Nonproliferation Project
http://www.stimson.org/cwc/

The PTS-OPCW-PrepCom Home Page
http://www.opcw.nl/

United States Army Chemical School
http://www.mcclellan.army.mil/

Harvard Sussex Program on CBW Armament and Arms Limitation
http://fas-www.Harvard.edu/~hsp/

Medical Chemical and Biological Defense
http://mrmc-www.army.mil/

United States Army Medical Research Institute of Infectious Diseases
http://www.usarmriid.army.mil

Armed Forces Radiobiological Research Institute (Medical Radiological Defense)
http://www.afrri.usuhs.mil/

Defense Advanced Research Projects Agency (DARPA)
http://www.darpa.mil/

Joint Service Tech Base Planning for CB Defense
http://www.techbase.tasc.com/techbase/

Program Manager for Chemical Demilitarization
http://www-pmcd.apgea.army.mil/

ACDA Home Page
http://www.acda.gov/

Cal Poly CBW Page
http://www.calpoly.edu/~drjones/chemwarf.html

Joint Vaccine Acquisition Program
http://www.Armymedicine.army.mil/jvap

NBC Industry Group
http://wwww.erols.com/nbcgroup/

Joint Program Office for Biological Defense
http://www.jpobd.net

United States Joint Forces Command
http://www.acom.mil/acomweb.nsf

The Joint Chiefs of Staff
http://www.dtic.mil/jcs/

U.S. Military Internet Sites
http://www.sla.org/division/dmil/mlw97/ramkey/index.htm

Armed Forces News
http://www.armedforcesnews.com/

Department of Defense Health Affairs [DoD (HA)]
http://www.ha.osd.mil/

Military Operations on Urban Terrain (MOUT)
http://www.geocities.com/Pentagon/6453/

U.S. Marine Corps 1st Medical Battalion
http://www.cpp.usmc.mil/1medbn/index.htm

U.S. Marine Corps Warfighting Lab
http://www.mcwl.quantico.usmc.mil/mcwl-hot/

Marine Link
http://www.usmc.mil/

U.S. Marine Forces Atlantic (MARFORLANT)
http://www.nfd.usmc.mil/links.htm

U.S. Navy Bureau of Medicine and Surgery (BuMed)
http://navymedicine.med.navy.mil/

U.S. Navy Bureau of Naval Personnel (BuPers)
http://www.bupers.navy.mil/

Chemical and Biological Defense
http://www.cbd.navy.mil/

U.S. Navy Plans, Operations, and Medical Intelligence (POMI) Community
http://nmimc-web1.med.navy.mil/bumed/med-00~1/pomi/default.htm

U.S. Navy Medical Service Corps
http://navymedicine.med.navy.mil/med00msc/

Humanitarian Demining website
http://www.demining.brtrc.com/

Pan American Health Organization (PAHO)
http://www.paho.org/

World Health Organization (WHO)
http://www.who.int/

Doc Mangelsdorff's Cybermarine—Sources of information and links
http://www.txdirect.net/users/dmangels/

University of Texas at San Antonio research site
http://mrpi.utsa.edu/

San Antonio Metropolitan Health District
http://www.ci.sat.tx.us/health/

City of San Antonio
http://www.ci.sat.tx.us/

Arizona Division of Emergency Management
http://www.state.az.us/es/
Minnesota Department of Emergency Management
http://www.dps.state.mn.us/emermgt/Current/index.html

Texas Department of Emergency Management
http://www.txdps.state.tx.us/dem/

Florida Department of Emergency Management
http://www.floridadisaster.org/

Kentucky Department of Emergency Management
http://webserve.dma.state.ky.us/test5.htm

Michigan Department of Emergency Management
http://www.msp.state.mi.us/division/emd/emdweb1.htm

Nevada Department of Emergency Management
http://www.state.nv.us/dmv_ps/emrmgt.htm

North Dakota Department of Emergency Management
http://www.state.nd.us/dem/

Texas Department of Health
http://www.tdh.state.tx.us/

Healthcare Sites of Interest
http://www.haneys.org/resource/links/publicat.htm

Hospitalweb
http://neuro-www2.mgh.harvard.edu/hospitalwebusa.html

Medscape
http://www.medscape.com/index.html

Healthcare Professionals Guide to the Internet
http://members.aol.com/ppohly/index.htm

PubMed
http://www.ncbi.nlm.nib.gov/PubMed

American Academy of Medical Administrators (AAMA)
http://www.aameda.org/aama.htm

American College of Healthcare Executives (ACHE)
http://www.ache.org/

Armed Forces Journal International (AFJI)
http://www.afji.com/

All the Virology on the WWW
http://www.tulane.edu/~dmsander/garryfavwebbw.html

American Medical Association (AMA)
http://www.ama-assn.org/

American Public Health Association (APHA)
http://www.apha.org/

Center for Disaster Education and Research
http://mediccom.org/public/cder/cder.html

Center for Disaster Management and Humanitarian Assistance
http://payson.tulane.edu/cdmha/default.htm

Federation of American Scientists (FAS)
http://fas.org/index.html

Healthcare Publications
http://www.ncha.org/links/publications.html

Healthcare Security Officer
http://members.aol.com/pmh7/index2.html

Jane's Defense Products
http://www.janes.com/

Kim Spy—Intelligence and Counterintelligence
http://www.kimsoft.com/kim-spy.htm

Links to Disaster Sites
http://www.gsa-gsa.com/disasterlinks.htm

Medline
http://mymedline.onnetwork.com/medline/

The Bioweaponeers
http://cryptome.org.bioweap.htm

Emergency Preparedness Information Exchange (EPIX)
http://hoshi.cic.sfu.ca/epix/
http://hoshi.cic.sfu.ca/~anderson/
http://disaster.cprost.sfu.ca/~anderson/

Natural Hazards Research and Applications Information Center
http://adder.Colorado.edu/~hazctr/Home.html

Canadian Centre of Emergency Preparedness
http://alpha.netaccess.on.ca: 80/ccep

Environment and Nature: Disasters
http://www.yahoo.com/Environment_and_Nature/Disasters

Occupational Safety and Health Administration (OSHA)
http://www.osha-slc.gov/osha.html

U.S. Agency for Toxic Substances & Disease Registry (ATSDR)
http://atsdr1.atsdr.cdc.gov: 8080/atsdrhome.html

WWW Emergency Services
http://dumbmo.isc.rit.edu/ems/wwwes.html

The Unofficial Disaster Home page
http://rvik.ismennt.is/~gro/disaster.html

The Internet Disaster Information Network
http://165.247.199.30/
http://www.disaster.org.
http://www.disaster.net/index.html

EQE International
http://www.eqe.com/

Radiation and Health Physics Homepage
http://www.umich.edu/~bbusby/