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77. THE COMPONENTS OF THE BIO-RESPONSE TEMPLATE

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INTRODUCTION

When responding to a bioterrorist attack, the following aspects of response must be timely and well coordinated: medical surveillance to detect the attack; making quick, rapid and appropriate response decisions; implementing the pre-existing response plans; distribution of prophylaxis; ability to keep up with the flow of sick and "worried well"; and ability of response system to receive and rapidly utilize outside help. In consonance with these aspects of response, the following major functions comprise a full-spectrum and integrated response approach. This approach is called the bio-response template.

MEDICAL SURVEILLANCE

Medical surveillance improves the chances of quickly detecting unusual medical events. This initial, non-specific detection of medical activity above an established baseline would trigger other response actions. Several American communities are now monitoring hospital admissions, emergency calls, and unexplained deaths as indicators of an unusual medical event. When baselines are exceeded, city health and emergency management officials will decide if an unusual event has occurred. If this is the case, they then would initiate the four *active investigation* components of the response template (see Figure 1). Medical surveillance could be expanded to actively poll emergency departments, pediatricians, infectious disease doctors, and other infection-control practitioners to ascertain the context and possible cause of the non-specific indicator(s). Medical staff should be trained to be alert to unusual clusters of disease symptoms that are indicative of bioterrorist activity.

MEDICAL DIAGNOSIS

If medical surveillance indicates that an unusual event may be occurring, local officials should have established procedures for confirmation and definitive diagnosis. Preliminary medical diagnosis of suspected biological samples should be undertaken locally with samples sent for verification to other qualified laboratories. Veterinary diagnosis also should be considered in the verification process. If a potential biological weapons (BW) health problem arises, the medical and public health community should notify the senior local elected official, emergency manager and local law enforcement. Likewise, any selected infectious disease laboratory results that are reported to the public health department also should be reported to the senior local elected official, emergency manager and law enforcement.

EPIDEMIOLOGICAL INVESTIGATION

An epidemiological investigation could determine, using a variety of tools including interviews and diagnoses, the distribution of cases and sources of disease outbreak. Such an investigation would support the development of recommendations for containment, prevention and treatment.

If an epidemiological investigation is initiated, law enforcement should be notified and provided with data collected as needed. This way, criminal investigators can visit the original site to collect data when epidemiologists identify the location of the disease source.

The key to successful epidemiological and criminal investigations of potential BW events is a good working relationship between law enforcement, epidemiologists and the public health department. Developing procedures to facilitate sharing of information between these agencies is highly recommended.

CRIMINAL INVESTIGATION

The criminal investigation would be a joint effort involving many agencies and could complement the epidemiological investigation. It likely would entail conducting interviews with the sick in hospitals, fellow sick officers, and others in the affected population groups. To facilitate these interviews, a checklist of basic questions to ask should be developed. These interviews can help determine the cause, perpetrators and other details of the attack.

Other types of evidence include biological or clinical samples, heating, ventilation and air conditioning samples, surface samples, and food or water samples. Local communities should develop sampling protocols for law enforcement officials investigating potential bioterrorist events. These protocols should include coordination with the local laboratory to ensure appropriate specimen collection and handling.

If a potential BW health problem arises, sharing of the information described above between the health/medical community and law enforcement officials may help in the apprehension of the responsible individuals/groups. Communities should discuss mechanisms to identify and share pertinent information with each other, paying particular attention to patient confidentiality and operational security issues. For a credible biological threat, law enforcement should notify predetermined public health officials. Safety concerns such as agent hazards, secondary devices and/or booby traps left at the scene should be considered when planning response procedures for the criminal investigation team.

MASS PROPHYLAXIS

The results of the medical diagnosis, epidemiological and criminal investigations could be used by local officials to assess whether a major health event was occurring, to help determine the potential cause(s) and to identify the population at risk. Local officials could then make informed decisions on medical prophylaxis and treatment, containment and quarantine measures as required. In many cases, these decisions may need to be made on a presumptive basis and then acted on immediately to achieve timely prophylaxis and to keep pace with the onset of casualties.

Mass prophylaxis, the first *emergency response* component of the template, involves the distribution and medical application of appropriate antibiotics, vaccines, or other medications in order to *prevent* disease and death in exposed victims. For example, giving antibiotics to people shortly after exposure to anthrax can significantly reduce the occurrence of disease and save lives. However, the speed with which medical prophylaxis can be implemented effectively is critical to its success.

Application of medical prophylaxis requires identification of the population at risk. Because this identification cannot be verified immediately, treatment may have to be applied to a much greater number of people than those actually exposed. Distribution of medications could occur through existing medical institutions or through other medical emergency response systems.

In addition, local policy should be developed that provides priority emergency antibiotic prophylaxis for use by "essential" emergency personnel, including law enforcement personnel conducting the criminal investigation, in order to allay their fears and help assure their continued presence during the response. A specific list of such personnel should be developed in advance.

RESIDUAL HAZARD ASSESSMENT AND MITIGATION

Residual hazard assessment and mitigation involves activities that would assess and protect the population from further exposure to potential environmental hazards. Normally the risks from residual BW agents are small compared to those from the actual attack, but they still warrant attention once the more immediate threats have been addressed. Public health officials, coroners and/or medical examiners and criminal investigators would need to work together to mitigate residual hazards and identify potentially large numbers of fatalities. Assessment and mitigation may include environmental sampling of air, water, and soil, as well as surface swipes and insect and animal screening for the BW agent.

Vector and animal control measures may be used as applicable. Decontamination would be site specific and may be required for certain "hot spots" around the area of release or for the interior of buildings and other enclosures.

CONTROL OF AFFECTED AREA/POPULATION

Control of affected area and population is divided into two major sub-elements: 1) physical control, and 2) public information and rumor control. Together, these two elements help maintain order, inform the population, and facilitate organized emergency response. Physical control includes crowd control and security at hospitals, emergency medical facilities, fatality handling sites and other vital installations such as airports, utility sites, bridges and tunnels. In addition, activities that control the affected area also provide excellent opportunities for isolation and preservation of the crime scene, if one is identified.

Traffic management could provide ingress and egress control for essential personnel, equipment and residents within the affected city and to and from staging areas. The affected areas within the city could be patrolled to maintain security as warranted.

Public information and rumor control are vital for informing and instructing the population in ways that enhance emergency response and avoid panic. Activities could include establishing and operating a city hotline, providing information to the media and distributing self-help fact sheets. Strict management of information as well as ensuring that all information disseminated is timely and accurate are crucial activities of the local command structure in order to prevent panic and maintain public cooperation.

MODULAR EMERGENCY MEDICAL SYSTEM (MEMS) – CARE OF PRESENTED CASUALTIES AND WORRIED WELL

Care of presented casualties and worried well, along with medical prophylaxis, form the backbone of the bio-response template. Other components of the template support and enable these two.

The worried well are individuals who believe that they have been exposed to a biological agent, when in fact they have not. They may magnify the number of patients by 5 to 15 times and will require triage and evaluation to distinguish them from the truly ill. Many will fall out of the patient count as their clinical status remains unchanged over time. Unfortunately, they will seek medical assistance during the most critical time of the incident, and thus, will impact the delivery of care to the victims of a biological attack. For example, in the case of the Aum Shinrikyo subway attack in Tokyo, the number of worried well was approximately 4500 of the 5500 casualties.

In order to manage this huge casualty load the BW Improved Response Program (IRP) team developed the Modular Emergency Medical System (MEMS) to address shortfalls in hospital space, equipment and medical personnel. The MEMS concept was developed to address the need of a BW response plan to expand and contract in size, based on casualty counts and acuity.

Public and private area hospitals could admit BW casualties until they approach full capacity while operating under their internal emergency operations plans. As the hospitals become full, local officials would determine that the medical emergency is overwhelming the community's medical care system and could decide on appropriate activation of a system similar to the MEMS, which is described below and is graphically represented by Figure 2. Area hospitals would form their own internal emergency medical command centers (MCC) to coordinate all assigned sector health care operations. Acute care centers (ACC) would be established in structures close to the area hospitals to provide definitive and supportive care to acutely ill BW patients who exceed hospital capacity.

The current health care management system includes public and private area hospitals, clinics, and private physicians. These components could be integrated and expanded during emergency operations by activating pre-planned components and applying additional resources.

Local clinics, schools and shopping centers of suitable size could be expanded into Neighborhood Emergency Help Centers (NEHC) to provide the primary point of entry into the emergency medical system for BW patients and worried well and to distribute medical prophylaxis medications. Local volunteers could be used to assist the medical staff in these centers. Private medical doctors would send their BW patients and worried well to the NEHCs. Community outreach could be performed by police, firefighters, community health personnel, and other officials to link home-bound patients to the NEHC.

If the acute care centers and clinics became overwhelmed because of the extreme numbers of casualties or are delayed in being set up, community outreach personnel would distribute information, appropriate medication (after victims were triaged by trained medical personnel) and medical supplies to victims at their homes. They also could provide limited medical care by mobilizing a citizen home care effort and augment NEHCs in quickly distributing medical prophylaxis.

Casualty relocation units could transfer non-BW hospital patients to remote locations in order to provide additional hospital space for BW patients. Only non-critical patients would be relocated. The patients could be moved by ground, water, or air transports.

The rapid and large-scale expansion of facilities has a critical companion effect: the rapid and large-scale expansion of staffing needs. A large-scale BW disaster would quickly overwhelm the existing medical staff, even in our largest and best-staffed cities. Therefore, until sufficient staff are available, cities may want to consider the use of "physician and nurse extenders" to cover medical staff shortfalls. When using physician and nurse extenders, it is important to address the legal issues. These persons may include dentists, veterinarians, final-year medical students, nursing students and other medical specialists. These extenders could, through necessity, assume broader roles in providing medical care to mass casualties.

FATALITY MANAGEMENT

Medical prophylaxis and care of casualties according to established health protocols will reduce death and suffering following a BW attack. However, fatalities still are likely to occur and may occur in large numbers with a lethal agent like anthrax. Therefore, fatality management must be planned.

The template includes the use of morgues to provide rapid central processing of remains and the establishment of long-term storage facilities using refrigerated trucks, rail cars or other containers to hold remains until final disposition. Local officials would need to make a decision on the final disposition of remains. Options for the final disposition of remains could include (1) mass cremation, (2) mass burial and (3) release of remains to

families for normal disposition. Temporary interment is an option that might be used while awaiting final disposition.

Remains contaminated with biological agents could present health concerns and may need to be disposed of according to established protocols.

EMERGENCY MANAGEMENT OPERATIONS

When local officials determine that a major health event is occurring, they will likely activate their emergency operations center (EOC). They might also implement an incident/unified command system. A unified medical branch could be established within this command structure, and representatives from local, state and federal agencies could be requested at the local EOC. The emergency operations plan, including application of medical prophylaxis and use of the modular emergency medical system, could be activated. Local officials could declare a state of emergency and request mutual aid from surrounding municipalities. The key is early coordination among all departments and forging early relationships between police, medical practitioners, emergency management and public health officials. Planning and conducting joint training exercises are effective in preparing strong unified command structures. Activating the emergency public information system must be an early and continuing action throughout the response in order to help prevent panic, further injuries and deaths.

LOGISTIC AND RESOURCE SUPPORT

The resource and logistic support component of the bio-response template would establish staging areas and distribution points for incoming personnel and supplies. Statements of needs and prioritization for equipment, personnel and services would have to be established. Supplies would be delivered to the response sites from the staging areas and distribution points. A central reception center would receive incoming mutual aid and personnel and provide instructions, accreditation, and assignments.

CONTINUITY OF CRITICAL INFRASTRUCTURE

The continuity of infrastructure component of the response template would activate local continuity of operations plans when disaster-related absenteeism exceeds critical thresholds. Critical infrastructure facilities would implement emergency staffing plans to sustain response operations at a high tempo. Telecommunications would activate their emergency communication plan to establish priorities, call blocking and cellular augmentation. Electrical power generation, water and transportation would activate their emergency staffing plans as required based on absenteeism. Sanitation would augment disposal of biohazard material and provide sanitary facilities and pest control at Acute Care Centers and other emergency facilities.

KEY WORDS

Terrorism, biological terrorism, biological agents, weapons of mass destruction, SBCCOM, Improved Response Program, emergency management, emergency medical services, hazardous-materials, public health, medical response, medical surveillance, bioresponse template, personal protection, decontamination, medical treatment, Modular Emergency Medical System

FIGURES

Figure 1. BW Response Template Components and Key Decisions

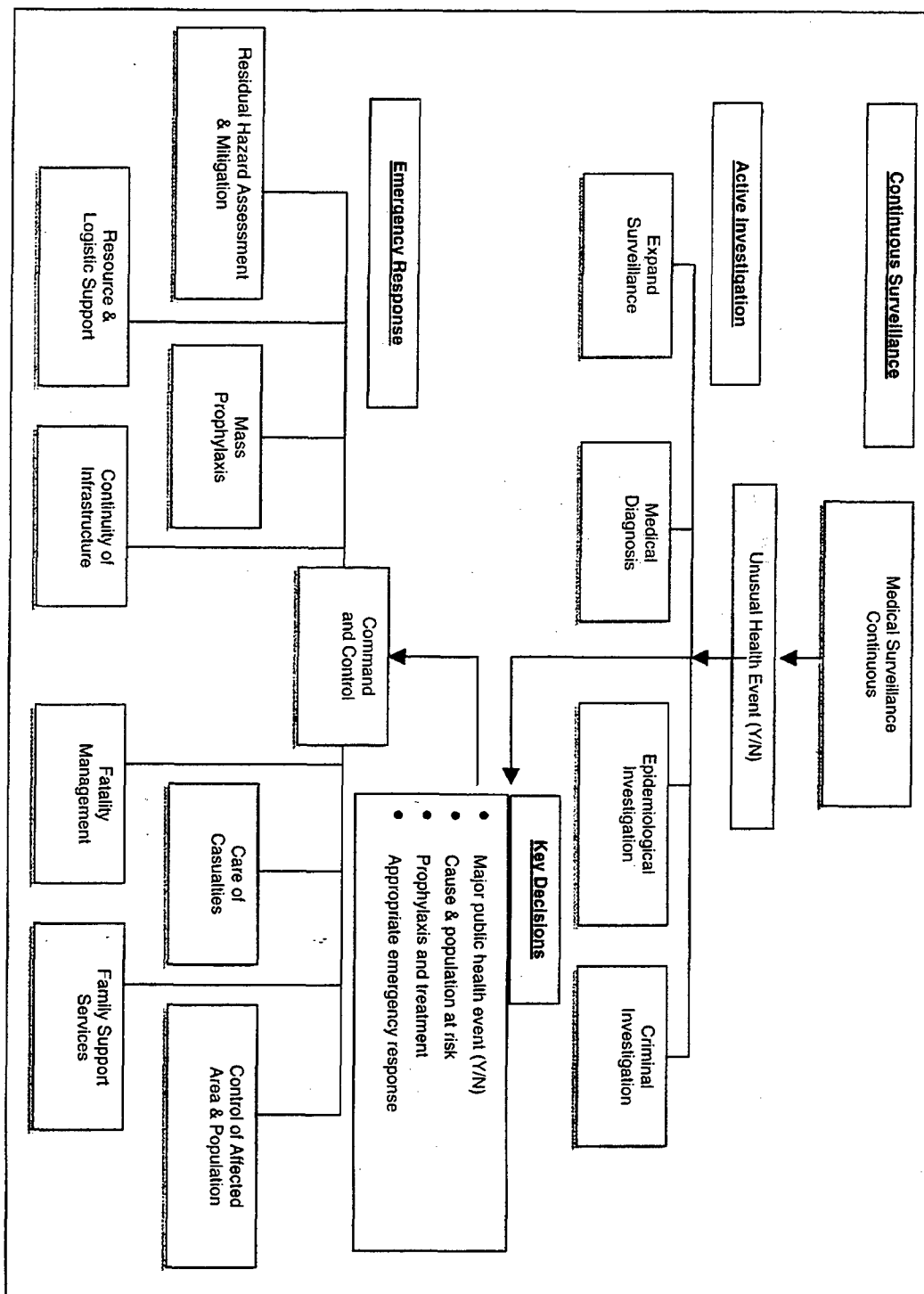


Figure 2. Modular Emergency Medical System

