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**BIOLOGICAL WARFARE IMPROVED DEFENSE PROGRAM
RESPONSE DECISION TREE WORKSHOP
29-30 APRIL 1999**

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PREFACE

The work described in this report was authorized under Contract No. SPO900-94-D-0002, Task Order No. 383, and Delivery Order No. 178. The work was started in and completed in April 1999.

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**BIOLOGICAL WARFARE IMPROVED DEFENSE PROGRAM
RESPONSE DECISION TREE WORKSHOP
29-30 APRIL 1999**

1. INTRODUCTION

Based on PL 104-201, the Biological Warfare Improved Response Program (BW-IRP) was established in 1998 to identify, evaluate, and demonstrate the best practical approaches to improve domestic preparedness for incidents of biological warfare (BW). The BW-IRP is a multi-year program under the auspices of the Department of Defense and operated by the US Army Soldier Biological and Chemical Command (SBCCOM). During its first year of operation, the BW-IRP assembled an experienced, multi-agency team from the medical and responder communities to develop two primary products: a BW Response Template summarized in Figure 1 and a prioritized list of response gaps and improvements that would be the basis for additional study.

2. PURPOSE

The purpose of this workshop was to continue the process of improving the BW Response Template (hereafter, the template) by focusing on the decision-makers' thought processes as a hypothetical biological emergency unfolds. Specific objectives included the following:

- a. To better define the key decisions that must be made to respond to a potential biological terrorist incident.
- b. To identify 'triggers' or 'flags' that can be used to guide decision-makers in determining if an unannounced BW response has occurred.
- c. To determine how a response would differ for an announced vs. unannounced attack scenario.
- d. To attempt to validate the generic nature of the template.

A basic assumption of the workshop was that the municipality would agree to implement the template, would have established reliable baseline values for the monitored information, and would have an active continuous medical surveillance program.

3. KEY DECISIONS DURING AN UNANNOUNCED ATTACK (See Figure 1)

A. An unusual event has occurred. The critical issue during continuous medical surveillance is whether or not monitored information is above the trigger level for response. The group discussed the following issues:

- 1) The majority of the larger cities probably have most of this information available, but it may not be in a system that makes it readily available for monitoring. Cities must ensure that the information is accessible and appropriately monitored.

- 2) The 911 emergency call system provides a wealth of information, but cities have to determine what information is important to monitor, categorize this data, and develop the required baselines and reporting system.
- 3) The frequency of EMS runs is another source of valuable information, but again the locality has to categorize the information and set up an appropriate reporting system.
- 4) Adjunct to the EMS runs is the number of daily ER/local clinic visits and hospital admissions. These numbers will be different from the EMS runs due to self-referrals to the ER. Again, these numbers should be appropriately monitored and reported.
- 5) The number of deaths, particularly unusual deaths, was felt to be a particularly useful indicator of unusual medical activity. A potential problem with this indicator is the varying frequency with which deaths are reported to the Department of Health (DOH). If this trigger were used, the trigger value would have to be very low and could result in some false initiation of expanded surveillance.
- 6) One of the problems discussed was how to gather data from facilities that are not publicly funded, since these organizations consider all patient information, including statistical summaries, to be proprietary. The group agreed that in the absence of a declared emergency, the only way to gather monitoring data would be to rely on the data from municipal organizations.
- 7) The group decided that the monitoring of retail and pharmacy purchases would be futile, since not only would there be privacy concerns, but the mechanism to collect this information in a timely fashion does not exist and would be very expensive to implement. The same reasoning applies to the monitoring of laboratory test results in the absence of an emergency.
- 8) Given the diversity of municipal organizations in the country, the group recommended that it would be inappropriate to specify who should make the decisions required by the BW response template. All that could be done would be to suggest where the decision should be made, and to let the individual municipalities fit the recommendation within their current reporting chain.
- 9) Regardless of where the decisions are made, the group recommended that there be a definite monitoring and reporting procedure in place to alert officials when indicators suggest a potential BW attack on the country's cities.

B. A major health event is occurring. After it is decided that an unusual medical event has occurred, expanded medical surveillance must be initiated. The group recommended that the DOH (or equivalent) be the organization responsible for conducting the expanded Medical Surveillance and making the decision that a major medical event is occurring. Once the decision is made, the DOH should inform the mayor or equivalent. The following items were concluded by the group to be necessary to support the decision that a major health event is occurring:

- 1) All data from all sources should be integrated and reviewed by a single individual so as to form a coherent picture of the event.

- 2) The decision that an unusual event has occurred should trigger active two-way communication between DOH and health organizations such as poison control centers, hospitals, other local DOHs, morgues and medical examiners, local clinics and HMOs, private ambulance services, and the state DOH.
- 3) The DOH must try to define the initial population at risk. Working relationships should be developed that facilitate an exchange of information between the DOH and law enforcement elements so that this determination can be a joint effort.
- 4) Since a single case of an unusual medical condition may be sufficient to declare a major medical event (e.g., a death attributed to inhalation anthrax), the DOH should ensure that such conditions are known by the appropriate medical community and are reportable.

C. Potential cause and population at risk. When the DOH informs the mayor that a major medical event is occurring, in all likelihood the mayor will issue a press release. Therefore, the DOH must be prepared to answer questions from the press, or the press liaison, which will not interfere with the investigation. The following points should be considered during this phase of the event:

- 1) Should initial prophylaxis be administered? If so, to whom? What are the consequences if all the local prophylaxis supplies are exhausted on the wrong population?
- 2) It is essential for the medical team to develop a presumptive (or definitive) diagnosis as rapidly as possible.
- 3) If bioterrorism is suspected, the epidemiological team should determine the most likely release point and the associated population at risk. This determination may be facilitated with relational mapping software like GIS. Since this investigation is critical in determining the population at risk and the overall size of the emergency, all organizations should provide priority support to the team performing the epidemiological investigation. Preliminary answers should be available within 24 hours.
- 4) The mayor may activate law enforcement to begin a criminal investigation. Medical and health assets should work cooperatively to preserve evidence while assessing risk.
- 5) Local and state elements may request the involvement of the FBI and CDC if bioterrorism is suspected.
- 6) Personnel developing this information should be cognizant of the fact that weaponized BW agents are not the only agents that could be used on an unsuspecting and unprotected civilian population.
- 7) Release of accurate information to the media is critical in maintaining control of the situation. If the media do not believe they are obtaining accurate and timely data from the official sources, they will develop their own sources of information, which may be counterproductive to the official effort.
- 8) The emergency response official must know who should be prophylaxed, where to transport potentially exposed personnel, and what to tell the responders.

D. Medical prophylaxis and treatment measures, and appropriate activation of the modular emergency medical system. Once the probable cause and potential population at risk is known, the mayor (with advice from DOH) must decide what prophylaxis to administer and to whom and what level of the modular emergency medical system to activate. If it has not been done already, the mayor will activate the EOC and attempt to determine what assistance is required from state, regional, and federal authorities. Other factors that must be considered when the modular emergency medical system is activated are:

- 1) To what degree is regular medical treatment affected?
- 2) To what extent are volunteers or other medical extenders used in the various modules, and what credentialing will be required?
- 3) Are hospital disaster plans activated (with the definition of a disaster being a mismatch of needs & resources)?
- 4) How will medical personnel arriving from other locations be accredited/credentialed?
- 5) To what extent should mutual aid be activated?
- 6) Can the media be used to direct the flow of potential patients?
- 7) If the goal is to stay ahead of the "tidal wave" of patients, how fast should the modules be opened?
- 8) Can the modules respond adequately to the use of multiple BW agents?

4. KEY DECISIONS DURING AN ANNOUNCED ATTACK

The next topic of discussion was how an announced BW attack would change the decision path leading to the declaration of a medical emergency. The group concluded that regardless of how the BW attack was announced, law enforcement would have to decide if the attack was credible. If the attack was not credible, the mayor would issue a media release and continue routine medical surveillance. If the attack was credible, then there would be two available options. The first option is that the release would be confirmed. At this point the mayor would activate the EOC and the modular emergency medical system while law enforcement is conducting a criminal investigation and the medical community is conducting an epidemiological investigation. The second option is that no definitive determination could be made concerning the validity of the announced attack. The expanded medical surveillance, epidemiological investigation, and criminal investigation portions of the BW response template would be activated and a media release would be made concerning the actions taken by public officials. These actions would continue until the determination could be made as to the validity of the announcement.

5. BW RESPONSE DECISION TREE

A. The BW Response Decision Tree is presented in Figure 2. The Decision Tree is designed for use with the Biological Warfare (BW) Response Template. The purpose of the Decision Tree is to address who makes the decisions, the sequencing of the decisions, and the types of information that need to be developed and considered when making the decisions. The starting point for this decision tree is the assumption that the local jurisdiction has a functional medical surveillance program and has incorporated the BW Response Template into their Emergency Response System. Medical surveillance should operate continuously and provide non-specific detection of medical activities above established baselines in order to improve the chances of detecting unusual medical events sooner rather than later. In order for medical surveillance to be effective, specific medical activities, i.e., volume of 911 calls, categorized EMS runs, or unusual deaths, must be monitored. Once the monitored values pass a trigger threshold, this activity must be reported to an individual within the DOH or equivalent agency for action.

B. When the DOH individual is notified, an informal investigation must be conducted to determine if there is a known cause for the trigger value. If the person determines there is a known cause, such as a major accident or a natural disaster, this result is logged and the system returns to routine medical surveillance. If there is no apparent cause for the unusual value and the individual decides that an **unusual event has occurred**, then the Office of Emergency Management (OEM) is notified to alert these personnel that an unusual event has occurred and that the DOH is initiating **expanded medical surveillance**.

C. **Expanded medical surveillance** would initiate a more active gathering of medical information to support the decision that a **major health event is occurring**. This information is gathered by the DOH. The DOH would actively poll hospital emergency rooms, poison control centers, morgues, and other local health officers to try and determine if these organizations are experiencing an unusual number of persons contacting them with similar complaints/symptoms. Once the DOH determines that a **major health event is occurring**, the mayor (or other appropriate elected official) would be notified and **medical diagnosis, epidemiological investigation, and criminal investigation** would be activated or intensified.

D. The DOH personnel performing the **medical diagnosis** must concentrate on obtaining a presumptive diagnosis as rapidly as possible so that they can make a decision as to what **medical prophylaxis and treatment measures** are appropriate. Simultaneously, DOH must perform a rapid **epidemiological investigation** to support a decision as to what segment of the **population is at risk** and the **probable cause** of the major health event. Additionally, law enforcement would initiate a **criminal investigation** based on risk factors, such as identified threats and dates of special significance, and try to determine if **criminal activity** initiated the major health event and if there is a crime scene to investigate. Once any of these activities uncovers new information, or at a previously set time, the mayor must be updated.

E. After receiving the update, the mayor must decide if the available information warrants the partial or full activation of **the modular emergency medical system** and activation of the government's EOC. Additionally, the mayor must decide if a medical emergency declaration is required and if state and federal assistance is required. Additional points to consider at this time are the availability of medical supplies, if access to and egress from the community is warranted, and if a curfew is warranted. Finally, once a definitive diagnosis is obtained, DOH must decide what medication to provide to the victims, particularly since the initial medication, if appropriate, may be in short supply.

6. EXERCISE OF THE BW RESPONSE DECISION TREE

A. To validate the BW Response Decision Tree, the group conducted a tabletop exercise of an unannounced anthrax attack on Baltimore City, which resulted in 10,000 infected people. The anthrax casualty projections from the model were used to determine the number of victims requiring medical assistance. A day-to-day summary of the decision-maker's actions follows:

Day Zero: The attack occurs and is undetected.

Day One: Even though there are 10,000 infected people within the city, the disease is in its incubation period, so there are no personnel requiring medical assistance this day. The city conducts normal daily operations.

Day Two: During the course of the day, 700 people present themselves to medical facilities seeking aid. They are experiencing flu-like symptoms. These personnel are treated and released by the local medical community. The city conducts normal daily operations.

Day Three: There are an additional 2700 personnel with flu-like symptoms seeking medical aid today, 600 repeat personnel with upper respiratory infection symptoms, and 100 fatalities. This volume of cases triggers the initiation of the expanded medical surveillance program. The mayor is also briefed about the developing situation at about 11:30pm. During this meeting, the mayor wants to ensure that all actions are coordinated with the city's key organizational elements; that the State DOH will be notified; and that a further update meeting has been scheduled in six hours to further update the situation.

Day Four: Based on a presumptive diagnosis of inhalation anthrax from an autopsy of two individuals and the large number of personnel requiring medical assistance, the decision is made to update the mayor at 2:00am. During this update meeting, the mayor is informed that there have been 2 presumptive anthrax fatalities, the state DOH has notified the CDC, a criminal investigation has been initiated by law enforcement, and an extensive epidemiological survey has been initiated to define the population at risk. The mayor wants to know how much prophylaxis is available locally and who is going to get it, what he should tell the media, and when the worst would be over. The mayor also wants to know if a curfew should be declared and the city closed. He also decides to declare an emergency, open the EOC, activate the modular emergency medical system, and request state and federal emergency assistance.

B. Points for consideration that resulted from the scenario included:

- 1) A case definition or objective indicator of inhalation anthrax is needed to facilitate separation of the worried well from those actually ill with the disease. This was identified as a critical need, since the amount of readily available prophylaxis is not sufficient to be able to treat large numbers of people.
- 2) Distribution plans should be developed for daily (or less frequent) distribution of the prophylaxis so it is not unnecessarily distributed; the medication may be quickly changed as the clinical diagnosis is developed and the population at risk is better defined or narrowed.

C. Finally, the group discussed methods to disseminate the results of the BW response template and this workshop. Possible techniques discussed were specific classes to train personnel on the template, with various scenarios to emphasize how it works; preparation of a training film, in conjunction with the CDC; and presentation during the USAMRIID/CDC Satellite courses.

7. CONCLUSIONS

The workshop participants concluded that development of the BW Decision Tree was a significant aid in identifying and tracking the difficult but necessary decisions that must be made during an ongoing large-scale medical emergency. Additionally, the participants concluded that the BW Decision Tree is extremely helpful in providing a quick overview of the BW Response Template, facilitating its use, and understanding the rationale for why it is needed.

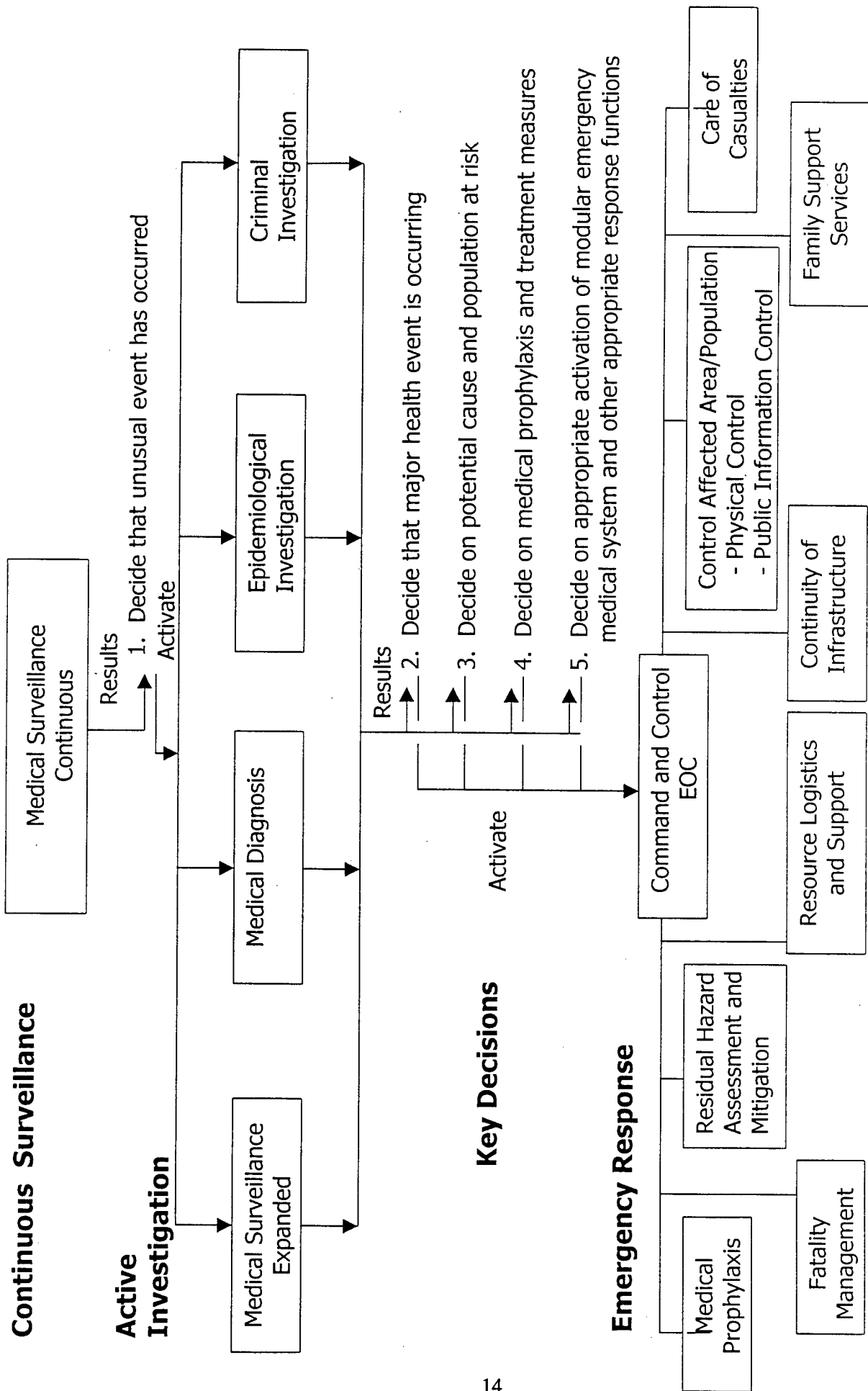
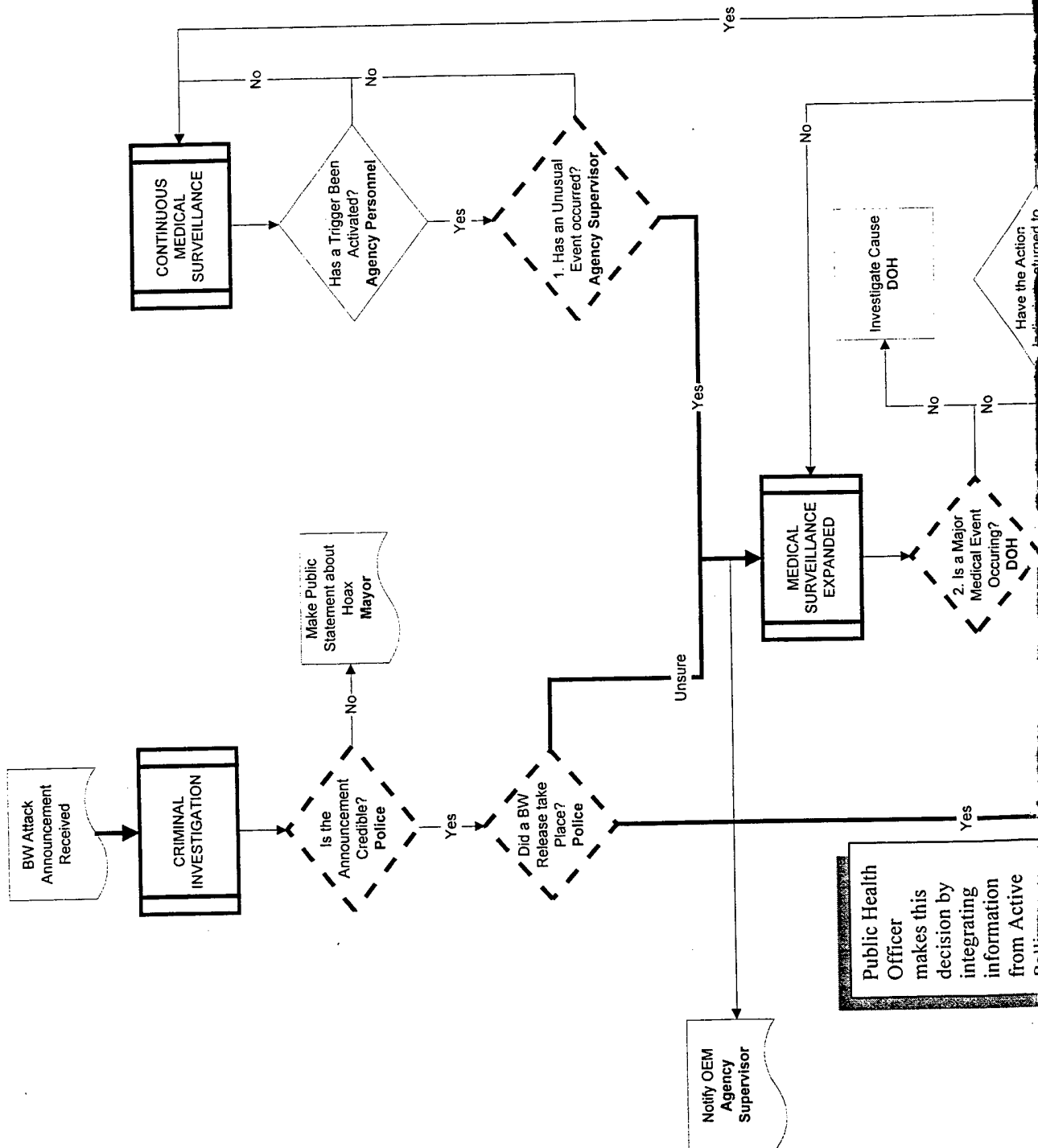


FIGURE 1:
BW Response Template Components and Key Decisions

UNANNOUNCED ATTACK

ANNOUNCED ATTACK



Assume a continuous Medical Surveillance program is operating and providing real-time information to appropriate Personnel.

- Examples of Monitored Data:
- 911 Calls
 - Categorized EMS Runs
 - Number of Deaths, particularly Unusual Deaths

Quick Intradepartmental investigation to see if there is a known cause for the Unusual Activity, i.e., major transportation accident or natural disaster.

Begin Active Polling by Public Health Office of Hospital Emergency Rooms, Poison Control Centers, Morgues, and other local Health Offices, Police, and Fire.

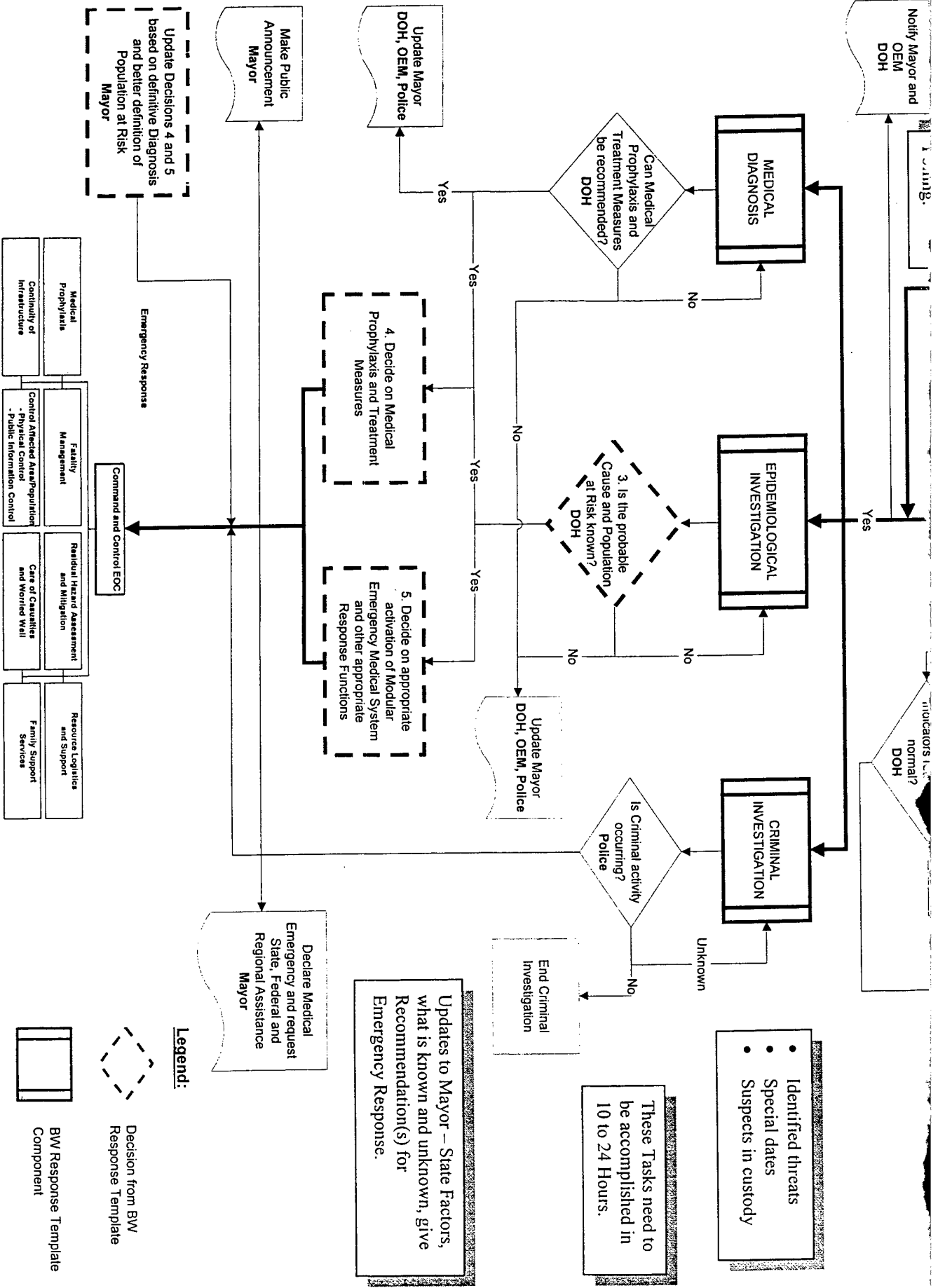


FIGURE 2:
BW Response Decision Tree

- Legend:**
- Decision from BW Response Template
 - BW Response Template Component
 - Outputs
 - Indicates Response Activation