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REPORT

of the

Biological Weapon Improved Response Program (BW-IRP)

Updated BW Response Decision Tree and BW Response Template

To

U.S. Army Soldier and Biological Chemical Command (SBCCOM)

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By

Richard L. Kussman, P.E.

Battelle Edgewood Operations
2012 Tollgate Road, Suite 206
Bel Air, MD 21015

BIOLOGICAL WEAPON
IMPROVED RESPONSE PROGRAM

Updated
BW Response Decision Tree
and
BW Response Template

U.S. Army
Soldier and Biological Chemical Command
Edgewood Area
Aberdeen Proving Ground, MD

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PREFACE

This work was conducted as a part of the Improved Response Program under the FY 2000 Nunn-Lugar-Domeni Domestic Preparedness Program. Battelle Edgewood Operations, 2012 Tollgate Road, Suite 206, Bel Air, MD 21015 was the supporting contractor (Contract No. SP0700-00-D-3180, Task No. 011, Delivery Order 15)

COMMENTS AND SUGGESTIONS

Comments and suggestions relating to response concepts and working material contained herein are welcome and should be directed to the U.S. Army Soldier and Biological Chemical Command, Homeland Defense Business Unit, 5183 Blackhawk Road, Aberdeen Proving Ground, MD 21010-5424, Attention: Mr. Gregory Mrozinski: telephone 410-436-2963, e-mail: Gregory.Mrozinski@sbccom.apgea.army.mil; Mr. Michael DeZearn: telephone 410-436-3658, e-mail: Michael.Dezearn@sbccom.apgea.army.mil; or Dr. Richard Hutchinson: telephone 410-436-3382, e-mail: Richard.Hutchinson@sbccom.apgea.army.mil

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EXECUTIVE SUMMARY

In response to growing concerns regarding domestic terrorism, the 104th Congress passed Public Law 104-201, the National Defense Authorization Act for Fiscal Year 1997 which contained Title XIV – Defense Against Weapons of Mass Destruction. In addition to providing our nation's first responders with training regarding emergency response to weapons of mass destruction, this legislation required that the Secretary of Defense develop and carry out a program for testing and improving the responses of federal, state and local agencies to emergencies involving biological and chemical weapons. As a result, the U.S. Army Soldier and Biological Chemical Command (SBCCOM), in partnership with the Department of Health and Human Services (DHHS), the Federal Emergency Management Agency (FEMA), the Federal Bureau of Investigation (FBI), the Environmental Protection Agency (EPA), the Department of Agriculture (USDA), and the Department of Energy (DOE), developed a Biological Weapons (BW) Improved Response Program (IRP). This partnership was formed to assist all agencies with their particular responsibilities when preparing for and responding to a biological incident. The BW-IRP is a multi-year program under the auspices of Department of Defense (DoD) and operated by SBCCOM.

The purpose of this report is to update the original BW-IRP Decision Tree and the BW-IRP Response Template, published in April 1999, with information obtained from workshops, exercises and seminars conducted subsequent to its initial development. The BW Response Template was validated by a series of workshops at various cities to determine the applicability and scalability to different locations and demographics. Additional workshops were focused on other areas of the project.

The Wichita Workshop was conducted in Wichita, Kansas in July 1999. The purpose of the workshop was to determine if the response template and decision tree tools were scalable to various demographic locations and population densities; to identify areas to enhance or improve the response template; and to assist Wichita/Sedgwick County understand and address the nature of the biological threat, develop biological incident response plans, and identify areas that require additional resources (personnel, equipment or supplies) to successfully respond to a bio-terrorist incident. There was significant discussion on the impact the template had on local responses, but actual recommendations for modification to the template were relatively minor. The participants were most concerned with the issues of medical surveillance and handling of remains.

The FBI National Domestic Preparedness Office (NDPO)/DoD Workshop was held in Bel Air, Maryland in January 2000. The specific purpose of the workshop was "to identify methods to establish information-sharing relationships between the law enforcement community and the medical/public health community, at all levels of government; to ensure the timely exchange of critical information; and to rapidly identify a terrorist incident involving biological agents." It was discovered that both law enforcement and public health personnel frequently collected similar information from the victims. This realization resulted in development of a joint questionnaire for use in BW incidents. It was also evident that information sharing should take

place early and frequently as the response to the incident progresses. It was not determined, however, at what point in the process this interaction should begin. The Emergency Operations Center was identified as an excellent vehicle for enhancing information exchange and understanding. Other results included recommendations on selecting a spokesperson, recognition that the concept of trigger levels was extremely important for determination that a BW incident was underway, and the need to work closely with the legal profession due the unique situations likely to arise from a BW incident.

The Pinellas County Workshop was held in February 2000 in Pinellas County, Florida. The purpose of the Pinellas County Workshop was identical to that of the Wichita Workshop. The participants determined that the response template was a good starting point to organize their response planning and also a good reminder list to ensure all subjects were addressed. Among the results of the workshop was realization that the template could evolve into software that could be used in responding to a BW incident. This software would have a significant advantage by allowing a local jurisdiction to enter their data so that locally available resources would be identified in the output.

The Centers for Disease Control and Prevention (CDC)/DoD Smallpox Workshop was held in April 2000 in Bel Air, MD. The purpose of the workshop was to evaluate the application of the response template to a contagious disease. Three primary areas were discussed with experts throughout government and private practice: Medical Surveillance, Vaccination/Prophylaxis, and Isolation/Quarantine. These discussions resulted in a process description that was converted into a decision tree format that could be used by local jurisdictions during response to a contagious disease outbreak.

The Dover Workshop was held in Dover, Delaware in July 2000. The purpose of the Dover Workshop was to determine how a city and nearby military base could work together to respond to a biological incident. Three major areas were examined during the workshop: Emergency Management, Law Enforcement, and Medical and Health Services. Among the more significant results of the workshop was the recommendation to add "Public Information" as a separate component of the response template. Some of the other outcomes were the realization that reporting relationships need to be defined and structured, the need for a central coordinating body for medical resources and the discovery that the presumptive diagnosis is sometimes not correct, requiring flexibility in the response and emphasizing the importance of communication between all participants.

The Revised Decision Tree incorporates changes and modification derived from the workshops conducted under the BW-IRP. As part of the modification process, several additional decision trees were generated that go into more detail than the basic Decision Tree. This level of detail may prove to helpful to jurisdictions as they plan for their response to a BW incident. The key decisions during a BW response are:

1. Has an unexplained event occurred?
2. Is a major public health event occurring?
3. Is the probable cause and population at risk known?

4. Decide on medical prophylaxis and treatment measures.
5. Decide on appropriate activation of emergency medical support and other appropriate responses functions.

Embedded in each of these major decisions are many smaller decisions and actions, based on the major decision. In addition, subordinate decision trees may be entered from the BW Response Decision Tree to see more detail on the processes recommended for response. The subordinate decision trees include the Medical/Public Health Decision Tree, the Prophylaxis Decision Tree, and the Isolation Decision Tree.

All of the workshops contributed to revisions to the BW Response Template. The most significant change to the template was the identification of Public Information as a separate component of the Response Template. All of the template activities were updated, as well, to reflect details developed during the workshops conducted as part of the BW-IRP.

The result is that the BW Decision Tree and BW Response Template, when taken together, provide a picture of what is likely to be required to successfully respond to a BW incident. The BW Decision Tree and its subordinate decision trees may serve also as an aid in identifying and tracking the difficult but necessary decisions that must be made during an ongoing large-scale medical emergency. The template provides a structured response strategy and includes examples of response activities.

The multiple workshops and ongoing peer-review of the BW Decision Tree and the accompanying subordinate decision trees and BW Response Template have given credence to these concepts. Every jurisdiction should adapt these tools to their unique situation. Since the BW response strategy is applicable to any large-scale medical emergency, such as a natural disease outbreak, preparations for BW terrorism can provide an opportunity to better prepare for serious but more likely events (i.e., influenza outbreak).

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1. INTRODUCTION

In March 1995, members of the Japanese cult Aum Shinrikyo attacked the Tokyo subway with Sarin nerve agent. The incident captured international headlines and sensitized governmental leaders around the world to the possibilities of the terrorist use of Weapons of Mass Destruction (WMD). In response to this threat, the 104th Congress passed Public Law 104-201, the National Defense Authorization Act for Fiscal Year 1997, which contained Title XIV – Defense Against Weapons of Mass Destruction. In addition to providing preparedness training against weapons of mass destruction for our nation's first responders, Section 1415 of Title XIV stated,

> "The Secretary of Defense shall develop and carry out a program for testing and improving the responses of Federal, State and local agencies to emergencies involving biological weapons and related materials and emergencies involving chemical weapons and related materials."

In response to this legislation and in support of the Department of Defense (DoD), the U.S. Army Soldier and Biological Chemical Command (SBCCOM), in partnership with the Department of Health and Human Services (DHHS), the Federal Emergency Management Agency (FEMA), the Federal Bureau of Investigation (FBI), the Environmental Protection Agency (EPA), Department of Agriculture (USDA), and the Department of Energy (DOE), developed a Biological Weapons (BW) Improved Response Program (IRP). This partnership was formed to assist all agencies with their particular responsibilities when preparing for and responding to a biological incident. For example, Presidential Decision Directive 62 designates DHHS as the lead Federal agency for planning and preparation for a national response to medical emergencies arising from the terrorist use of weapons of mass destruction. A companion chemical warfare IRP is focusing on enhancing responder protection and detection and on mass casualty decontamination.

Based on PL 104-201, the BW-IRP was established in 1998 to identify, evaluate, and demonstrate the best practical approaches to improve domestic preparedness for incidents of biological warfare. The BW-IRP is a multi-year program under the auspices of the Department of Defense and operated by the 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, Appendix A, and a prioritized list of response gaps and improvements that would be the basis for additional study.

The BW Response Template has been validated by a series of workshops at various cities to determine the applicability and scalability to differing locations and demographics. Additional workshops are focused on other areas of the BW-IRP.

2. PURPOSE

The purpose of this report is to update the original BW-IRP Decision Tree and the BW-IRP Response Template which was published in August 1999 with information obtained from workshops, exercises, and seminars conducted subsequent to its initial development.

3. WORKSHOP INSIGHTS

The original BW-IRP Response Decision Tree Workshop was conducted on April 29-30, 1999. Subsequent to this workshop, several additional workshops have been conducted to address gaps identified in the original decision tree and response template. The following is a brief synopsis of these activities and the significant findings of the workshops.

3.1 Wichita Workshop. The workshop in Wichita, Kansas was conducted in July 1999 for the purpose of testing the scalability of the template to different geographic and demographic locations in the United States. Wichita/Sedgwick County was selected as one of two municipalities that would participate in a facilitated review of their ability to respond to a local bio-terrorist incident using the BW-IRP response template. The objectives of the workshop were twofold:

1) Assist the BW IRP:
   - Determine if the response template and decision tree tools developed to date are scalable to various demographic locations and population densities; and
   - Identify areas to enhance or improve the response template.

2) Assist Wichita/Sedgwick County:
   - Understand and address the nature of the biological threat;
   - Develop biological incident response plans; and
   - Identify areas that require additional resources (personnel, equipment or supplies) to successfully respond to a bio-terrorist incident.

The workshop was divided into three one-day segments. The first segment consisted of presentations to ensure a roughly equal baseline of information among the participants. The second and third segments required the participants to analyze a biological scenario and identify modifications to the Integrated Response Template to meet Wichita/Sedgwick County's needs.

After the baseline presentations, breakout groups were formed consisting of Emergency Management and Fire, Public Health and Health Care, and Law Enforcement. Each of the groups was assigned a section of the Integrated Response Template to validate. The work groups concentrated on the following areas:

- Projecting casualties;
- Determining the response requirements (actions, equipment, personnel);

- Identifying interactions between responders;
- Identifying and mobilizing existing resources; and
- Identifying and accessing additional resources.

The scenario used for Wichita/Sedgwick County was designed to produce a level of casualties that would significantly stress the local response system, but not overwhelm it to the point that a credible initial response was precluded. The intent was to exercise all aspects of the BW response system and require planning for rapid augmentation by regional, state and federal assets. The scenario involved the release of a BW agent in a building complex's heating, ventilation, and air conditioning (HVAC) system that resulted in a total medical impact of approximately 33,000 casualties.

Results from the Wichita Workshop

As a result of working with the scenario, there was significant discussion of the impact the template had on local responses. However, actual modifications to the template were relatively minor. The nature of those adjustments suggested that the tool was scalable to Wichita/Sedgwick County. The changes made to the template, while tailoring the tool to the Wichita/Sedgwick County demographics and resources, were primarily revisions to resource types and numbers.

Workshop participants were concerned with issues of *medical surveillance* and *handling of remains,* which were areas where technology and/or procedural gaps existed. In the opinion of the workshop participants, additional time, effort, and new technology were needed to help resolve these concerns.

3.2 FBI National Domestic Preparedness Office (NDPO)/DoD Workshop. The law enforcement and public health communities were brought together in January 2000 to look at the BW-IRP Decision Tree and Response Template. The specific purpose of the gathering was "to identify methods to establish information-sharing relationships between the law enforcement community and the medical/public health community, at all levels of government; to ensure the timely exchange of critical information; and to rapidly identify a terrorist incident involving biological agents. These relationships should build upon existing policies and procedures whenever possible and establish new mechanism when necessary."

Results from the NDPO/DoD Workshop

- For the first time in a workshop setting, law enforcement and public health officials were gathered together to discuss the roles that each would play during a biological incident. This promoted a new level of communication and understanding.

- The information sharing that occurred during this process led to the discovery that both law enforcement and public health personnel frequently collected the same information from the victims. Greater cooperation between the law enforcement

and public health communities could mean more efficient and less intrusive information gathering.

- A "joint questionnaire" was developed.

- The development of "trust" between the law enforcement and public health community was dealt with specifically. The point at which information sharing should commence between law enforcement and public health investigations was at issue. The obvious answer, "as soon as possible," was agreed upon, but the specific point in the response when information sharing would take place was not identified. It was agreed that both groups must respect the need for non-dissemination and information confidentiality by the other party.

- The necessity to involve the Emergency Operations Center (EOC) was identified as critical to achieving overall coordination.

- Another matter discussed by participants was the appropriate spokesperson for the jurisdiction. While it is important to maintain recognized and trusted spokespersons, in order to carry the necessary credibility, they should also use noted technical experts. It is also necessary for all agencies involved in the BW response to coordinate all public information releases so "mixed" or conflicting information is not released from the local jurisdiction.

- The concept of triggers was identified as extremely important. Numerous factors could be utilized, including monitoring over-the-counter medications. The triggers were recognized as being more important than usual because BW events generally do not start from a 911 call. For example, in Pinellas County, Florida, representatives of major drug retail chains are now included in their EOC staffing.

- The need to work closely with attorneys was identified as an important element during an incident. For example, a general counsel should be present in the EOC for obtaining advice on matters that might arise as a result of a BW response. The potential for unique situations is quite likely in a BW incident response.

3.3 Pinellas County Workshop. In February 2000, emergency managers, firefighters, Emergency Medical Service (EMS), law enforcement and hospital personnel had the opportunity to test and calibrate the BW-IRP template in Pinellas County, Florida. This was well received by most of the participants; however, one immediate shortfall observed was that the original scaling model for the tool was New York City. The differences between the urban areas of New York City and Pinellas County made the total number of required resources substantially different and the need for scaling factors quite evident.

While the template makes a good tool, the level of detail and the sheer size (thickness) of the document can be overwhelming to potential users at first exposure. It is possible the template could be re-packaged as a number of slimmer volumes, thus lowering the "intimidation" factor. Even the addition of tabs to the current document, distinguishing

hospital from law enforcement, etc., would improve the ability of the user to navigate through the document.

The scenario in Pinellas County involved the introduction of a BW agent into the HVAC system of a public facility. The scenario was "thought provoking" in terms of the security and planning implications of the imaginary action. Participants noted that for many of them, this was the first time they had considered a response to a BW incident.

Because the traditional first responder system is oriented to a direct response to the results of some action, the concept that a BW incident could occur without immediate notice was a troubling thought to many. One participant specifically noted, "I sensed too much of a 'we can handle hurricanes, so this is a snap' attitude." Many traditional first responders are uncomfortable with the lack of a traditional "crime scene" or "accident scene" associated with BW incidents. In addition, a BW incident will probably not enter the emergency response system through 911, as most emergencies do. In case of a BW event, the very first indication of a problem may be a call from a local hospital emergency department expressing concern about an overflow of people arriving with "flu-like symptoms."

Results from the Pinellas Workshop

- The template provided a logically ordered starting point for people unfamiliar with a response to a BW incident. It also served as a list of things to remember when responding to a BW incident.

- One future benefit of the template would be the ability to customize it through software for each community. A simple series of questions could elicit the names of personnel responsible for various types of decisions. Then, the software could print out a copy of the decision tree, personalized with the names of the responsible parties in the local jurisdiction.

- Similarly, the software package could allow the plug-in of the local resource base – this would allow the difference between available resources and needed resources (as calculated by the adjusted template) to be immediately available.

3.4 Centers for Disease Control and Prevention (CDC)/DoD Smallpox Workshop. In April 2000, law enforcement, medical/health personnel, emergency responders, risk communicators, fire, and legal professionals gathered with SBCCOM and CDC to evaluate the application of the Response Template to special circumstances presented by a communicable disease. The purpose of the meeting was to refine the CDC Smallpox Control Plan/Strategy by applying it against a terrorist release scenario. Specific areas that were evaluated included medical surveillance, vaccination, and quarantine/isolation.

The workshop represented diverse perspectives of the various levels of government, that would be involved in responding to a bioterrorism incident. There were two phases to the workshop: briefings and breakout groups. In particular, the breakout groups were used to

identify potential solutions to the complicated problems of enhanced medical surveillance, vaccination, and isolation/quarantine for smallpox.

Results from the CDC Workshop

Medical Surveillance

- Indicators or triggers were identified as being extremely important to enhanced medical surveillance. Some of the factors involved in making sure the system generates information on an early warning basis include monitoring of over-the-counter drugs, presentation of patients in clusters, or patients presenting unusual symptoms. In addition, it is important to coordinate the occurrence of unusual events in the animal or crop surveillance areas with these and other indicators. Hospital admissions, EMS runs, and the number of cases accepted by the medical examiner for investigation are additional trigger mechanisms.

- The importance of developing case definitions for BW agents was noted. Structured training on identification of the disease and subsequent treatment is dependent on this issue.

Vaccination

- Contact tracing was identified as extremely important in a BW incident involving communicable diseases. Along with this concept, it is extremely important for essential workers (i.e., those doing the tracing) to be protected. For a contagious disease, it is always preferable to vaccinate the individual at risk rather than conducting mass vaccination. If possible, the contact tracers should also administer the vaccine.

- A follow-up program is important to evaluate the effectiveness of the vaccinations.

- The potential impact of the vaccine on the victim has to be taken into account – will the vaccine aggravate an existing condition or be likely to cause adverse reaction?

- In order to mitigate subsequent "waves" of victims, the timely identification and vaccination of the contacts of the first wave of exposures is critically important.

Isolation/Quarantine

- The key to success of this strategy is communicating to the public that it is in their best interest to follow the recommendations of the local public health officers (i.e.

use the public to self-enforce isolation requirements). This communication needs to be done by someone recognized and trusted within the community.

- In addition to having the legal authority to implement an isolation strategy, states must also have the capacity to enforce the isolation of individuals when necessary. The group recommended, however, that jurisdictions **should not attempt to strictly enforce their isolation strategy,** regardless of the size and scope of the incident.

3.5 Dover Workshop. The workshop with Dover, Delaware and Dover Air Force Base (AFB) was conducted in July 2000 to review and modify, as appropriate, the existing Response Template to respond to potential biological terrorist incidents. In addition, the workshop was designed to determine how a city and a military base could work together to respond to a biological incident. Workshop participants used the BW response template as a foundation in developing response template applicability to the Dover, Delaware and the Dover Air Force Base communities. Because of suggestions from earlier workshops, the template was presented in a simplified electronic format that facilitated participants' comprehension and template adjustment. Three breakout groups were formed to focus on different elements of the template: emergency management, medical and health services, and law enforcement. Following the discussion of the results from the breakout groups, a table top exercise was conducted to test the concepts discussed and the modifications recommended for the response template.

<u>Results from the Dover Workshop</u>

Each of the groups focused on different elements of the response concept in order to:

- Determine response activities and strategies;
- Consider the impact of the scale of the attack;
- Identify the source and availability of local, state and federal resources;
- Identify activities related to Dover versus Dover Air Force Base; and
- Identify points of contact to further define and implement the elements of the resulting response template.

The three groups successfully identified interactions between the response elements to enhance their ability to function as an integrated system. The following are key issues raised and resolved by the three groups.

Emergency Management

The group found the suggested template actions helpful in directing their thoughts toward developing a Dover/Dover AFB Response Plan. Given the importance of Public Information/Media Relations, it was suggested that this section be broken out into a separate block and added to the template for consideration. The workshop participants underscored the importance of creating and maintaining lines of communications. This was later verified under the more (relatively) realistic terms of the tabletop simulation. Access to military assets was also discussed in detail. A number of routes are available

to request assistance from Dover AFB. For immediate assistance in protecting life and property, the Base Commander can immediately apply base resources for up to 72 hours. In addition, the Base Commander can also supply assistance through Military Assistance to Civil Authorities (MACA).

Workshop participants acknowledged the importance of "speaking with one voice" during an emergency. In addition, the basic newsgathering function of the media was discussed, and emphasis was placed on the importance of media representatives deriving and communicating recommended protective actions for the public.

Law Enforcement

The Dover Police Department and Dover AFB Security Forces have had a long-standing and cordial working relationship, with each agency assisting the other in investigations of mutual concern. This workshop helped them to further identify what each agency is capable of providing or not providing in the event of a terrorist attack.

Medical and Health Services

The medical group identified the ability of Dover AFB to monitor the use of over-the-counter medication on a rapid basis with minimal implementation. The group also acknowledged the need to use pre-established protocols for communication and reporting. This process should not be person-dependent; rather it should be process driven.

The medical community acknowledged the need for early cooperative inter-hospital collaborative agreements, especially with respect to transfer of potential victims, including the availability and use of isolation beds.

Many processes or procedures are required to respond to a BW incident. Some of these processes exist and others have yet to be established. As an example, Dover AFB has a process for forwarding laboratory samples to the U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID) but does not have an established policy and procedure for communication with authorities located outside the air base. The group agreed that the reporting process should be collaborative with the local health authorities and that reciprocal arrangements with the Dover area should be established.

The medical group concluded that prophylaxis is a medical-operational-political decision. The need to alleviate the concerns of the emergency responders and essential personnel will be a significant driving force. The natural fear that the agent or illness may be transported to the family is an issue of real concern. The ultimate prophylaxis decision would come out as a Governor's office policy statement based on recommendations from the Public Health Officer.

Dover AFB offered the possibility of using the Air Mobile Field Clinic with a 12 to 24 hour ramp-up time to full operation and the Air Force War Readiness Materiel (WRM) as

a potential source of on-hand regional material resources. These could augment local medical resources and probably be operational before out-of-region resources arrive.

The use of predetermined "Family Practice Centers" for disasters was expanded upon for the medical group as a basis for establishing neighborhood emergency help centers (NEHC). These outreach clinics already physically exist within the Dover community.

General Comments

- Many informal reporting relationships exist that need to be defined and structured;
- Epidemiological studies were conducted independent of law enforcement authorities; and
- There was a need for a central coordinating body/agency to be created for medical resources.

Issues for Discussion from the Tabletop Exercise

- Emergency management personnel realized that in an unannounced biological attack, management forces could not take action until indicators triggered an awareness that an unusual medical event was occurring.
- Sometimes, the presumptive diagnosis is not correct, emphasizing the need for flexibility in the response and the importance of communication between all participants.

4. REVISED DECISION TREE

Appendix A has several decision trees dealing with the response to a BW incident. Figure 1, Appendix A, depicts the BW Response Template, which contains the elements needed to respond to a biological attack and includes key decisions that would need to be made during the response. Figure 2, Appendix A presents the BW Response Decision Tree, the top-level decision tree. Within Figure 2, there is a point where another, more detailed decision tree is entered (Figure 3, Appendix A). Two additional decision trees (Figures 4 and 5, Appendix A) are entered from Figure 3 at points "B" and "D" for contagious diseases.

This section discusses the key decisions in the BW Response Decision Tree and the more detailed subordinate decision trees. In the discussion, bullet points are frequently used. The bullet points do not represent a hierarchical order. Other parts of the discussion have numbered points which indicate a sequential order of events. Two basic scenarios are presented in the BW Response Decision Tree—Unannounced Attack and Announced Attack.

4.1 Key Decisions During an Unannounced Attack.

BW Response Decision Tree

Triggers are incidents or actions that can serve as indicators of a BW incident. The discussion that follows deals with several examples of triggers and how they might be used or assessed. It may not be necessary to use all these triggers, nor are these the only triggers that can be used. The critical issue during continuous disease surveillance is whether or not monitored information is above the trigger-level for response.

- The majority of larger cities probably have most of this information available on potential triggers, but it may not be in a system that makes it readily available for monitoring. Many cities are now establishing medical surveillance systems through grants from the Department of Health and Human Services.

- The 911 emergency call system provides a wealth of information, but cities would need to determine what information is important to monitor, categorize this information, and develop the required baselines and reporting system.

- The frequency of EMS runs is another source of valuable information, but again the locality would need to categorize the information and set up an appropriate reporting system.

- Another important trigger is the number of daily emergency room/local clinic visits and hospital admissions. These numbers will be different from EMS runs because some individuals will choose to admit themselves to the emergency room. Again, these numbers should be appropriately monitored and reported.

- The number of deaths, particularly unexplained deaths, is a useful indicator of unusual medical activity. A potential problem with this indicator is the varying frequency with which unexplained deaths are reported to the local public health agency. If this trigger were used, the trigger threshold would have to be very low and could occasionally result in false initiation of expanded surveillance.

- One of the problems is gathering the data from private facilities. Many of these organizations consider *all* patient information, including statistical summaries, to be proprietary. In the absence of a declared emergency, the best way to gather monitoring data would be to rely solely on data from municipal organizations.

- Similarly, monitoring retail and pharmacy over-the-counter medication purchases would be difficult to achieve. 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 design and implement. The same reasoning applies to the monitoring of laboratory test results in the absence of an emergency. It is possible, however, to obtain useful data to use as a trigger by developing

memorandums of understanding (MOUs) with local pharmaceutical distribution centers.

- Given the diversity of municipal organizations in the country, it would be inappropriate to specify who should make the decisions required by the BW response template. Suggestions have been made about where in the template the decision could be made. The local jurisdictions can best fit the recommendation within their current reporting chain.

- Regardless of where the decisions are made, there should be a definite monitoring and reporting procedure in place to alert officials when indicators suggest a potential BW attack on our cities.

- Once a trigger is tripped, it must be further evaluated to determine if an unexplained event has occurred. As an example, an airliner crash at the local airport would result in a large increase in 911 calls and emergency room admissions. Although this might trip a trigger, further evaluation would show that this was not an unexplained event.

Is a Major Public Health Event Occurring?

After it is determined that an unexplained event has occurred, expanded disease surveillance should be initiated. The local public health agency is normally the organization responsible for conducting the expanded disease surveillance and determining if a major public health event is occurring. Once the decision is made, a senior elected official in the jurisdiction should be notified. The following items may be used to support the decision that a major health event is occurring:

- All data from all sources should be integrated to form a coherent picture of the event.

- The decision that an unexplained event has occurred should trigger active, two-way communication between the local public health agency and other health-related organizations, such as poison control centers, hospitals, other local public health agencies, morgues and medical examiners, local clinics and HMOs, private ambulance services, and the state public health agency. In addition, the local law enforcement agencies should be notified.

- The local public health agency must try to define the initial population at risk. Working relationships should be developed that facilitate an exchange of information between the public health and law enforcement elements so that this determination can be a joint effort.

- 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 public

health agency should ensure that such conditions are communicated to appropriate elements of the medical community and that the condition/disease is reportable.

- Should it be determined that a major public health event is not occurring, the cause of the unexplained event should be investigated and the action indicators (triggers) should be examined to see if they have returned to normal levels.

Probable Cause and Population at Risk

Once a Major Public Health Event is evident, Medical Diagnosis of the disease must be established and Epidemiological and Criminal Investigations should be initiated.

- The Medical Diagnosis and the Epidemiological Investigation are intricately intertwined. They each use data from the other in the process of identifying the disease and the appropriate treatment and preventive measures for it. The steps proposed in Figure 2, Appendix A, provide an overview of the necessary steps and decisions leading to the appropriate treatment of the ill. These steps also outline decisions on prophylaxis for the potentially exposed or at-risk population, and the activation, if needed, of expanded disease surveillance. Additional detail on the critical decisions associated with the Medical Diagnosis and Epidemiological Investigation are provided in Figure 3, Appendix A, beginning at Point A.

- Similarly, the Criminal Investigation and the Epidemiological Investigation have many common threads. Law enforcement agencies need information to determine if criminal activity has taken place. The epidemiological community must obtain similar information to determine the source and identity of the disease outbreak. It is critical that the law enforcement and epidemiological communities work closely together and share information. Specific recommendations are provided in the *BW IRP NDPO/DoD Workshop Report*

<u>Medical /Public Health Decision Tree</u>

1. Three separate, but related, actions begin within the medical community once it is determined that a Major Public Health Event has occurred and the Medical Diagnosis and Epidemiological Investigations have been initiated:

    a. Make a presumptive diagnosis and begin treatment of the patients;

    b. Perform laboratory tests, based on the presumptive diagnosis to confirm the disease; and

    c. Begin the Epidemiological Investigation.

Once laboratory testing has confirmed that the disease is communicable, then two additional, more detailed decision trees (Figure 4, Appendix A, Prophylaxis Decision Tree and Figure 5, Appendix A, Isolation Decision Tree) apply.

2. For non-contagious diseases, specific control measures to reduce the severity or prevent the disease in the population at-risk should be implemented. These control measures are derived from the findings of the epidemiological investigation and clinical and preventive medicine practices.

3. The next major decision deals with implementation of any prophylaxis.

4. Throughout the process, numerous feedback loops check to ensure the treatment and control measures are effective. If they are not effective, then every step of the process, including diagnosis, should be reevaluated.

Prophylaxis Decision Tree

The Prophylaxis Decision Tree is entered from Point B on the Medical/Public Health Decision Tree (Figure 3, Appendix A) only if the confirmed diagnosis is a communicable disease.

1. The first decision made by the public health agency is whether to vaccinate or provide appropriate prophylaxis. In those cases where there is no vaccine or prophylaxis that will protect the population at-risk, or for some other reason vaccination/prophylaxis is not recommended, isolation and treatment of the ill is the primary course of action. The process flow described in the Isolation Decision Tree (Figure 5, Appendix A) operates in parallel to the Prophylaxis Decision Tree.

2. If a vaccine or other prophylaxis is recommended, then the strategy for distribution and administration needs to be agreed upon and implemented. Among the factors to be considered are the population at-risk, the availability of the vaccine/prophylactic agent, and the potential for adverse reactions. The two primary strategies are as follows:

    a. Contact Prophylaxis. In most instances, contact Prophylaxis is the preferred strategy. Those receiving the vaccine under this strategy would include potentially exposed persons with no symptoms, contacts of potentially exposed persons, medical and other care-giving personnel, first responders and other response teams, hospital laundry and mortuary personnel, clergy who will be in contact with infected or potentially exposed persons, and lab technicians performing diagnostic tests.

    b. Mass Prophylaxis. Mass vaccination/prophylaxis is rarely warranted. There may be political pressure to vaccinate large segments of the population; however, this pressure should be resisted, as it "wastes"

vaccine on those that do not need it, may put additional people at risk to adverse reactions, and may delay administration of the vaccine to the population at-risk.

3. Once the strategy is determined, and the vaccine is administered, any adverse reactions must be dealt with, and the effectiveness of the vaccine/prophylaxis must be evaluated. Once the Prophylaxis has been administered and shown to be effective, the Medical/Public Health Decision Tree (Figure 3, Appendix A) is re-entered at Point C.

Isolation Decision Tree

The Isolation Decision Tree is entered from Point D on the Medical/Public Health Decision Tree (Figure 3, Appendix A) only if the confirmed diagnosis is a communicable disease. In many cases, if the presumptive diagnosis is of a communicable disease, the individual patients may already be isolated. This decision tree deals with the public as a whole and offers the guidance on isolation to reduce the risk to the public.

1. The first decision is based on the size of the disease outbreak. Deciding if the outbreak is large or small is a very subjective decision. Some of the factors that may help to make this determination are:

    a. Can the hospitals cope with the number of cases and contacts without activating their emergency plan?
    b. Is there sufficient vaccine/prophylaxis to deal with the number of patients and close contacts?
    c. Is the vaccine/prophylaxis working?
    d. Are the control measures working?

2. For small outbreaks, the initial cases can be isolated in a hospital setting with appropriate safeguards for infectious disease prior to a confirmed diagnosis. Confirmed cases, following disease confirmation, should be isolated at home and monitored via telephone. Close contacts and suspected cases should also be isolated at home. Any prophylaxis or vaccine should be administered by trained personnel in the home to reduce the potential for exposing additional people.

3. Large outbreaks are handled similarly. There may be a need to set up a centralized neighborhood medical clinic to triage and advise the worried well and the infected victims. Initial cases in a large outbreak will likely require transfer to a non-hospital setting. Alternatives are single-family dwellings or buildings with no shared ventilation, (i.e. hotels).

4. Once the isolation options are in place, they should be monitored to measure their effectiveness and modified as necessary.

5. The Medical/Public Health Decision Tree (Figure 3) is re-entered at Point E.

4.2 Key Decisions During an Announced Attack.

The BW Response Decision Tree (Figure 2, Appendix A) is used for the announced attack, similarly to the unannounced attack. An announced attack takes place when someone or some group sends a message that an attack is going to take place. Sometimes the location and time of the attack are included in the announcement. For most bio-terrorist incidents, the announcement is likely to follow the actual release of the biological agent. Intelligence information developed by law enforcement agencies or other intelligence gathering activities are also included in the "announced attack" portion of the decision tree, (Figure 2, Appendix A).

1. Once an announced attack is indicated, a threat assessment and investigation should be undertaken. The threat assessment is carried out by law enforcement personnel and may involve a preliminary investigation, and, in a potential bio-terrorist incident, an interagency conference call that includes both the FBI and CDC, along with other Federal agencies.

2. If the incident is announced (not the product of intelligence) and the threat is not credible, a senior elected official from the jurisdiction involved in the incident, along with supporting law enforcement personnel, will likely make a public statement concerning the incident and the hoax. Law enforcement personnel will also initiate a criminal investigation to find and prosecute the perpetrator.

3. If the incident is deemed credible, local public health officials should be notified so that they can begin to activate their response and initiate expanded disease surveillance to be alert for disease resulting from this potential event.

4. Response officials should also determine if an infectious release has actually taken place. Even if the release is questionable, expanded disease surveillance should continue to monitor for signs of increased disease.

5. If no Major Public Health Event has occurred and the incubation period has expired for the disease agent suspected, then an investigation should be undertaken to determine what occurred. The action indicators (or triggers) should be reviewed to see if they have returned to normal levels. If not, expanded disease surveillance should continue. If the triggers have returned to normal levels, then the medical investigation should cease, and the public health system should return to normal surveillance (continuous disease surveillance).

6. If a Major Public Health Event has occurred, then the remaining portion of the BW Response Template would be applied in the same way as for an unannounced attack.

5. REVISED BW RESPONSE TEMPLATE

The BW Response Template (Figure 1, Appendix A) shows the response elements needed to respond to a biological attack. The detailed response activities associated with each element of the template are shown in Appendix B. These are formatted as worksheets that can be used by a community as a starting point to develop their local BW response strategy and actions. The sample activities in the worksheets resulted from the initial and subsequent workshops that developed and refined the BW Response Template. After defining their local strategy, a community would need to identify the resources required to implement their strategy. Response plans and lines of communication would need to be established to assure the availability of resources if a BW incident were to occur.

6. CONCLUSIONS

The BW Decision Tree and BW Response Template, taken together, provide a picture of what is likely to be required to successfully respond to a BW terrorist incident. The decision tree may serve as an aid in identifying and tracking the difficult but necessary decisions that must be made during an ongoing large-scale medical emergency. The response template provides structure to the response strategy and includes example response activities.

The multiple workshops and ongoing peer-review of the decision tree and template have given credence to these concepts. However, every community should adapt these tools to their unique situation. Since the BW response strategy is applicable to any large-scale medical emergency such as a natural disease outbreak, preparations for BW terrorism can provide an opportunity to better prepare for serious but more likely incidents (i.e. influenza outbreak).

APPENDIX A

DECISION TREES

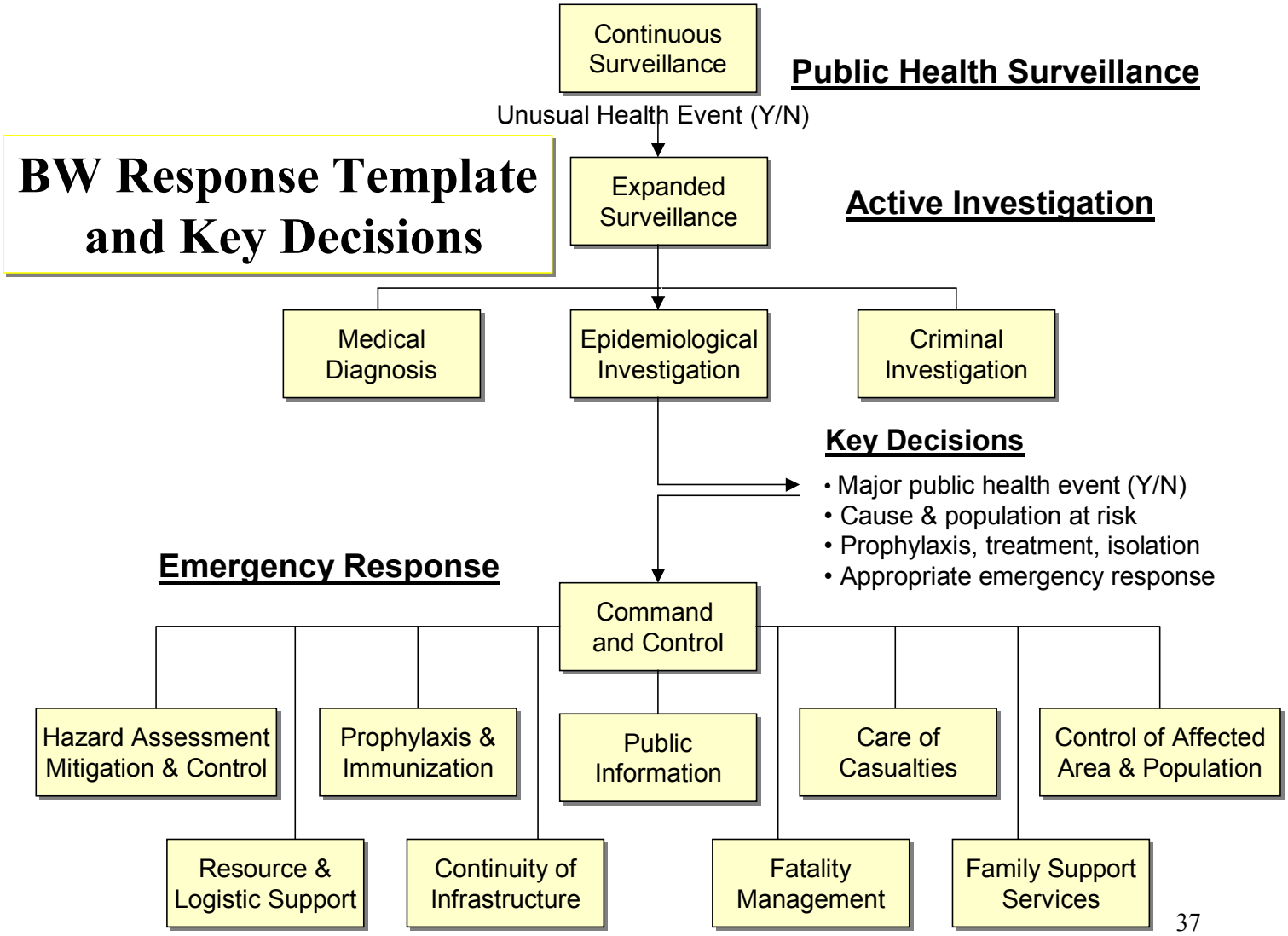
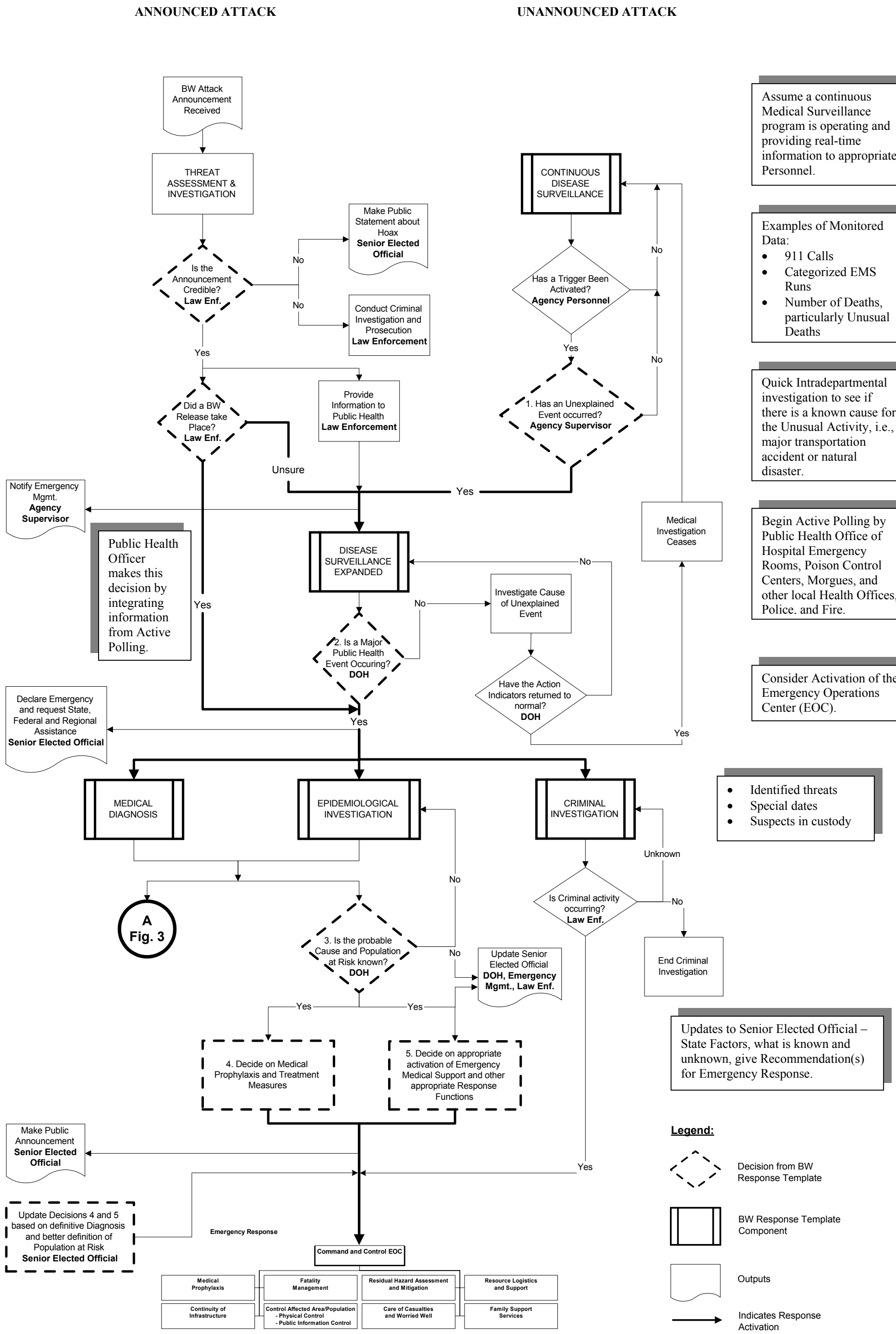


Figure 1 BW Response Template and Key Decisions

FIGURE 2. BW Response Decision Tree



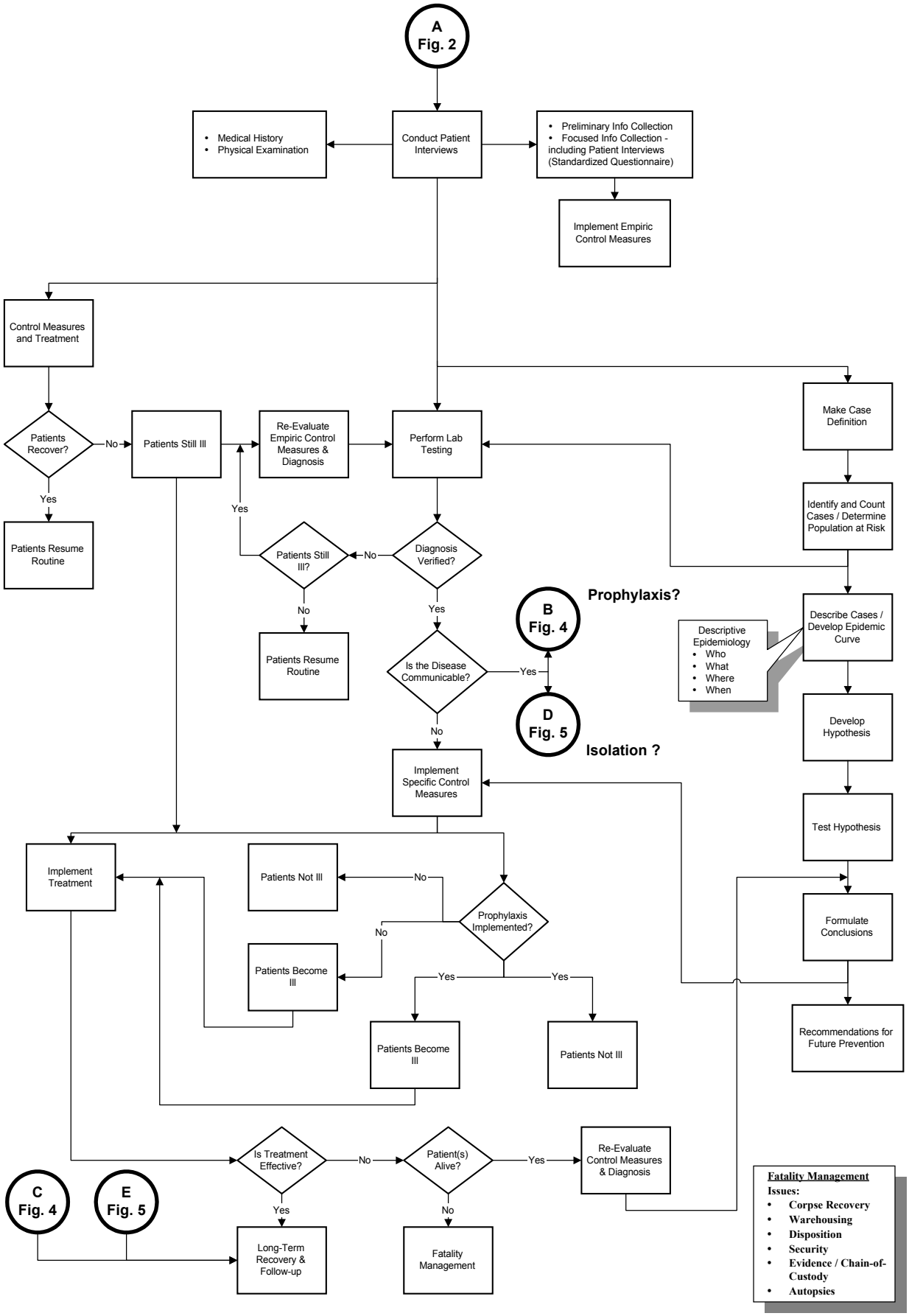


Figure 3: Medical/Public Health Decision Tree – Epidemiological Investigation

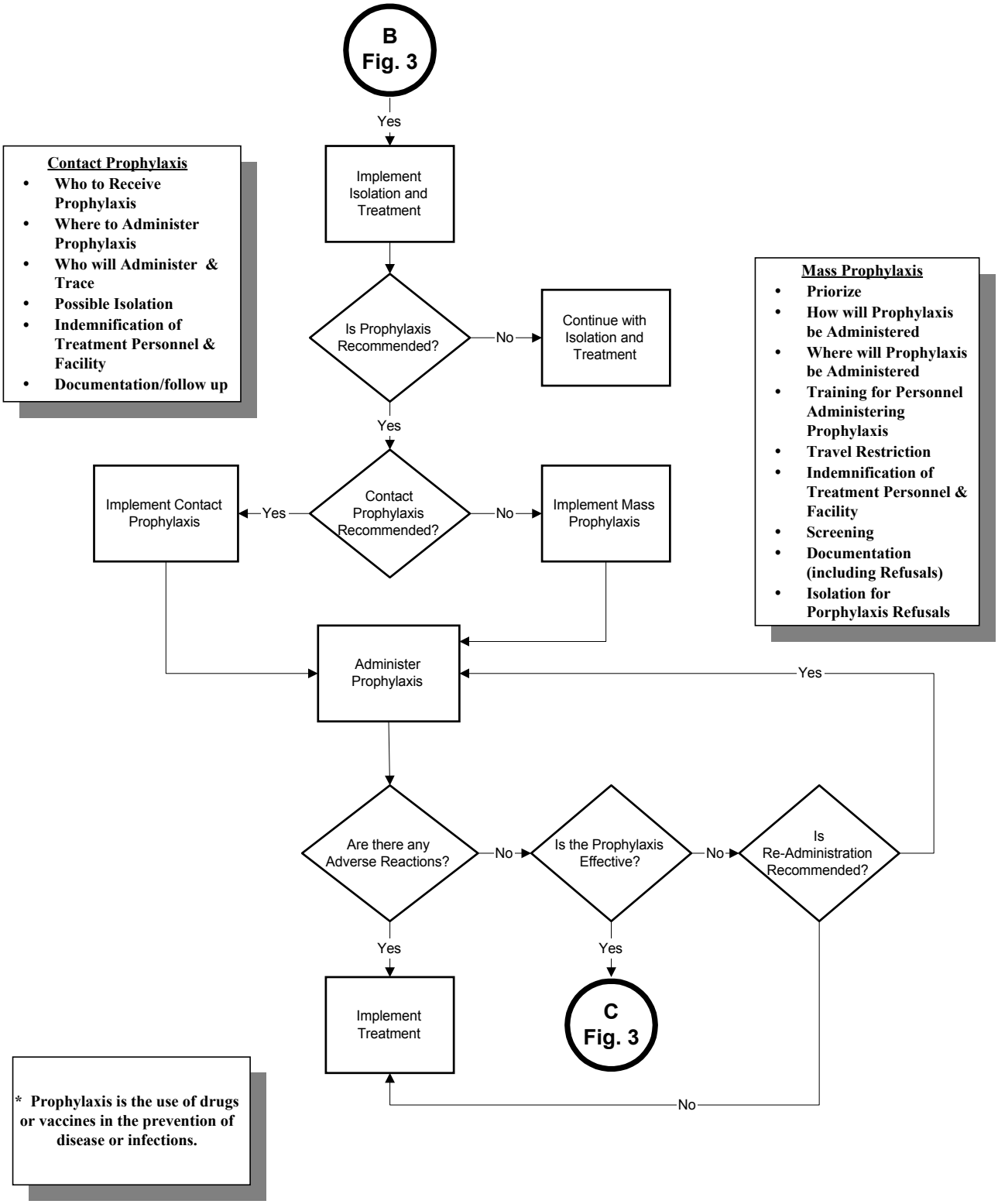


Figure 4. Prophylaxis* Decision Tree

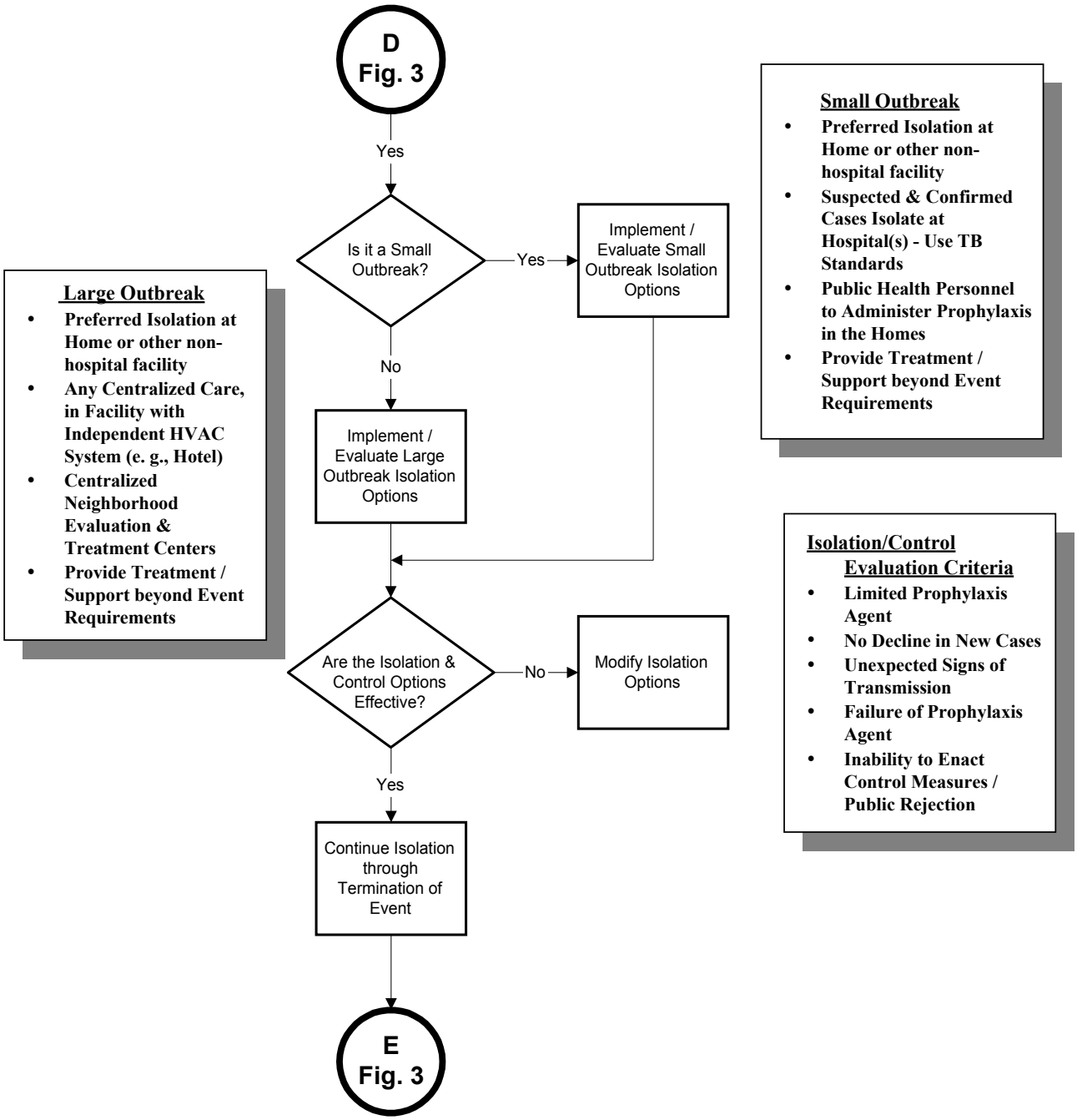


Figure 5. Isolation Decision Tree