

**RAND**

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**Understanding and Preparing for the Psychological Consequences of Bioterrorism**

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**EXECUTIVE SUMMARY**

The tragic attacks of September 11, 2001, and the persistent threat of future terrorism demonstrate the importance of preparing our nation for more effectively countering and responding to the threats posed by terrorists. Bioterrorism, in particular, poses unique challenges for government officials charged with devising prevention and response plans, and raises important questions regarding the ability of the public health system to respond to such attacks. Although the federal government has undertaken unprecedented efforts to rapidly increase our nation's ability to respond to a bioterrorism event, the psychological and mental health aspects of bioterrorism have received relatively little national or local policy attention. This issue paper describes some of the major challenges that the psychological consequences of a bioterror attack will pose, and proposes specific strategies for dealing effectively with those challenges. The information should prove useful for a wide range of policymakers attempting to develop state and local response strategies that effectively meet the psychological needs of multiple populations in the event of a bioterror attack.

**SETTING THE CONTEXT: WHAT IS THE DIFFERENCE BETWEEN TERRORISM AND BIOTERRORISM?**

A common theme among definitions of terrorism is the recognition that a terrorist event is intended to have a psychological effect beyond the physical damage caused by the event itself. Terrorism attacks can take different forms, including conventional, chemical, biological, radiological, and nuclear. Bioterrorism is the use of biological agents in terrorism. When considering the psychological effects of bioterrorism, the distinction between those agents that are easily transmissible and those that are not is of particular importance. Other factors likely to impact the psychological response will include the level of familiarity with the agent, its potential to cause mass casualties, and the effectiveness of available treatment interventions.

Many of the psychological consequences of a terrorist event will be similar to those of other traumatic events. Individuals most likely to be affected include those who are: directly harmed by the event; witnesses to the event or in close physical proximity to it; exposed to traumatic situations as a result of their attempts to assist victims of the event; and/or at greater personal risk for developing psychological symptoms. But terrorism may be more likely than other traumatic events to cause a psychological reaction in individuals far from the attack because of their own concerns about being at risk. Bioterrorism, in particular, differs from other types of terrorist events in its presentation and effect on a population (see Table 1). The novelty of biological weapons, the uncertainty in determining whether an attack has occurred and the scope of that attack, the possibility that one may unknowingly have been a target of the attack, and the possibility of contagion all may increase the level of fear and anxiety in the event of a bioterror attack.

Table 1: Distinctions Between Terrorism and Bioterrorism

	<b>Terrorism</b>	<b>Bioterrorism</b>
(1) Speed at which attack results in effect	Immediate	Prolonged
(2) Site of attack	Specific	Unknown
(3) Knowledge of attack boundaries/scope	Well understood	Unknown
(4) Familiarity with means of attack	High	Low
(5) Distribution of affected patients	Concentrated area	Geographically dispersed
(6) Decontamination of victims and environment	Confined environment	Geographically dispersed
(7) Isolation/quarantine	Not usually necessary	Required for transmissible diseases
(8) Medical interventions	Trauma, first aid	Antibiotics, vaccines

The lack of information and uncertainty about the psychological effects of bioterrorism complicates the task of state officials who have been charged with developing mental health plans as part of their overall state preparedness for future terrorist attacks. At the same time, the manner in which response plans are implemented and communicated might generate or mitigate fear and anxiety in various populations. Clearly, understanding how to manage the psychological consequences of bioterrorism is critical to developing and implementing realistic and appropriate response strategies.

## STUDY METHODOLOGY

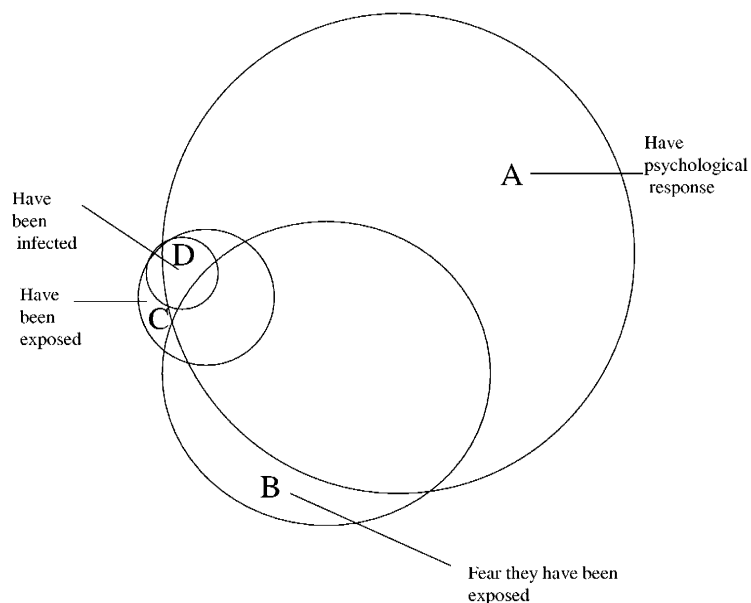
This study draws on information related to community-wide trauma, terrorism, bioterrorism, and other potential bioterrorism analogs culled from four literature sources: peer-reviewed articles, government reports, web-based information, and published conference proceedings. To complement the review of the literature, interviews were conducted with experts in two areas: 1) those with prior clinical and research experience with assessing and treating psychological/psychiatric consequences of terrorism and disasters; and 2) senior operational decision makers with expertise and experience in devising and implementing disaster and terrorism response plans and strategies. This information is incorporated in the findings and conclusions of the report.

Given the lack of any actual data currently available on the mental health consequences of bioterrorism per se, our analysis uses the information obtained through the literature review and expert interviews to understand how the expected psychological consequences of bioterrorism are likely to compare to the known consequences of mass violence and conventional terrorist attacks, and other bioterrorism analogs (e.g., industrial accidents/chemical terrorism and infectious disease outbreaks). The findings are organized in a conceptual framework that considers specific victim populations affected and their experiences over the course of an event.

A similar framework is used to consider the needed critical capacities (strategies and resources) for addressing these psychological consequences and to discuss issues for future research.

### DEFINING THE VICTIMS OF TRAUMA: WHO SHOULD WE BE MOST PREPARED TO HELP IN THE EVENT OF A BIOTERROR ATTACK?

For any traumatic event, a range of populations can be thought of as having different levels of exposure. Using a modified version of Kron et al's delineation model, we characterize what the literature has revealed about the psychological aspects of bioterrorism for four populations of interest: direct victims, responders, vulnerable populations, and the general public. As Figure 1 suggests, identifying these specific victim populations and understanding who is likely to experience psychological consequences will be particularly challenging. Many people will have psychological reactions to the event; a significant number will think they have been exposed to the bioterror agent; fewer will actually have been exposed; and only a subset of these will actually have been infected. Determining who belongs to what group will be complicated by additional uncertainties about the start and end of the traumatic event, and how to distinguish between the neuropsychiatric effects (particularly cognitive and behavioral responses) of biological/chemical agents and typical early psychological responses to trauma (e.g., shock, anxiety, and confusion).



## UNDERSTANDING THE PSYCHOLOGICAL EFFECTS OF TRAUMATIC EVENTS ON DIFFERENT POPULATIONS

Much has been written about the range of mental and behavioral effects that can be expected in the immediate aftermath of traumatic events, including emotional, cognitive, somatic or biological, and behavioral responses. Many of these same responses have been identified on a community-wide basis following other large-scale traumatic phenomena. In the case of man-made mass violence, such as shootings and terrorism, the psychological consequences are frequently more severe given the deliberately intentional malevolence of the events.

For bioterrorism in particular, the consequences are less clear, and will vary along multiple dimensions, including time, type of event, individual risk and protective factors, and individual roles in relation to the event. We summarize what is known about the psychological impact of community-wide trauma across our four populations of interest.

***Direct Victims:*** Direct victims of a traumatic event typically experience a range of emotional and psychological reactions, reflecting changes in symptoms over time. As victims progress through these phases, opportunities for active coping and supportive interventions exist and promote psychological recovery. Disaster research has found that mass violence is the most psychologically disturbing type of disaster, with up to two-thirds of those directly exposed experiencing some degree of psychological impairment. Direct victim populations exposed to mass violence and conventional terrorism have been shown to experience PTSD, anxiety disorders, depression, and substance use problems.

***First Responders:*** First responder groups may be called upon to enter dangerous environments where their own health and well-being may be potentially harmed and where they may witness mass carnage and destruction, all of which can have a severe psychological impact. Secondary traumatic stress resulting from helping or wanting to help a traumatized person is also common among individuals in these groups, placing them at risk for PTSD or other stress-related disorders. Several emotional and behavioral consequences, including interpersonal problems, difficulty sleeping, and anxiety are also more common. In a bioterrorism event, 'victims' will present at hospitals, doctors offices, and community clinics. As such, the first responders will likely include emergency room physicians and nurses, community-based physicians, clinic staff, as well as more traditional first-responders. With the increasing attention on bioterrorism preparedness since September 11<sup>th</sup>, these health care providers are becoming increasingly aware of their new role as a first responder, however, they have not traditionally been on the front-lines in a disaster. Given that responders to a bioterrorism event may not benefit from the same protective and resiliency factors common among the traditional first responder community, and that such an event will undoubtedly take time and involve a great deal of uncertainty, fear and anxiety are likely to be at extremely high levels among first responders.

***Vulnerable Populations:*** Two populations particularly vulnerable to the psychological impact of mass violence and terrorism are children and those with current psychiatric disorders. Previous disaster research with children has indicated the importance of children's subjective appraisal on their reactions to trauma, including their initial emotional response and perceived life threat. Individuals with current and prior psychiatric illness may also have an increased

vulnerability to the severe emotional and behavioral consequences of terrorism. However, the literature has provided very little data on the potential impact of such events on these individuals.

**General Public:** Research studies following the September 11 attacks have underscored the importance of understanding the psychological impact of large-scale traumatic events on individuals with little or no direct exposure to them. They also highlight the need to develop a range of responses for detecting, treating, and managing the psychological consequences of such an event across various subsets of the general population.

To better understand the major psychological and psychiatric consequences associated with specific traumatic events that may bear some relevance to the probable mental health impact of bioterrorism, we present relevant findings for each victim group across three categories/types of trauma: international mass violence/ conventional terrorism, industrial accidents/chemical terrorism, and infectious disease outbreaks. A synthesis of this information reveals that those most directly affected and those with personal characteristics that put them at risk are most likely to have severe psychological reactions to a bioterror event, but that a much larger group of individuals may experience fear and anxiety that may significantly influence their behavior.

#### PREPARING FOR AND RESPONDING TO THE MENTAL HEALTH CONSEQUENCES OF BIOTERRORISM

In the aftermath of other major terrorist events, community-oriented responses have been instrumental in managing the psychological consequences experienced by victims and others requiring assistance. However, the role of such efforts in the immediate aftermath of a bioterrorism event is less clear. Certainly, informing members of the general public about how they can protect themselves before and immediately after an outbreak has been detected will be of critical importance.

Overall strategies for preparing and responding to large-scale traumatic events can be organized according to targeted population and the phase of the bioterrorism event. These strategies can be divided into two categories with two distinct yet overlapping goals: (A) to provide for immediate psychological management to allow for effective public health response strategies (e.g., by mitigating or preventing mass anxiety and fear; as well as unnecessary demands on the health care system); and (B) second to reduce both short and long term psychological morbidity. While many of the efforts identified in this report comprise the traditional emergency response to a disaster, we highlight the need to adapt and apply these strategies to other populations that may not be included in the traditional emergency response system.

In addition, more specific training will be required for the special provider groups who will play a critical role in responding to the diverse psychological needs that are likely to arise across a variety of populations and in preventing and/or mitigating a more severe response.

**Primary Care Providers:** During the acute phase of a bioterror attack, emergency department clinicians and primary care providers (PCPs) may be called upon to: manage widespread public fear and anxiety about the potential for infection and contagion, illness severity, and risk of death; provide psychological support to large and varied victim groups; and deal with their own

personal mental health response. During the long-term phase, they will need to help all victim groups cope with ongoing and varying levels of stress and trauma, and manage the full recovery of patients with illnesses that are not well understood. Preparing and supporting PCPs to meet these challenges will require building new partnerships between local and state public health structures and coordinating with national organizations. Although the relationship of patients with PCPs is different than that of the relationship with ED clinicians, in both cases clinicians who more commonly focus on the physical health of patients will need to be able to address individuals fears and anxieties as part of responding to their somatic complaints.

***Mental Health Specialists:*** The involvement of those familiar with psychological and psychiatric issues will also be critical to all phases of local and state level bioterrorism preparedness planning. In the preparation and planning phases, these individuals can provide assistance in devising appropriate risk communication strategies; developing educational materials that are sensitive to risk perception and emotional and cognitive responses and processing; and training/educating emergency response personnel about detecting and effectively treating traumatic responses. During the acute management phase of a bioterrorism event, trained mental health professionals can be part of the response team to assist with diagnosis of neuropsychiatric complications associated with some biological agents as well as the differential diagnoses between psychosomatic symptoms and actual symptoms. Over the longer term, they can provide appropriate and effective interventions for direct victims and others who experience psychological distress, including members of the general population. A few specific issues with respect to mental health specialists require further consideration by federal, state and local preparedness planners: workforce size and training requirements for disaster response and bioterrorism specifically; the mental health treatment system surge capacity to handle psychological casualties; the need for effective interventions to address needs of different victim populations.

***Informal Care Providers and Community Organizations:*** In the event of a bioterror attack, informal providers will be instrumental in providing information and support to victims and their families, and helping to manage the psychological consequences. *Schools* will be in a unique position to provide grief counseling, reassure students of their safety, and monitor students with severe stress reactions. *Worksites* provide a further opportunity for individuals to express concerns and receive information following a terrorist or bioterrorist incident. If response strategies include isolation of employees or quarantine of buildings, employers will need to understand their role in implementing a public health response as well as managing the psychological consequences of the event and the response. *Clergy*, cited as one of the most frequently sought source of help in surveys conducted after the September 11 attacks, represent another important source of informal care provision. Response planners should consider how churches and religious organizations can work together to manage the psychological consequences of bioterrorism, when individuals may either be encouraged to not attend public gatherings or when there is widespread anxiety among community members.

Responding to the psychological consequences of bioterrorism will cross these three sectors, however, the mental health response to disaster and terrorism is often and will likely continue to be embedded within a complex and not well specified set of relationships between these three sectors. The current relationships between these sectors is complicated by historical, structural,

practical and financial barriers. Implementing any future bioterrorism response will require an understanding of the current relationship and barriers such that any specific interventions can take overcome existing barriers and encourage integration where possible and feasible.

Given the multiple points of service provision required to respond to the psychological consequences of a bioterrorism event, decisions regarding the allocation of resources across sectors are complicated. . However, at this stage, it is more important that multiple groups/organizations are involved in planning and training for bioterrorism response. In particular, response planners should consider schools, employers, and religious organizations as an outlet and convening mechanism for conveying public health information more broadly to parents, students, workers, and other members of the community. Clearly, it will be important for response planners to think about how to utilize these informal care/support networks most effectively during a bioterrorism event.

Critical tools and intervention strategies for managing the psychological consequences of bioterrorism will include creating effective communication systems, building close working relationships and collaborations, and developing efficacious clinical intervention techniques.

## **CONCLUSION: THE PSYCHOLOGICAL IMPERATIVE**

The public health system must be prepared for the likelihood of a future biological or chemical terrorist attack and have strategies in place to minimize the consequences of such an event. Initial preparation should include partnering and coordinating with a variety of agencies involved in a bioterror attack, including emergency responders, health care providers, and other health care personnel. Implementing an effective communication system will be essential to avoiding panic and disorder among the public. State and local health departments should consider developing a three-prong approach similar to that used by the FEMA model for preparing the public for an emergency, which includes educational, preparedness, and action components. Finally, public health systems need to address the mental health consequences of a bioterror attack, as well as the health issues faced by a civilian population living with the new and constant threat of biological and chemical terrorism.

Based on our review of the literature and expert interviews, we offer the following set of priorities for funding, research, and development:

- Design and testing of effective preparedness, detection/management, and intervention strategies that are sensitive for different roles and different populations.
- Use of risk communication strategies during all phases of preparedness and response by local community leaders, as well as by state and federal officials.
- Appropriate planning, training/exercise, and funding for bioterrorism response. Such plans and exercises should include strategies for preparing and responding to the psychological aspects of the event, but should also include representatives from the informal care providers and community organizations as well as the psychological response community.