

## **Bioterrorism: Our Frontline Response—Evaluating U.S. Public Health and Medical Readiness**

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Good morning, Mr. Chairman and members of the Committee:

I am Dr. D.A. Henderson, Professor of Epidemiology and International Health and Director of the Center for Civilian Biodefense Studies at Johns Hopkins University. My involvement in counter terrorism activities dates back to 1990-93 when I served as Science Adviser to President Bush and subsequently during my tenure as Deputy Assistant Secretary and Senior Science Advisor in the Department of Health and Human Services. I continue to serve on a variety of consultant panels to the DOD and the intelligence community.

Why now the concern? Over the past four years, concerns about terrorism, and bioterrorism in particular, have increased sharply. Three events, in particular, are seen as having been of special significance. First was the sarin gas attack in Tokyo in 1995 perpetrated by the apocalyptic religious cult, Aum Shinrikyo, whose intent was to kill tens to hundreds of thousands of persons. Sarin gas, however, was used only after several failures in efforts to disseminate anthrax and botulinum toxin. The cult is still a legal, operative entity with substantial commercial revenue.

Second was the discovery in 1995 that, however threatening Iraq's bioweapons capability had been thought to be, new documents revealed that it was far more advanced and extensive than had been appreciated. Finally, an appreciation of the scope and sophistication of a Soviet bioweapons program became increasingly available during the 1990s with the defection of senior bioweapons officials. They revealed that the program had consisted of at least eight major research and production facilities employing 60 000 persons. The production capacity is said to be on the order of many tons of each of several agents each year with special attention having been given to anthrax, smallpox and plague. The complement of personnel has substantially decreased over recent years but where the professionals have gone is unknown. Meanwhile, upwards of 10 different countries are believed to be developing their own capacities to produce and disseminate bioweapons.

A Presidential Decision Directive in June 1995 provided for a broad mobilization within federal agencies to begin to counter the threat; substantial special funding was provided in the 1997 Defense Against Weapons of Mass Destruction Act. However, discussions about the implications of this threat and its possible scenarios were confined primarily to those in the military, diplomatic, law enforcement and intelligence communities and to those concerned with arms reduction issues. Only recently have the civilian medical and public health communities begun to be engaged in examining the practical challenges posed by this threat.

## **The Unique Nature of the Biological Threat**

Of the weapons of mass destruction, the biological ones are the most greatly feared but the country is least well prepared to deal with them. So far, virtually all federal efforts in strategic planning and training have been directed toward crisis management after a chemical release or an explosion. Should such an event occur, plans appropriately call for so-called "first responders" -- fire, police, and emergency rescue workers-- to proceed to the scene. There, with the FBI assuming lead responsibility, they are expected to stabilize the situation, to deal with casualties, to decontaminate, and to collect evidence for identification of a perpetrator. This is an important function and one not unfamiliar to civilian authorities because of the fact that spills or releases of hazardous materials, explosions, fires and other civil emergencies are regularly recurrent events in every major urban area.

A bioterrorist event presents an entirely different scenario, one that is alien to civil authorities. Epidemics of serious diseases such as could be anticipated are wholly unknown to American cities. Unlike an explosive or chemical event, the bioweapons release would be silent and almost certainly undetected. The aerosol cloud would be invisible, odorless and tasteless. It would behave much like a gas in penetrating interior areas. No one would know until days or weeks later that anyone had been infected. Then, patients would begin appearing in emergency rooms and physicians' offices with symptoms of a strange disease that few physicians had ever seen. There would be no sudden alarm calling for action within minutes to hours on the part of "first responders". In fact, the "first responders" would not be fire and law enforcement staff but public health and medical personnel.

## **Responses Following a Bioweapons Attack**

Special measures would be needed for patient diagnosis, care and hospitalization, for laboratory confirmation regarding the identity of microbes unknown to most laboratories, for providing vaccine and perhaps antibiotics to large portions of the population, and for identifying and possibly quarantining patients. Trained epidemiologists would be needed to identify where and when infection had occurred, so as to identify how and by whom it may have been spread. Public health administrators would be challenged to undertake emergency management of a problem alien to their experience, in a public environment where epidemics of pestilential disease are unknown, and in an environment where the potential for panic is high.

In brief, the personnel that are required, the skills that they must have and the strategies to be employed are unique. The common assumption that chemical and biological threats are generically so similar that they can be readily handled by multi-purpose "chembio" experts is clearly absurd. However, until very recently, none of the relevant medical and public health groups had been meaningfully involved in assessing risks, nor in planning for appropriate civilian responses, nor in training, nor in defining research and development needs.

## **The National Initiative**

I was extremely pleased last year when for FY99, HHS was given an appropriation of \$133 million of which \$51 million is intended for an emergency stockpile of antibiotics and vaccines. Other funds were allocated to the CDC, primarily for planning purposes, for the strengthening of the infectious disease surveillance network and for enhancing the capacity of federal and state laboratories. Planning for and implementation of that initiative has only just begun. The appropriation represented an important although still modest sum of money, considering the needs of a fragile public health infrastructure extending over 50 states and at least 120 major cities.

The provision of funds to HHS is consonant with the belief that the critical element for coping with bioterrorism is a strengthened public health and infectious disease infrastructure. An augmented full-time cadre of professionals at the state and local level would represent, for biological weapons, a counterpart to the National Guard Rapid Assessment and Initial Detection Teams for chemical weapons. However, the augmented capabilities to deal with a bioterrorist event would not be on a standby status to be employed only in the case of an emergency. Rather, they would be key performers in strengthening our efforts to deal with such as new and emerging infections, food-borne diseases and growing antibiotic resistance.

## **The Major Threats**

In theory, any infectious organism could be used as a biological weapon. Most agents, however, cause only mild illness or no clinical symptoms at all and many would be difficult or impossible to grow in quantity and to disperse widely. Before a reasonable plan for prevention and response to a bioterrorist threat could be developed and training initiated, it was necessary to assess the relative threats posed by different agents and to reach consensus as to the appropriate measures to be taken. Under the aegis of the Johns Hopkins Civilian Biodefense Studies Center, such an assessment was begun some nine months ago by a working group comprised of experts from federal, state and local institutions as well as academia.

Six organisms were identified as posing a sufficiently serious threat as to potentially cause major medical problems and social disruption throughout a large community. These were smallpox, anthrax, plague, botulinum toxin, tularemia and a hemorrhagic fever agent such as the Ebola or Marburg virus.

By far, the two of greatest concern are smallpox and anthrax. Both are associated with high case fatality rates when dispersed as an aerosol. For smallpox, the case-fatality rate is 30%; for anthrax, above 80%. There is no immunity against anthrax in the population and virtually none against smallpox. Both agents have other advantages in that they can be grown reasonably easily and in large quantities and are sturdy organisms that are resistant to destruction.

They are thus especially suited to aerosol dissemination to reach large areas and numbers of people. Smallpox has the added attribute of being able to spread further from person to person.

The working group supported the view that reserve stockpiles both of anthrax and smallpox vaccines should be produced and that a stockpile of antibiotics should be created to deal with anthrax. The group believed that the possible development of second generation vaccines for both diseases should be explored as a matter of urgency. Reviews of both of these diseases as well as plague have been completed and documents setting forth the consensus views of these experts will be published in a major national publication beginning in May. Other documents detailing the threat and response for the other agents will follow.

Over the past year, personnel from the Hopkins Center have made more than 50 presentations, on the request of professional organizations and hospitals, to acquaint them with the realities of the threat of bioterrorism and to discuss initiatives that need to be taken. In February, a two-day National Symposium on bioterrorism, sponsored by the Hopkins Center, DHHS and 12 other sponsoring organizations, took place in Washington. It was the first of its kind directed to a public health and medical audience. The response was so great that registration had to be closed at some 950 participants many days before the Symposium convened. At this time, I believe it is reasonable to conclude that there is a markedly heightened concern and desire on the part of the medical and public health community to take a far more active role in the nation's preparedness.

## **A Look to the Future**

Biologists, especially those in medicine and public health, are as critical to confronting the problems posed by biological weapons as are physicists in dealing with nuclear threats and chemists with chemical weapons. There is a need to expand the discussion regarding the salient issues both at national and local levels, to recruit the interest and commitment of scientists in devising strategy, in undertaking needed research and in the complex planning process which is needed to blend together the very diverse array of institutions, both public and private in coherent local, state and federal plans.

Plans for dealing with large numbers of patients, including those who require isolation will have to be elaborated on a regional basis and plans developed for emergency care facilities, for decontamination procedures, for dispensing rapidly large quantities of vaccine and antibiotics, for rapid and secure communications, for informing the media and the public in a timely manner, for provision of mental health services and for emergency mortuaries.

Developing the experts and expertise will require a major educational effort, given the variety of specialists that are needed and the now virtual absence of knowledgeable and experienced specialists. There is a need to train primary care physicians and emergency room personnel in early recognition of the most important disease threats. Infectious disease specialists and hospital epidemiologists must also become versed in case recognition and in steps to take if a suspicious case is detected. There is a need for trained laboratory directors and key staff in laboratories with designated responsibilities for lab diagnoses. Moreover, state and local health officers and epidemiologists require training in, among other things, detection, surveillance and management of epidemic disease. Such an effort will require the full participation of professional organizations as well as those in the public sector and in academia.

Last but not least, it will be important to recruit the help of the medical and public health community in longer term measures that may prevent acts of terrorism. This would include strengthening the provisions of the Biological Weapons Convention Treaty and expanding our intelligence capabilities so as to anticipate and perhaps interdict terrorists. The fostering of international cooperative research programs to encourage openness and dialogue as is now being done with Russian laboratories is also important.

The possible role of the medical community in educating peoples and policymakers everywhere about the dread realities of bioterrorism has also been proposed as a parallel effort to an earlier initiative that proved so effective in clarifying the disastrous consequences of a nuclear war.